



# T K R COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

## B.TECH. COMPUTER SCIENCE AND ENGINEERING-R17 COURSE STRUCTURE & SYLLABUS

### IV YEAR I SEMESTER

S.No	Course code	Course Title	L	T	P	Credits
1	A57PC1	Network Security & Cryptography	4	0	0	4
2	A57PC2	Linux Programming	4	1	0	4
3	A57PC3	Machine Learning	3	1	0	3
4	A57PE4	1. Introduction to Big Data Analytics 2. Information Security Assessment and Audits 3. Mobile Computing	3	0	0	3
5	A57PE5	1. Internet Of Things 2. Design Patterns 3. Advance Computer Architecture	3	0	0	3
6	A57PE6	1 Software Process and Project Management 2. Computer Forensics 3. Information Retrieval Systems	3	0	0	3
7		Open Elective-3	3	1	0	3
8	A57PC8	Linux Programming Lab	0	0	4	2
9	A57PE8	Cutting Edge Technologies Lab	0	0	4	2
<b>Total Credits</b>						<b>27</b>

### IV YEAR II SEMESTER

S.No	Course code	Course Title	L	T	P	Credits
1		Open Elective-4	3	0	0	3
2	A58PE2	1. Introduction to Predictive Analytics 2. Storage Area Networks 3. Information Security Incident Response and Management.	3	0	0	3
3	A58PE3	1. Adhoc Sensor Networks 2. E-Commerce 3. Human Computer Interaction	3	0	0	3
4	A58PW4	Industry Oriented Mini Project	0	0	0	2
5	A58SC5	Seminar	0	0	6	2
6	A58CV6	Comprehensive Viva	0	0	0	2
7	A58PW7	Major Project	0	0	18	9
<b>Total Credits</b>						<b>24</b>



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE AND ENGINEERING –R17**

**NETWORK SECURITY & CRYPTOGRAPHY -A57PC1**

**B.Tech IV Year I Semester**

**L/T/P/C**  
**4/0/0/4**

**COURSE OBJECTIVE:**

Learn the Network security and cryptographic algorithms.

**COURSE OUTCOMES:** After completion of the course student will be able to

1. Learn the security concepts and conventional encryption techniques – L2
2. Contrast and compare symmetric and asymmetric algorithm –L4
3. Generate authentication for information and learn the authentication applications- L6
4. Analyze web and email Security Concepts.- L4
5. Analyze the IP security mechanisms and design the intrusion detection systems.–L5

**UNIT I:**

**SECURITY CONCEPTS**

Introduction, security trends, OSI Architecture, security attacks, security services, security mechanism, A Model for Network Security.

**CRYPTOGRAPHY CONCEPTS AND TECHNIQUES**

Introduction, Plain Text and cipher text, substitution techniques(Caesar cipher, Playfair cipher, Hill cipher), transposition techniques, steganography.

**UNIT II:**

**SYMMETRIC KEY CIPHERS**

Block Cipher principles, DES, AES, Block Cipher Modes of Operation, Stream ciphers, RC4.

**ASYMMETRIC KEY CIPHERS**

Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic and Cryptography.

**UNIT III:**

**CRYPTOGRAPHIC HASH FUNCTIONS**

Authentication requirements and Functions, Message Authentication Code, Secure Hash Algorithm (SHA- 512), Message authentication codes: HMAC, CMAC, Digital signatures,

**AUTHENTICATION APPLICATIONS:** Kerberos, X.509 Authentication Service, Public – Key Infrastructure

**UNIT IV:**

**WEB SECURITY**

Web security considerations, Secure Socket Layer, and Transport Layer Security, Secure Electronic Transaction.

**E-MAIL SECURITY**

Pretty Good Privacy, S/MIME

**UNIT V:**

**IP Security:** IP Security overview,

IPSecurity architecture,

Authentication Header, Encapsulating security payload, combining security associations, Key Management.

**SYSTEM SECURITY**

Intruders, Intrusion Detection, Password Management

**TEXT BOOKS**

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

**REFERENCE BOOKS**

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning



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**B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17**

**LINUX PROGRAMMING - A57PC2**

**B.Tech IV Year I Semester**

**L/T/P/C**  
**4/1/0/4**

**COURSE OBJECTIVE:**

Understand and make effective use of LINUX utilities and shell scripting.

**COURSE OUTCOMES:**

**After completion of course the student is able to**

1. Understand the basic commands of LINUX operating system and shell scripts. – L2
2. Learn and understand file system concepts and directories. – L2
3. Apply the necessary skills to understand process concepts and signal management. – L3
4. Design APIs for messages and semaphores. L5
5. Develop the network programs using sockets. L5

**UNIT I:**

**LINUX UTILITIES**

An Introduction to Linux, General-purpose utilities, File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text Processing utilities and Backup utilities, the vi- editor. sed- scripts, operation, address, commands, applications, awk- execution, fields and records, scripts, operations, patterns, actions, associative arrays, string and mathematical functions, system commands in awk, applications.

**SHELL PROGRAMMING WITH THE BOURNE AGAIN SHELL (BASH)**

Introduction, shell responsibilities, pipes and Redirection, Here documents, Running a shell scripts, The shell as a programming language, Shell meta characters, File name substitution, Shell variables, Command substitution, Shell commands, The environment, Quoting, Test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts

**UNIT II:**

**FILES**

File Concept, File types ,File system Structure, File meta data – Inodes, Kernel support for files, System calls for file I/O operations – open, create, read, write, close, lseek, dup2. File status information – stat family, file and record locking, fcntl function, file permissions – chmod, fchmod, file ownership- chown, lchown, fchown, Links – Soft links & hard links – symlink, link, unlink.

**DIRECTORIES:**Creating, removing, changing directories – mkdir, rmdir, chdir, obtaining current working directory – getcwd, directory contents, scanning directories – opendir, readdir, closedir, rewinddir function

### **UNIT-III: PROCESS**

Process concepts, layout of a C program image in main memory, process environment – environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control- process creation, replacing a process image, Waiting for a process, process termination, zombie process, orphan process, system call interface for process management – fork, vfork, exit, wait, waitpid, exec family, process groups, session and controlling terminal, difference between threads and processes.

### **SIGNALS**

Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, Kill, raise, alarm, pause, abort, sleep functions.

### **UNIT-IV: INTER PROCESS COMMUNICATION**

Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes – creation, IPC between related processes using Unnamed Pipes, FIFOs – creation, IPC between unrelated processes using FIFOs(Named pipes), difference between named and unnamed pipes, popen and pclose library functions.

### **Message Queues**

Kernel support for messages, APIs for Message Queues, client/server examples.

### **Semaphores**

Kernel support for semaphores, APIs for semaphores, FILE locking with semaphores.

### **UNIT-V: Shared Memory**

Kernel support for Shared memory, APIs for shared memory, shared memory examples.

### **Sockets**

Introduction to Berkeley Sockets, IPC over a network, client/server model, Sockets Address Structure(UNIX Domain & Internet Domain), Socket System calls for connection oriented Protocol and connectionless protocol, Example client/server programs – single server-client connection, multiple simultaneous clients, socket options – setsockopt andfcntl system calls, comparison of IPC mechanisms.

### **TEXT BOOKS**

1. Unix concepts and Applications, 4th Edition, Sumitabha Das, TMH.
2. Unix System Programming using C++, T. Chan, PHI.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Willey India Edition.

### **REFERENCE BOOKS**

1. Linux System Programming. Robert Love, O'Reilly, SPD.
2. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX Network Programming, W.R.Steven, PHI.
4. UNIX for Programming and users, 3rd Edition, Graham Glass, King Ables, Pearson Edition.



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE AND ENGINEERING –R17**

**MACHINE LEARNING -A57PC3**

**B.Tech IV Year I Semester**

**L/T/P/C**  
**3/1/0/3**

**COURSE OBJECTIVE**

Formulate machine learning problems corresponding to different applications and range of machine learning algorithms along with their strengths and weaknesses.

**COURSE OUTCOMES: On completion of this course the student should be able to**

1. Illustrate the concepts of concept learning. L2
2. Apply decision trees learning, artificial neural networks and evaluation hypotheses for the machine learning problems. L3
3. Compare and contrast Bayesian, Computational and Instance-based learning techniques. –L4
4. Choose correct learning set of rules. –L4
5. Illustrate Reinforce learning task and Q Learning. L3

**UNIT-I:**

**INTRODUCTION** - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning

**CONCEPT LEARNING AND THE GENERAL TO SPECIFIC ORDERING –**

Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

**UNIT-II:**

**DECISION TREE LEARNING** – Introduction, 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.

**ARTIFICIAL NEURAL NETWORKS** – Introduction, Neural network representation, appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks.

**EVALUATION HYPOTHESES** – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses

**UNIT-III:**

**BAYESIAN LEARNING** – Overview of -Bayes theorem principle, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum Description Principle, Bayes optimal Classifier,

Gibbs algorithm, Naive Bayes Classifier.

**COMPUTATIONAL LEARNING THEORY** – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space,  
**INSTANCE-BASED LEARNING**- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

**UNIT-IV:**

**Learning Sets of Rules** – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, **Analytical Learning** - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation- Based Learning- Discovering new features,

**UNIT V:**

**Combining Inductive and Analytical Learning** – Motivation, Inductive- Analytical approaches to Learning, Reinforce learning task and Q Learning.

**TEXT BOOKS**

1. Machine Learning – Tom M. Mitchell, -MGH
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)

**REFERENCE BOOKS**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE AND ENGINEERING –R17**

**INTRODUCTION TO BIG DATA ANALYTICS - A57PE4**

**B.Tech IV Year I Semester**

L/T/P/C

3/0/0/3

**COURSE OBJECTIVE:** Understand the Big Data Analytics for Business, Big data tools, technologies & programming languages which is used in day to day analytics cycle.

**COURSE OUTCOMES:** After completing this course the student must able to

1. Explain the various concepts of data management. L2
2. Use the big data tools for decision making. L3
3. Compute descriptive statistics to understand the nature of the data. L3
4. Design Machine Learning Algorithms for prediction. L5
5. Use appropriate tools for data visualization. L3

**UNIT-I:**

**Data Management:** Design Data Architecture and manage the data for Analysis, Understand various sources of data like sensors/signals/GPS. Etc. Data management, Data Quality (noise, outliers, missing values, duplicate data) and Data preprocessing. Export All the data on to the cloud ex.AWS/RAKSPACE etc

**Maintain Healthy, Safe and Secure Working environment:** Introduction, Work safety, Report Accidents & Emergencies, Protect Safety & healthy as your Work, course conclusion , assessment.

**UNIT-II:**

**Big Data Tools:** Big data Tools like Hadoop, Spark, Impala et., Data ETL Process, identify the gaps in the data and follow up for decision making.

**Provide Data/Information in Standard Formats:** Introduction, knowledge management, Standardized Reporting and compliances, Decision Models, Course conclusion, assessment.

**UNIT-III:**

**Big Data Analytics:** Run descriptive to understand the nature of the available data, collate all the data sources to suffice business requirement, Run descriptive statistics for all the variables and observer the data ranges, outlier detection and elimination.

**UNIT-IV:**

**Machine Learning Algorithms:** Hypothesis testing and determining the multiple analytical methodologies, train model on 2/3 sample data using various statistical/machine learning algorithms, Test model on 1/3 sample for prediction etc.

**UNIT-V:**

**Data visualization:** Prepare the data for the visualization, use tools like Tableau, Qlickview and D3, Draw Insights of visualization tool. product implementation

**TEXT BOOK**

1. Student Hand book Associate Analytics.

**REFERENCE BOOKS**

2. Introduction to Data mining, Tan, Steinbach and Kumar, Addison Wesley, 2006
3. Data mining Analysis And Concepts M. Zaike and W. Meira  
:<http://www.dataminingbook.info/uploads/book.pdf>



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**B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17**

**INFORMATION SECURITY ASSESSMENTS AND AUDITS -A57PE4**

**B.Tech IV Year I Semester**

**L/T/P/C**  
**3/0/0/3**

**COURSE OBJECTIVE:** Provide management with an assessment of the effectiveness of the information security management function and evaluate the scope of the information security management organization and determine whether essential security functions are being addressed effectively.

**COURSE OUTCOMES:**

1. Discuss about Information Security Performance Metrics and Security Audits. L2
2. Identify Information Security Audit Tasks and Predict Post Auditing Actions. L2
3. Demonstrate Vulnerability Management functions. L4
4. Discuss about Vulnerability Assessment. L2
5. Describe Configuration reviews. L2

**UNIT-I:**

Information Security Performance Metrics And Audits: security metrics and reporting, common issues and variances of Performance Metrics, introduction to security Audits, Servers and Storage Devices, infrastructure and Networks, Communication Routes, information security Methodologies(Black-box, white-box, grey-box), phases of information security Audit and Strategies, ethics of an information security Auditor etc .

**UNIT-II:**

**Information Security Audit Tasks, Reports And Post Auditing Actions:** Pre-audit checklist, Information Gathering, Vulnerability Analysis, External Security Audit, internal Network Security Audit, Firewall Security Audit, IDS Security Auditing, Social Engineering security Auditing, Web Application Security Auditing, Information Security Audit Deliverables & Writing Report, Result Analysis, Post Auditing Actions, Report Relation etc.

**UNIT-III:**

**Vulnerability Management:** information Security Vulnerabilities-Threats and Vulnerabilities, Human-based Social Engineering, Computer-based Social Engineering, social Media countermeasures, Vulnerability Management- Vulnerability Scanning, testing, Threat Management, Remediation etc.

**UNIT-IV:**

**Information Security Assessment:** Vulnerability Assessment, Classification, types of Vulnerability Assessment, Vulnerability assessment Phases, Vulnerability Analysis stages, Characteristics of a good Vulnerability Assessment Solutions & Considerations, Vulnerability Assessment Records- Tools and Choosing a right Tool, Information Security Risk Assessment, Risk Treatment, Residual Risk, Risk Acceptance, Risk Management Feedback Loops etc.

**UNIT-V:**

**Configuration Reviews:** Introduction to Configuration Management, Configuration management Requirements-Plan-Control, Development of Configuration Control Policies, Testing Configuration Management etc.

**TEXT BOOKS:**

1. Assessing Information Security(strategies, tactics, logic and framework) by A Vladimirov, K. Garvrilenko, and A.Michajlowski
2. “The Art of Computer Virus Research and Defense by peterszor.”



# TKRC COLLEGE OF ENGINEERING & TECHNOLOGY

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## B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17

### MOBILE COMPUTING -A57PE4

B.Tech IV Year I Semester

L/T/P/C  
3/0/0/3

**COURSE OBJECTIVE:** The student should be able to develop mobile application by applying the concepts of mobile computing Paradigm, mobile networking infrastructure through popular GSM Protocol, issues and solutions of various layers of mobile networks, namely MAC layer, Network layer & Transport layer, database issues in mobile environments and data delivery models, adhoc networks and related concepts, platforms and protocols, used in mobile environment within the desirable time frame.

#### COURSE OUTCOME

After completion of the course the student will be to

- 1 Understand the preliminaries of mobile communication and GSM architecture. L2
- 2 Compare and contrast SDMA, TDMA, FDMA and CDMA schemes. L4
- 3 Analyze the Data Recovery Process and QoS parameters L4
- 4 Analyze various data dissemination and synchronization techniques. L4
- 5 Analyze the mobile communication and mobile computing protocols. L4

#### UNIT-I:

##### INTRODUCTION

Mobile Communications, Mobile Computing, Paradigm, Promises/Novel Applications and Impediments and Architecture, Mobile and Hand Held Devices, Limitations of Mobile Hand Held Devices.

##### GSM

Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling Handover, Security, New Data Services, GPRS, CSHSD, DECT.

#### UNIT-II:

##### MEDIUM ACCESS CONTROL

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN (IEEE 802.11)

##### MOBILE NETWORK LAYER

IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation, Route Optimization, DHCP.

### **UNIT-III:**

#### **MOBILE TRANSPORT LAYER**

Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

#### **DATABASE ISSUES:**

Database Hoarding & Caching Techniques, Client-Server Computing & Adaption, Transaction Models, Query Processing, Data Recovery Process & QoS Issues.

### **UNIT-IV:**

#### **DATA DISSEMINATION AND SYNCHRONIZATION**

Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing methods,

#### **DATA SYNCHRONIZATION**

Introduction, Software and Protocol Models.

### **UNIT-V:**

#### **MOBILE ADHOC NETWORKS**

Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Directory.

#### **PROTOCOLS AND PLATFORM FOR MOBILE COMPUTING:**

WAP, Bluetooth, XML, J2ME, Java card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

### **TEXT BOOKS**

1. Jochen Schiller, “ Mobile Communications”, Addison Wesley, Second Edition 2009.
2. Raj Kamal, “Mobile Computing”, Oxford Press, 2007, ISBN: 0195686772

### **REFERNCE BOOKS**

1. Stojmenovic and Cacute, “ Handbook of Wireless Networks and Mobile Computing”, Wiley, 2002, ISBN: 0471419028
2. Reza Behravanfar, “ Mobile Computing Principles: Design and developing Mobile Applications with UML and XML”, ISBN: 0521817331, Cambridge University Press, October 2004.



# TKR COLLEGE OF ENGINEERING & TECHNOLOGY

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## B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17

### INTERNET OF THINGS - A57PE5

**B.Tech IV Year I Semester**

L/T/P/C  
3/0/0/3

#### **COURSE OBJECTIVE:**

Learn the concepts of IOT and build simple IOT Systems

#### **COURSE OUTCOME:**

After completion of course the student will be able to

- 1 Construct the IoT Logical design architecture with core functional stack. L5
- 2 Construct NETCONF-YANG based network Architecture for Systems management of IoT. L5
- 3 Understand python packages of interest for IoT. L2
- 4 Analyze the detailed features of IoT devices, Board and Interfaces. L4
- 5 Construct the architecture of Smart Parking & smart traffic management system in IOT. L5

#### **UNIT-I:**

##### **INTRODUCTION TO INTERNET OF THINGS:**

Introduction, physical design of IoT, logical design of IoT-functional blocks, communicational models, communication APIs, IoT enabling technologies, IOT levels & deployment templates

#### **UNIT-II:**

##### **IOT AND M2M**

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, IoT System Management with NETCONF-YANG: Need for IOT systems management, simple network management protocol, network operator requirements, NETCONF, YANG, IoT system management with NETCONF-YANG.

#### **UNIT-III:**

##### **IOT PLATFORMS DESIGN METHODOLOGY**

Introduction, IoT Design Methodology, Motivation for Python Hardware and Software for IoT: Logical design using Python-data types & Data Structures, control flow, functions, modules, packages, file handling, classes, and Python packages of Interest for IoT

#### **UNIT-IV:**

##### **IOT PHYSICAL DEVICES & ENDPOINTS**

IoT Device, Exemplary Device Raspberry-Pi, Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming, Raspberry Pi with python.

## **UNIT-V:**

### **IOT PHYSICAL SERVERS & CLOUD OFFERINGS**

Introduction to Cloud Storage Models & Communication APIs. WAMP-AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework –Django. Case Studies Illustration IoT Design: Introduction, Home Automation, Cities.

### **TEXT BOOK**

1. Arshdeep Bahga, Vijay Madiseti, —Internet of Things – A hands-on approach, Universities Press, 2015.

### **REFERENCE BOOKS**

1. Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017.
2. Olivier Hersent, David Boswarthick, Omar Elloumi , —The Internet of Things – Key applications and Protocols, Wiley, 2012 (for Unit 2).
3. Jan Hoeller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle, “From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence”, Elsevier, 2014.
4. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting the Internet of Things, Springer, 2011.
5. Michael Margolis, Arduino Cookbook, Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, O’Reilly Media, 2011.



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**B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17**

**DESIGN PATTERNS - A57PE5**

**B.Tech IV Year I Semester**

**L/T/P/C**

**3/0/0/3**

**COURSE OBJECTIVE:** Infer the idea behind Design patterns in handling common problems faced during building an application.

**COURSE OUTCOME:**

After completion of course the student will be able to

- 1 Describe the consistent format for describing the design patterns.L2
- 2 Discuss about user interface and its design problems.L3
- 3 Discuss in detail about Creational pattern.L3
- 4 Compare different language features that are exploited by proxy pattern L4
- 5 Discuss the implementation issues of Strategy behavioral pattern and the structure and participants of state design pattern.L3

**UNIT – I:**

**Introduction:** What is a design pattern? design patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

**UNIT – II:**

**Designing a Document Editor:** Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

**UNIT-III:**

**CREATIONAL PATTERNS**

Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-IV:**

**STRUCTURAL PATTERNS**

Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

**UNIT-V:****BEHAVIORAL PATTERNS**

Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor.

**TEXT BOOK**

1. Design Patterns, Erich Gamma, Pearson Education.

**REFERENCE BOOKS**

1. Patterns in Java Vol-I, Mark Grand, Wiley Dream Tech.
2. Patterns in Java Vol-II, Mark Grand, Wiley Dream Tech
3. Java Enterprise Design Patterns, Vol-III, Mark Grand, Wiley Dream Tech.
4. Head First Design Patterns, Eric Freeman, O'Reilly Publications.



# T K R COLLEGE OF ENGINEERING & TECHNOLOGY

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**B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17**

**ADVANCE COMPUTER ARCHITECTURE - A57PE5**

**B.Tech IV Year I Semester**

**L/T/P/C**

**3/0/0/3**

**COURSE OBJECTIVE:** Understand and gain insight knowledge on the architecture of computer systems.

**COURSE OUTCOMES:** After completion of course the student will be able to

1. Classify the instructions, memory addressing and operations required for computer design. – L2
2. Illustrate the operations for pipelines, implement classic five stage pipelined RISC processor. –L3
3. Demonstrate the operation of performance enhancements such as dynamic scheduling, branch prediction, cache and vector processors. – L3
4. Design modern architectures such as RISC, Super scalar, VLIW approach. L5
5. Discuss the fundamentals of multiprocessors, and thread level parallelism.- L2

## **UNIT-I:**

### **FUNDEMENTALS OF COMPUTER DESIGN**

Fundamentals of computer design, changing faces of computing and task of computer designer, Technology trends, cost price and their trends, measuring and reporting performance, quantitative principles of computer design, Amdahl's law

Instruction set principles and examples-Introduction, classifying Instruction-set, Memory addressing-type and size of operands, operations in the instruction set.

## **UNIT –II:**

### **PIPELINES**

Introduction, Basic RISC Instruction set, simple implementation of RISC instruction set, classic five stage pipelined RISC processor, basic performance issues in pipelining, Pipeline Hazards, Reducing pipeline branch penalties.

### **MEMORY HIERARCHY DESIGN**

Introduction, review of ABC of cache, cache performance, reducing cache miss penalty, virtual memory.

### **UNIT –III:**

#### **INSTRUCTION LEVEL PARALLELISM THE HARDWARE APPROACH**

Instruction-level parallelism, dynamic scheduling using Tomasulo's approach, Branch prediction, high performance instruction delivery-hardware based speculation.

### **UNIT –IV:**

#### **ILP SOFTWARE**

Approach for basic compiler level techniques, Static branch prediction, VLIW approach, exploiting ILP, parallelism at compile time, cross cutting issues-hardware versus software.

### **UNIT –V:**

#### **MULTIPROCESSOR AND THREAD LEVEL PARALLELISM**

Processors and thread level parallelism- Introduction, Characteristics of application domain, systematic shared memory architecture, distributed shared-memory architecture, synchronization.

### **TEXT BOOKS**

1. John L. Hennessy, David A Patterson- Computer Architecture: A Quantitative approach, 3<sup>rd</sup> Edition, An Imprint of Elsevier.

### **REFERENCE BOOKS**

1. John P. Shen and Mikko H Lipasti- Modern Processor Design: Fundamentals of Super Scalar Processors
2. Computer Architecture and Parallel Processing- Kai Hwang, Faye A. Briggs., McGraw Hill.
3. Advanced Computer Architecture. – A Design space approach Dezsó Sima, Terence Fountain, Peter Kacsuk, Pearson ed.



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY  
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B.TECH. COMPUTER SCIENCE AND ENGINEERING-R17  
SOFTWARE PROCESS AND PROJECT MANAGEMENT -A57PE6**

**B.Tech IV Year I Semester**

**L/T/P/C  
3/0/0/3**

**COURSE OBJECTIVE:** Focus on Principles, techniques, methods & tools for model-based management of software projects and Assurance of Product Quality and process adherence (Quality assurance), as well as experience based creation & improvement of models.

**COURSE OUTCOMES:**

1. Analyze the preliminaries of software project management and evolution of project economics. L4
2. Contrast and compare various software economics improvements. L4
3. Analyze the various artifacts of software project. L4
4. Analyze software process workflows. L4
5. Analyze various project quality indicators.L4

**UNIT –I:**

**CONVENTIONAL SOFTWARE MANAGEMENT**

The waterfall model, conventional software management performance.

**EVOLUTION OF SOFTWARE ECONOMICS:**

Software economics, pragmatic software cost estimation.

**UNIT-II:**

**IMPROVING SOFTWARE ECONOMICS**

Reducing software product size, improving software process, improving team effectiveness. Improving automation, Achieving required quality, peer inspections. The old way and the new- the principles of conventional software engineering. Principles of modern software management, transitioning to an iterative process.

**UNIT-III:**

**LIFE CYCLE PHASES**

Engineering and production stages, inception, elaboration, construction, transition phases. Artifacts of the process: the artefact sets. Management artifacts, engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

#### **UNIT-IV:**

##### **WORK FLOWS OF THE PROCESS**

Software process workflow, Inter trans workflows. Checkpoints of the process: Major Mile stones, Minor Milestones, periodic status assessments. Iterative process planning work breakdown structures, planning guidelines, cost and scheduled estimating, interaction, planning process, pragmatic planning. Evolution of Project Organization, Project Organizations and responsibilities, Line-of-Business organization.

#### **UNIT-V:**

##### **PROJECT CONTROL AND PROCESS INSTRUMENTATION:**

The server care metrics, management indicators, and quality indicators. Life cycle expectations pragmatic software Metrics, Metrics Automation. Tailoring the Process: Process discriminates, example.

##### **FUTURE SOFTWARE PROJECT MANAGEMENT**

Modem project profiles next generation software economics modem process transitions.

##### **CASE STUDY**

The Command Center Processing and Display System. Replacement (CCPDS-R).

#### **TEXT BOOKS**

1. Software Project Management. Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata MCGraw Hill.

#### **REFERNCE BOOKS**

1. Applied Software Project Management, Andrew Stebian, & Jennifer Greene, O'Reilly 2006.
2. Software Engineering Project Management. Richard H. Thayer & Edward Yourdon, Second edition, Wiley India, 2004.
3. Software Project Management in Practice Pankaj Jalote Pearson education, 2002.



# TKRC COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

## B.TECH. COMPUTER SCIENCE AND ENGINEERING-R17

### COMPUTER FORENSICS- A57PE6

B.Tech IV Year I Semester

L/T/P/C

3/0/0/3

#### **COURSE OBJECTIVE:**

Analyze and collect the digital evidences against crime.

#### **COURSE OUTCOMES:**

After completion of course the student will be to

1. Contrast and compare various computer forensic services and technologies.L4
2. Analyze various data recovery techniques in computer forensics.L4
3. Analyze different duplication and preserving digital data evidence.L4
4. Contrast and compare different computer forensic techniques.L4
5. Evaluating current computer forensic tools.L6

#### **UNIT-I:**

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics

In Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings,

Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists, Who Can Use Computer Forensic Evidence? Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement

Computer Forensic Technology, Types of Business Computer Forensics Technology.

#### **UNIT-II:**

Computer Forensics Evidence and Capture: Data Recovery: Data Recovery Defined, Data Backup and Recovery, the Role of Backup in Data Recovery, the Data-Recovery Solution, Case Histories. Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collecting and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody Duplication and preservation of Digital Evidence.

#### **UNIT-III:**

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving Computer Forensic Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication, Practical Considerations, Practical Implementation.

**UNIT-IV:**

Computer Forensics Analysis: Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool, Identification of Data: Timekeeping, Time Matters, Forensic Identification and Analysis of Technical Surveillance Devices. Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. Networks: Network Forensics Scenario, A Technical Approach, Destruction of Email, Damaging Computer Evidence, International Principles Against Damaging of Computer Evidence, Tools Needed for Intrusion Response to the Destruction of Data, Incident Reporting and Contact Forms.

**UNIT-V:**

Current Computer Forensics Tools: Evaluating Computer Forensics Tool Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software.

**TEXT BOOKS**

1. "Computer Forensics: Computer Crime Scene Investigation", JOHN R. VACCA, Firewall Media.
2. "Guide to Computer Forensics and Investigations"4e, Nelson, Phillips Enfinger, Steuart, Cengage Learning.

**REFERENCE BOOKS**

1. "Computer Forensics and Cyber Crime", Marjie T Britz, Pearson Education.
2. "Computer Forensics", David Cowen, McGraw Hill.



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE & ENGINEERING – R17**  
**INFORMATION RETRIEVAL SYSTEM -A57PE6**

**B.Tech IV Year I Semester**

**L/T/P/C**  
**3/0/0/3**

**COURSE OBJECTIVE:** Understand the different models of information storage and use retrieval utilities for extraction of information using various strategies.

**COURSE OUTCOMES:** After completion of course, the student will be able to

1. Analyze various retrieval strategies. L4
2. Use various retrieval utilities for improving retrieval in terms of time complexity. L3
3. Use various retrieval utilities for improving retrieval in terms of space complexity. L3
4. Demonstrate various retrieval techniques to improve retrieval efficiency. L3
5. analyze various approaches to integrate the structured and semi structured, distributed data. L4

**UNIT-I:**

**Introduction, Retrieval Strategies:** Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models.

**UNIT-II:**

**Retrieval Utilities:** Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

**UNIT-III:**

**Retrieval Utilities:** Semantic networks, Parsing Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

**UNIT-IV:**

**Efficiency:** Inverted index, Query processing, Signature files, Duplicate document detection.

**UNIT-V:**

**Integrating Structured Data and Text**

A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema

**Distributed information Retrieval**

A Theoretical model of distributed retrieval Web search.

**TEXT BOOK**

1. David A. Grossman, Ophir Frieder, information Retrieval —Algorithms and Heuristics, Springer, 2 Edition (Distributed by Universities Press), 2004.

## **REFERENCE BOOKS**

1. Gerald J Kowaiski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000
2. Soumen Chakrabarti, Mining the Web: Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009



# T K R COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

## B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17

### LINUX PROGRAMMING LAB -A57PC8

B.Tech IV Year I Semester

L/T/P/C

0/0/4/2

**COURSE OBJECTIVE** Write file utilities and shell scripting programs.

#### **COURSE OUTCOMES:**

After completion of course the students will be able to

1. Demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment. –L3
2. Evaluate the concept of shell scripting programs by using an AWK and SED commands. L5
3. Create, change and remove the directory. L2
4. Analyze the process of parent and child relationships. L4
5. Write client-server communication programs by using sockets. L2

#### **Experiments**

- 1) Write a shell script that accept a file name starting and ending line numbers as arguments and display all the lines between given line no:
- 2) Write a shell script that delete all lines containing a specified word
- 3) Write a shell script that displays a list of all the files in the current directory
- 4) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file or directory.
- 5) Write a shell script that accept a list of file names as arguments count and report the occurrence of each word.
- 6) Write a shell script to find the factorial of given integer
- 7) Write a shell script that list the all files in a directory.
- 8) Write a awk script to find the number of characters, words and lines in a file? 16 linked list respectively.
- 9) Write a C Program that makes a copy of a file using standard I/O and system calls?
- 10) Implement in C the following Unix commands using system calls A) cat B)mv
- 11) Write a C program to emulate the UNIX ls-l command?
- 12) Write a C program to list for every file in a directory, its inode number and file name.?
- 13) Write a C Program that demonstrates redirection of standard output to a file .
- 14) Write a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen

- 15) Write a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen.?
- 16) Write a C program to create a Zombie process.?
- 17) Write a C program that illustrates how an orphan is created
- 18) Write a program that illustrates how to execute two commands concurrently with a command pipe.?
- 19) Write a C programs that illustrate communication between two unrelated processes using named pipe.
- 20) Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.?
- 21) Write a C program that illustrates suspending and resuming processes using signals
- 22) Write client and server programs(using c) for interaction between server and client processes using Unix Domain sockets
- 23) Write a client and server programs(using c)for interaction between server and client processes using Internet Domain sockets?
- 24) write a program to implement the shared memory
- 25) Write a client and server programs(using c)for interaction between server and client processes using Internet Domain sockets?
- 26) Write a C program that illustrates two processes communicating using shared memory



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17**  
**CUTTING EDGE TECHNOLOGIES LAB -A57PE8**

**B.Tech IV Year I Semester**

**L/T/P/C**  
**0/0/4/2**

**COURSE OBJECTIVE:** Disseminate the practical demonstration of Machine learning and Internet of Things.

**MACHINE LEARNING CONCEPTS:**

**COURSE OUTCOMES:** After completion of the course the students will be able to

1. Make use of Data sets in implementing the machine learning algorithms. L3
2. Implement the machine learning concepts and algorithms in any suitable language of choice. L3

**Note to students for implementation.**

1. The programs can be implemented in either JAVA or Python.
2. For Problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.

Note: Data sets can be taken from standard repositories

(<https://archive.ics.uci.edu/ml/datasets.html>) or constructed by the students

1. Implement and demonstrate the **FIND-S algorithm** for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the **Candidate-Elimination algorithm** to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based **ID3 algorithm**. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the **Back propagation algorithm** and test the same using appropriate data sets.
5. Write a program to implement the **naïve Bayesian classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the **naïve Bayesian Classifier** model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a **Bayesian network** considering medical data. Use this

model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

8. Apply **EM algorithm** to cluster a set of data stored in a .CSV file. Use the same data set for clustering using **k-Means algorithm**. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement **k-Nearest Neighbour algorithm** to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric **Locally Weighted Regression algorithm** in order to fit data points. Select appropriate data set for your experiment and draw graphs.

## **INTERNET OF THINGS LAB**

**COURSE OUTCOMES:** After completion of the course the student will be able to

1. Develop the programs in python. –L5
2. Gain knowledge of Arduino IDE and different types of Arduino Board.- L1
3. Write program using Arduino IDE for Blink LED. –L3
4. Developed programs using Arduino IDE and Arduino Board for RGB Led, RFID, NFC,MQTT Protocol and LED bilking using Raspberry Pi. – L5

### **List of Programs**

1. Study and Install Python in Eclipse and WAP for data types in python.
2. Write a Program for arithmetic operation in Python.
3. Write a Program for looping statement in Python.
4. Study and Install IDE of Arduino and different types of Arduino.
5. Write program using Arduino IDE for Blink LED.
6. Write Program for RGB LED using Arduino.
7. Study the Temperature sensor and Write Program foe monitor temperature using Arduino.
8. Study and Implement RFID, NFC using Arduino.
9. Study and implement MQTT protocol using Arduino.
10. Study and Configure Raspberry Pi.
11. WAP for LED blink using Raspberry Pi.
12. Study and Implement Zigbee Protocol using Arduino / Raspberry Pi.



# T K R COLLEGE OF ENGINEERING & TECHNOLOGY

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## B.TECH. COMPUTER SCIENCE AND ENGINEERING – R17 PREDICTIVE ANALYTICS - A58PE2

B.Tech IV Year II Semester

L/T/P/C

3/0/0/3

**COURSE OBJECTIVE:** Understand the basic principles involved in analyzing the predictive behavior for business activities.

**COURSE OUTCOMES:** After completion of the course the student will be able to

1. Describe the predictive analytics frame work and its applications. –L2
2. Apply Logistic regression techniques. L3
3. Implement objective segmentation for performing prediction tasks for business needs. –L3
4. Apply time series methods for analyzing and predicting the business needs. – L3
5. Implement standard process for working with documents. – L3

### Unit – I:

**Introduction to Predictive Analytics & Linear Regression :** What and Why Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of data and variables, Data Modelling Techniques, Missing imputations etc. Need for Business Modelling. Regression — Concepts, Blue property-assumptions-Least Square Estimation. Variable Rationalization, and Model Building etc.

### Unit – II:

**Logistic Regression :** Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domains etc. Regression Vs Segmentation — Supervised and Unsupervised Learning, Tree Building — Regression, Classification, Overfitting, Pruning and complexity. Multiple Decision Trees etc.

### Unit – III:

**Objective Segrnentation :** Regression Vs Segmentation — Supervised and Unsupervised Learning, Tree Building — Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc. Develop Knowledge, Skill and Competences (NOS 9005) Introduction to Knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping, etc.

**Unit – IV:**

**Time Series Methods Forecasting, Feature Extraction :** Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average, Energy etc and Analyze for prediction.Project

**Unit – V:**

**Working with Documents :** Standard Operating Procedures for documentation and knowledge sharing. Defining purpose and scope documents, Understanding structure of documents — case studies, articles, white papers, technical reports, minutes of meeting etc., Style and format, Intellectual Property and Copyright, Document preparation tools — Visio, PowerPoint, Word, Excel etc., Version Control, Accessing and updating corporate knowledge base. Peer review and feedback.

**TEXT BOOK**

- Student's Handbook for Associate Analytics-III.

**REFERENCE BOOK**

Gareth James • Daniela Witten • Trevor Hastie Robert Tibshirani. An Introduction to Statistical Learning with Applications in R



# TKRC COLLEGE OF ENGINEERING & TECHNOLOGY

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**B.TECH. COMPUTER SCIENCE AND ENGINEERING -R17**

## **STORAGE AREA NETWORKS -A58PE2**

**B.Tech IV Year II Semester**

**L/T/P/C**

**3/0/0/3**

**COURSE OBJECTIVE:** demonstrate and understand the storage networks and their products, mechanisms for the backup or recovery.

**COURSE OUTCOMES:** After completion of the course the student will be able to

1. Learn storage area networks characteristics and components, become familiar with SAN vendors and their products. –L2
2. Compare and contrast integrated and modular storage systems.L4
3. Analyze various planned and unplanned outages. L4
4. Discuss various recovery topologies. – L2
5. Identify and manage the key areas of data to store. L2

### **UNIT- I:**

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:**

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.

**Case Studies:**

The technologies described in the course are reinforced with EMC examples of actual solutions. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

**TEXT BOOK**

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

**REFERENCE BOOKS**

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



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE AND ENGINEERING –R17**

**INFORMATION SECURITY INCIDENT RESPONSE  
AND MANAGEMENT - A58PE2**

**B.Tech IV Year II Semester**

**L/T/P/C**

**3/0/0/3**

**COURSE OBJECTIVE:** Understand the significance of information and incident response and management in terms of information security.

**COURSE OUTCOMES:**

After completion of the course, students will be able to

1. Explain briefly about different configuration modes. –L2
2. Explain Methodologies of Troubleshooting in network. –L2
3. Develop an effective data backup strategy and plan, security policy for backup procedures. – L5
4. Compare and contrast between Computer Security Logs, Configuring& Analyzing Windows Logs. – L4
5. Demonstrate about Detecting DoS Attack, DoS Response Strategies in handling Network Security Incidents. – L3

**UNIT-I:**

**Managing Information Security Services:** Configuring Network Devices, Identifying Unauthorized Devices, Testing the Traffic Filtering Devices, Configuring Router, Configuring Modes — Router Global interface/Line/Privilege EXEC/ROMIOU ser EXEC, Configuring a ban ner/Firewall Bastion Host NPN server etc.

**UNIT-II:**

**Troubleshooting Network Devices and Services:** Introduction & Methodology of Troubleshooting, Troubleshooting of Network Communication-Connectivity-Network Devices- Network Slowdowns-Systems-Modems etc.

**UNIT-III:**

**Information Security Incident Management & Data Backup:** Information Security Incident Management overview-Handling-Response, Incident Response Roles and Responsibilities, Incident Response Process etc. Data Back introduction, Types of Data Backup and its techniques, Developing an Effective Data Backup Strategy and Plan, Security Policy for Back Procedures.

**UNIT-IV:**

**Log Correlation:** Computer Security Logs, Configuring& Analyzing Windows Logs, Log Management-Functions & Challenges, Centralized Logging and Architecture, Time Synchronization — NTP NIST etc. Develop Knowledge Skill and competences (NOS 9005)

**UNIT-V:**

**Handling Network Security Incidents:** Network Reconnaissance Incidents, Network Scanning Security Incidents, Network Attacks and Security Incidents, Detecting DoS Attack, DoS Response Strategies, Preventing stopping a DoS Incident etc.

**Handling Malicious Code Incidents:** Incident Handling Preparation, Incident Prevention, Detection of Malicious Code, Containment Strategy. Evidence Gathering and Handling, Eradication and Recovery,

Recommendations etc. Project.

### **TEXT BOOKS**

1. Managing Information Security Risks, The Octave Approach by Christopher Alberts, and Audrey Dorofee
2. 'Cryptography and Network Security (4th Edition) by (Author) William Stallings.

### **REFERENCE BOOKS**

1. <https://www.sans.org/reading-room/whitepapers/incident/security-incident-handling-small-organizations-32979>



# TKRC COLLEGE OF ENGINEERING & TECHNOLOGY

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## B.TECH. COMPUTER SCIENCE AND ENGINEERING-R17

### ADHOC SENSOR NETWORKS -A58PE3

B.Tech IV Year II Semester

L/T/P/C  
3/0/0/3

**COURSE OBJECTIVE:** Understand the concept of ad-hoc sensor networks, design and implement sensor network protocols, evaluate measurements of protocol performance in sensor networks.

#### COURSE OUTCOMES:

After completion of the course the student will be able to

1. Explain Characteristics of MANETs and different routing approaches. –L2
2. Describe transport protocols for adhoc networks. – L2
3. Demonstrate the concepts of sensor networks and their applications. –L3
4. Employ security in sensor network platforms and tools. – L3
5. Summarize the imperative languages. L2.

#### UNIT- I:

**INTRODUCTION TO AD HOC WIRELESS NETWORKS:** Characteristics of MANETs, Applications of MANETs, Challenges.

**ROUTING IN MANETs:** Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

#### UNIT- II:

**DATA TRANSMISSION IN MANETs:** The Broadcast Storm, Multicasting, Geocasting

**TCP OVER AD HOC NETWORKS:** TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

#### UNIT- III:

**BASICS OF WIRELESS SENSORS AND APPLICATIONS:** The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**DATA RETRIEVAL IN SENSOR NETWORKS:** Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

#### UNIT- IV:

**SECURITY :** Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**SENSOR NETWORK PLATFORMS AND TOOLS:** Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

#### UNIT- V:

**OVER VIEW OF OPERATING SYSTEM – TinyOS**

**OVERVIEW OF IMPERATIVE LANGUAGES:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns- 2 and its sensor network extension, TOSSIM

## **TEXT BOOKS**

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P. Aggarwal*, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp2009.

## **REFERENCE BOOKS**

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, *Charles E. Perkins*, Pearson Education, 2001.
5. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng*, Auerbach Publications, Taylor & Francis Group, 2007



# TKRC COLLEGE OF ENGINEERING & TECHNOLOGY

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## B.TECH. COMPUTER SCIENCE AND ENGINEERING-R17

### E-COMMERCE -A58PE3

B.Tech IV Year II Semester L/T/P/C

3/0/0/3

**COURSE OBJECTIVE:** Identify business relationships between the organizations and their customers, perform various transactions like payment, data transfer etc.

#### **COURSE OUTCOMES:**

After completion of the course, students will be able to

1. Identify the major categories and trends of e-commerce applications, the essential processes of an e-commerce system. L2
2. Discover several factors and web store requirements needed to succeed in e-commerce, discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives. L4
3. Understand the main technologies behind e-commerce systems and interaction of technologies. L2
4. Discuss the various marketing strategies for online business. L2
5. Analyse various electronic payment types and associated security risks and the ways to protect against them. L1

#### **UNIT – I:**

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E- Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models.

#### **UNIT – II:**

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

**UNIT – III:**

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research. Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing

**UNIT – IV:**

Web Marketing Strategies, Communicating with Different Market Segments, Beyond Market Segmentation: Customer Behavior and Relationship Intensity, Advertising on the Web, E- Mail Marketing, Search Engine Positioning and Domain Names, Selling to Businesses Online, Electronic Data Interchange, Supply Chain Management Using Internet Technologies, Electronic Marketplaces and Portals

**UNIT – V:**

E-Business Revenue Models, Revenue Models for Online Business, Changing Strategies: Revenue Models in Transition, Revenue Strategy Issues for Online Businesses, Creating an Effective Business Presence Online, Web Site Usability, Virtual Communities, Mobile Commerce, Online Auctions

**TEXT BOOK**

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson. (UNITS 1, 2, 3)
2. E-Business by Gary P. Schneider, - Cengage India Learning (UNITS 4, 5)

**REFERENCE BOOKS**

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S. Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H. Michael Chang.
4. Electronic Commerce – Gary P. Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C. Taudon, Carol Guyerico Trave



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
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**B.TECH. COMPUTER SCIENCE AND ENGINEERING-R17**

**HUMAN COMPUTER INTERACTION -A58PE3**

**B.Tech IV Year II Semester**

**L/T/P/C**

**3/0/0/3**

**COURSE OBJECTIVE:** Apply HCI principles to interactive design, and also design certain tools for blind or PH People.

**COURSE OUTCOMES:** After completion of the course, students will be able to

1. Compare and contrast between user interface and graphical user interface. –L4
2. Design screen, emphasizing on view of navigation and flow, focus, statistical graphics. –L3
3. Implement new and window navigation schemes. L4
4. Design components for multimedia Interaction. –L5
5. Implement HCI features in software process and evaluate them using design methods. – L5

**UNIT – I:**

Introduction: Importance of user Interface – definition, importance of good design.

Benefits of good design. A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

**UNIT – II:**

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

**UNIT- III:**

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

#### **UNIT- IV:**

HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction

#### **UNIT- V:**

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right

#### **TEXT BOOKS**

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3
2. Human – Computer Interaction. Alan Dix, Janet Finckay, Gre Goryd, Abowd, Russell Bealg, Pearson Education Units 4,5

#### **REFERENCE BOOKS**

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning