**III B. Tech I Semester**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Name** | **subject Area** | **Periods per week** | | | **Credits** | **Scheme of Examination Max.**  **Marks** | | |
| L | T | P | CIA | SEE | Total |
| **R204GA05501** | Web Development Technologies | PCC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| **R204GA05502** | Computer Networks | PCC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| **R204GA05503** | Operating Systems | PCC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| **Professional Elective courses – I** | |  |  |  |  |  |  |  |  |
| **R204GA05504** | 1.Data Warehousing and Data Mining |  | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| **R204GA05505** | 2. Wireless Sensor Networks |
| **R204GA05506** | 3. Software Testing Methodologies |
| **Open Elective Course/Job oriented elective-I** | |  |  |  |  |  |  |  |  |
| **R204GA05507** | Open Elective-I |  | 2 | 0 | 2 | 3 | 40 | 60 | 100 |
| **R204GA05508** | Open Elective-I |
| **R204GA05509** | CN and OS Lab | PCC | 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| **R204GA05510** | Web Development Technologies Lab | PCC | 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| **R204GA05511** | IoT Lab | PCC | 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| **R204GA05512** | **Skill advanced course/ soft skill course\*** |  | **1** | **0** | **2** | **2** | 40 | 60 | 100 |
|  | tory course (AICTE suggested) |  | 2 | 0 | 0 | 0 |  |  |  |
| **Total** | | | | | | 21.5 | 320 | 480 | 800 |
| **Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)** | | | | | | 4 | 0 | 0 | 4 |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Web Development Technologies**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **III B.Tech - I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05501** | **PCC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| Objectives   1. To explore the fundamental concepts of web, internet protocols, client-server model, and applications. 2. To acquire knowledge in design and implement web applications. 3. To demonstrates the uses of scripting languages. 4. To explore the fundamental concepts of AngularJS, React JS and Node.js. | | | | | | | | |
| **Unit I – Introduction to Web and Internet** | | | | | | | | |
| Introduction to Networks, Internet, Web Protocols, Web Organization and Addressing.  **Web Browsers and Web Servers**: Apache HTTP Server, Apache Tomcat Server, XAMPP Server, Installations of above Servers, Web System Architecture, URL, Domain Name, Client-Side and Server-Side Scripting Technologies.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To explore fundamentals of Internet and Web. 2. To illustrate Client-Server Model. 3. Demonstrate the installation of Web Servers. 4. To explain the Scripting Technologies. | | | | | | | | |
| **Unit II – Web Designing** | | | | | | | | |
| **HTML5**: Basics of HTML5 Elements, Form Elements, Input Types and Media Elements.  **CSS3**: Properties, Selectors, Types of CSS. Introduction to Bootstrap & its Components.  **XML**: Document Type Definition (DTD), XML Schema XML-DOM, XSLT.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To Create HTML forms, tables, Lists. 2. To apply various styles using CSS. 3. To create DTD, XML, XSLT based web applications. | | | | | | | | |
| **Unit III – JavaScript** | | | | | | | | |
| **Basics**: Introduction to JavaScript, Data Types and Variables, Expressions, Operators, Statements, Objects, Array, Functions, Regular Expressions, Windows Object, Scripting Documents, Handling Event.  **Advanced JavaScript**: Introduction to JSON – JSON Structure, The jQuery Library, Introduction to AJAX, AngularJS, Understanding Angular, Angular Components.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To explain the basic concepts of JavaScript. 2. To demonstrate web page using jQuery and AJAX. 3. To explain the concepts of Bootstrap components. 4. To explain the concepts of AngularJS components. | | | | | | | | |
| **Unit IV – PHP & DATABASE CONNECTIVITY** | | | | | | | | |
| **Introduction to PHP**: Introduction, Download, Install and Configure of PHP, Anatomy of A PHP.  **Overview of PHP Data Types and Concepts**: Variables and Data Types, Operators, Expressions and Control Statements, Strings, Arrays and Functions, Regular Expressions.  **PHP advanced concepts**: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating Users:  **MySQL Basics**: Introduction to MySQL, Querying Single and Multiple MySQL databases with PHP – PHP data objects.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To learn how to configure PHP. 2. To demonstrate the need of Regular Expressions. 3. To explain PHP advanced concepts like Cookies, HTTP Headers, Sessions. 4. To the basic concepts of Database Connectivity using MySQL. | | | | | | | | |
| **Unit V – Application Development Using Node.js** | | | | | | | | |
| **Overview of Node.js**: Introduction to Node.js, Installing Node.js, Using Events, Listeners, Timers, and Callbacks in Node.js, Handling Data I/O in Node.js, Introduction to Mongodb, Accessing Mongodb from Node.js, Advanced MongoDB Concepts, Express Framework.  **Learning Outcomes:** At the end of this unit, the student will be able to   1. To explain the fundamentals of Node.js. 2. To explain the importance of mongodb and mangoose. 3. To demonstrate various advance concepts of Node,js. 4. To demonstrate Express Framework. | | | | | | | | |
| **Text Books:** | | | | | | | | |
| 1. [Chris Bates](https://www.wiley.com/en-us/search?pq=%7Crelevance%7Cauthor%3AChris+Bates), Web Programming: Building Internet Applications, 3rd Edition. 2. Brad Dayley, Brendan Dayley, and Caleb Dayley, Node.js, MongoDB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Paul Deitel, Harvey Deitel, Abbey Deitel, Internet & World Wide Web - How to Program, 5th edition, Pearson Education, 2012. 2. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, A press Publications (Dream tech.). 3. David Flanagan, “JavaScript: The Definitive Guide, Sixth Edition”, O'Reilly Media, 2011. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Create HTML and CSS, JavaScript effectively to create interactive and dynamic websites. 2. Design server-side programming with PHP. 3. Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms. 4. Implement client and server-side scripting. 5. Develop XML, XSLT based web applications. 6. Develop application using recent environment like JSON, AJAX, Node.js and Angular JS. | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Computer Networks**

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| **III B.Tech-I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05502** | **PCC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| Objectives   * 1. To explore the fundamental concepts of computer networking, protocols, architectures, and applications.   2. To acquire knowledge in design, implement and analyze performance of layers in networking.   3. To explore the fundamental concepts of network security. | | | | | | | | |
| **Unit I – Introduction to Computer Networks** | | | | | | | | |
| **Introduction:** Uses of Computer Networks, Network Hardware, Network Software, Reference Models.  **Physical Layer:** Theoretical basis for Data Communications, Transmission media, Circuit Switching and Packet Switching.  **Learning Outcomes:**  At the end of this unit, the student will be able to   * 1. Explore fundamentals of Network Hardware and Software.   2. Compare and Contrast TCP/IP Reference Model with OSI Model.   3. Illustrate various transmissions medium and its communication technologies. | | | | | | | | |
| **Unit II – Link Layer** | | | | | | | | |
| **Data Link Layer:** Design issues, Error Detection and Correction Layer, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols.  **Medium Access Control Layer:** Channel Allocation Problem, Multiple Access Protocols, Ethernet, Wireless LAN.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To illustrate design issues of Data Link Layer. 2. To explore various types of elementary and sliding window protocols. 3. To explore Multiple Access protocol and switching. | | | | | | | | |
| **Unit III – Communication Layer** | | | | | | | | |
| **Network Layer:** Design issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internetworking, and Network Layer in the internet.  **Transport Layer:** Transport Services, Elements of Transport Protocols, Congestion Control, UDP, TCP, Performance issues, Delay-Tolerant Networking.  **Learning Outcomes:**  At the end of this unit, the student will be able to   * 1. To explain the design issues, algorithms and QoS of network layer.   2. To illustrate transport services in the transport layer.   3. To illustrate Delay-Tolerant Networking. | | | | | | | | |
| **Unit IV – Application Layer** | | | | | | | | |
| **Application Layer:** DNS, Remote Logging, File Transfer, Electronic-Mail, WWW, HTTP, Network Management Systems, SNMP, Streaming Audio and Video, Content Delivery.  **Learning Outcomes:**  At the end of this unit, the student will be able to   * 1. To illustrate various types of Applications in Application Layer.   2. To explore various Application technologies like DNS, Remote Logging, File Transfer, E-mail.   3. To describe the fundamentals of Network Management Systems. | | | | | | | | |
| **Unit V – Network Security** | | | | | | | | |
| **Network Security:** Cryptography, Symmetric-key Algorithms, Public-Key Algorithms, Digital Signatures, Management of Public keys, Communication Security, Authentication Protocols, Email Security, Web Security and Social issues.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To explain the fundamentals and principles of Cryptography. 2. To demonstrate Symmetric-key Algorithms, Public-Key Algorithms and Digital Signatures 3. To demonstrate various security concepts like Authentication Protocols, Communication, Email and Web security in social media. | | | | | | | | |
| **Text Books:** | | | | | | | | |
| * 1. “Computer Networks”, Andrew S. Tanenbaum and David J. Wetharall, Prentice Hall, fifth Edition, 2011.   2. “Data Communications and Networking”, Behrouz A. Forouzon, Sophia Chung Fegan, McGraw Hill Higher Education fifth Edition, 2012. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| * + 1. “Computer Networks: A Systems Approach”, Larry Peterson and Bruce Davie, 5th Ed, The Morgan Kaufmann Series, Elsevier, 2011.     2. “Computer Networking: A Top-Down Approach Featuring the Internet”, J.F. Kurose and K.W.Ross, 6th Ed., Pearson Education, 2012.     3. “Data and Computer Communications”, William Stallings, Pearson Education, 10th Ed, 2013. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   * + - 1. Examine the different building blocks of Communication network and its architecture.       2. Contrast different types of networks and analyze the performance of network.       3. Identify and examine the various solutions in design issues of Data Link Layer.       4. Compare and Contrast various types of Routing Algorithms and Congestion Control Algorithms.       5. Illustrate fundamentals of transport services, protocols, congestion control implantation and its performance.       6. Illustrate Fundamental applications of Application Layer and its Security mechanisms. | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Operating Systems**

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| **III B.Tech-I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05503** | **PCC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| Objectives   1. To introduce the operating system concepts, designs and provide skills required to implement the services. 2. To describe the trade-offs between conflicting objectives in large-scale system design. 3. To develop the knowledge for application of the various design issues and services. | | | | | | | | |
| **Unit I – Introduction to Operating System** | | | | | | | | |
| **Introduction: Ope**rating System Operations, Resource Management, Security and Protection, Virtualization, Distributed Systems, Computing Environments.  **Operating-System Structures:** Operating-System Services, User and Operating-System Interface, System Calls, System Services.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. Determine the functionality of operating systems 2. Illustrate the process of virtualization, computing environments. 3. Illustrate the role of services, interfaces and system calls. | | | | | | | | |
| **Unit II – PROCESS MANAGEMENT** | | | | | | | | |
| **Processes:** Process Concept, Scheduling, Operations on Processes, Inter process Communication: Shared-Memory Systems, Message-Passing Systems, Examples, Communication in Client–Server Systems. CPU Scheduling**:** Scheduling Criteria, Scheduling Algorithms, Threads.  **Process Synchronization:** The critical-section problem, Petersons Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. 1. To demonstrate the process features like scheduling, creation and termination. 2. To explore IPC in Shared-Memory Systems and Message-Passing Systems. 3. To demonstrate Client-Server Communication Systems. | | | | | | | | |
| **Unit III – MEMORY MANAGEMENT** | | | | | | | | |
| Contiguous Memory Allocation, Swapping, Paging, Page Replacement algorithms, Thrashing, Memory Compression.  **Deadlocks:** System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.  **Learning Outcomes:**  At the end of this unit, the student will be able to  1. To investigate various techniques of allocating memory to processes.  2. To illustrate concepts of demand-paging, page-replacement algorithms.  3. To illustrate different methods for preventing or avoiding deadlocks. | | | | | | | | |
| **Unit IV – STORAGE MANAGEMENT & FILE SYSTEM** | | | | | | | | |
| **Mass-Storage Structure:** Overview of Mass-Storage Structure, Disk Scheduling, Storage Attachment, RAID Structure.  **I/O Systems:** I/O Hardware**,** Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations.  **File-System :** File Concept, Access Methods, Directory Structure, Protection, Memory-Mapped Files,  File system structure and Implementation.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. To evaluate disk scheduling algorithms. 2. To explore file-system protection. 3. To illustrate local file systems, directory structures and remote file systems. | | | | | | | | |
| **Unit V – Security and Protection** | | | | | | | | |
| Protection:Goals, Principles and domain, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights.  **Security:** The Security problem, Program threats, System and Network threats, Cryptography as a security tool.  **Learning Outcomes:** At the end of this unit, the student will be able to   1. To illustrate goals and principles of protection in modern operating system. 2. To demonstrate security threats and attacks. 3. To demonstrate various virtual machine technologies. | | | | | | | | |
| **Text Books:** | | | | | | | | |
| 1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley, Tenth Edition, 2018. 2. Operating Systems: Design And Implementation, Andrew S. Tanenbaum, Albert S. Woodhull, Pearson, 3rd Edition, 2015. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Operating Systems, A Spiral Approach, Ramez Elmasri, A.Gil Carrick, David Levine, McGrawHill Higher Education, 2010. 2. Operating Systems, Three Easy Pieces, Remzi H. Arpaci-Dusseau, Andrea C. Arpaci-Dusseau, Arpaci-Dusseau Books, 2015. 3. Operating Systems: and design Principles,5th Edition,William Stallings,PHI. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Apply various types of system calls and find the stages of various process states. 2. Apply thread scheduling and process scheduling techniques. 3. Apply and analyze communication between inter process and synchronization techniques. 4. Implement page replacement algorithms, memory management techniques and deadlock issues. 5. Differentiate the file systems for applying different allocation and access techniques. 6. Illustrate system protection, security, and the need of virtualization. | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Professional Elective-I**

**Data Warehousing & Data Mining**

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| **III B.Tech-I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05504** | **PEC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| Objectives   1. Familiarize with mathematical foundations of data mining tools. 2. Introduce classical models and algorithms in data warehouses and data mining. 3. Investigate the kinds of patterns that can be discovered by association rule mining, classification and clustering. 4. Explore data mining techniques in various applications like social, scientific and environmental context. | | | | | | | | |
| **Unit I – Introduction to Data Warehousing** | | | | | | | | |
| Basic Concepts – Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors – Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.  **Learning Outcomes:**  At the end of the unit, students will be able to:   1. Identify the component of Data warehouse 2. Create the architecture of Data warehouse 3. Apply different types of OLAP operations | | | | | | | | |
| **Unit II – Introduction to Data Mining** | | | | | | | | |
| Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.  **Learning Outcomes:**  At the end of the unit, students will be able to:   1. Summarize the data processing steps 2. Apply data cleaning process | | | | | | | | |
| **Unit III – Association Rule Mining** | | | | | | | | |
| Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns.  **Learning Outcomes:**  At the end of the unit, students will be able to:   1. Understand Association Rules 2. Apply different Mining Methods 3. Review Classification using Frequent Patterns | | | | | | | | |
| **Unit IV – Classification and Clustering** | | | | | | | | |
| **Decision Tree Induction** – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines –– Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy. Clustering Techniques – Cluster analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.  **Learning Outcomes:**  At the end of the unit, students will be able to:   1. Creating Decision Tree 2. Evaluate Classification techniques | | | | | | | | |
| **Unit V – WEKA TOOL** | | | | | | | | |
| Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database – Introduction to WEKA, The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association–rule learners.  **Learning Outcomes:**  At the end of the unit, students will be able to:   1. Investigate WEKA tool 2. Explain learning, clustering algorithms | | | | | | | | |
| **Text Books:** | | | | | | | | |
| * + 1. Jiawei Han and Micheline Kamber, ―Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.     2. [Pang Ning Tan](https://www.amazon.in/Pang-Ning-Tan/e/B00AJU1BFY/ref=dp_byline_cont_book_1),  [Michael Steinbach](https://www.amazon.in/s/ref=dp_byline_sr_book_2?ie=UTF8&field-author=Michael+Steinbach&search-alias=stripbooks), [Vipin Kumar](https://www.amazon.in/s/ref=dp_byline_sr_book_3?ie=UTF8&field-author=Vipin+Kumar&search-alias=stripbooks) - - Introduction to Data Mining, Pearson Publishers, 2016 | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016. 2. K.P. Soman, Shyam Diwakar and V. Ajay, ―Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006. 3. Ian H.Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Design a Data warehouse system and perform business analysis with OLAP tools. 2. Apply suitable pre-processing and visualization techniques for data analysis. 3. Apply frequent pattern and association rule mining techniques for data analysis. 4. Design appropriate classification and clustering techniques for data analysis. 5. Understand the basic principles and algorithms used in practical data mining. 6. Apply data mining techniques to solve problems in other disciplines (in a mathematical way). | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Wireless Sensor Networks**

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| **III B.Tech - I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05505** | **PEC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| **Objectives**   1. To study the concepts of sensor networks. 2. To understand the WSN node Architecture and Network Architecture. 3. To identify the Wireless Sensor Network Platforms. 4. To design and develop wireless sensor node. 5. To study the research issues in different layers of sensor networks. | | | | | | | | |
| **Unit I – INTRODUCTION** | | | | | | | | |
| **Introduction**: Wireless Networks,Adhoc Networks, Comparison of Adhoc and Sensor Networks, Applications of Sensor Networks, Challenges and Hurdles in Sensor network design.  **Wireless Transmission Technology and Systems:** Bluetooth; IEEE 802.11a/b/g/n series of wireless LANs; ZigBee; Radio-frequency identification (RFID).  **Sensor-node Architecture:** Hardware components, Energy consumption of sensor nodes, Operating systems and execution environments, Physical layer and transceiver design considerations in Wireless Sensor Networks.  **Learning Outcomes:**   1. Understand self-configured wireless networks. 2. Understand infrastructure less wireless networks. | | | | | | | | |
| **Unit II – MEDIUM ACCESS PROTOCOLS** | | | | | | | | |
| **Medium Access Control Protocols for Wireless Sensor Networks:** Fundamentals of MAC Protocols, Performance Requirements, Types of MAC protocols - Schedule-Based and Random Access-Based Protocols, Sensor-MAC, Zebra-MAC.  **Learning Outcomes:**   1. Evaluate the performance of schedule based and random Medium Access Control protocols for power consumption, fairness, channel utilization and control packet overhead. | | | | | | | | |
| **Unit III – NETWORK PROTOCOLS** | | | | | | | | |
| **Routing Protocols for Wireless Sensor Networks:** Fundamentals of Routing Protocols, Performance Requirements, Routing Strategies in Wireless Sensor Networks - Flooding and its variants, LEACH, Power-Efficient Gathering in Sensor Information Systems, Directed diffusion, Geographical routing.  **Learning Outcomes:**   1. Evaluate the performance of Geographic routing protocols for power consumption, scalability and latency parameters. | | | | | | | | |
| **Unit IV – END –TO- END DELIVERY** | | | | | | | | |
| **Transport Control Protocols for Wireless Sensor Networks:** Traditional Transport Control Protocols-TCP, UDP; Feasibility of Using TCP or UDP for WSNs, Transport Protocol Design Issues, Existing Transport Control Protocols- CODA (Congestion Detection and Avoidance), ESRT (Event-to-Sink Reliable Transport) Performance of Transport Control Protocols.  **Learning Outcomes:**   1. Evaluate the performance of transport control protocols for congestion detection and avoidance, reliability and control packet overhead parameters. | | | | | | | | |
| **Unit V –** MIDDLEWARE FOR WIRELESS SENSOR NETWORKS | | | | | | | | |
| **Middleware for Wireless Sensor Networks:** WSN Middleware Principles, Middleware Architecture, Existing Middleware-MiLAN (Middleware Linking Applications and Networks), IrisNet (Internet-Scale ResourceIntensive Sensor Networks Services).  **Time Synchronization and Localization:** Time synchronization protocols based on sender/receiver synchronization, Localization approaches- proximity, trilateration and triangulation.  **Learning Outcomes:**   1. Understand the Sensor management, sensor network middleware. | | | | | | | | |
| **Text Books:** | | | | | | | | |
| 1. Siva Ram Murthy and B. S. Manoj, Ad hoc Wireless Networks Architecture and Protocols, 2nd edition, Pearson Edition, 2007. 2. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile ad-hoc networking, Wiley-IEEE press, 2004. 2. Mohammad Ilyas, The handbook of ad-hoc wireless networks, CRC press, 2002. 3. T. Camp, J. Boleng, and V. Davies “A Survey of Mobility Models for Ad-hoc Network”. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Understand the principles of sensor networks and mobile ad hoc networks, and their impact on protocol design. 2. Develop MAC and routing protocols for sensor networks. 3. Develop efficient routing protocols for sensor and mobile networks. 4. Evaluate the performance of transport control protocols for congestion detection and avoidance, reliability and control packet overhead parameters. 5. Understand and develop information dissemination protocols for sensor and mobile networks. 6. Evaluate the performance of Geographic routing protocols for power consumption, scalability and latency parameters. | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Software Testing Methodologies**

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| **III B.Tech - I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05506** | **PEC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| Objectives   1. To study fundamental concepts in software testing and discuss various software testing issues and solutions in software unit, integration, regression and system tests. 2. To learn how to plan a test project, design test cases and data, conduct testing, manage software problems and defects, generate a test report. 3. To expose the advanced software tests concepts such as object-oriented software test methods, web-based and component-based software testing. 4. To understand software test automation problems and solutions. 5. To learn how to write software test documents and communicate with engineers in various forms. | | | | | | | | |
| **Unit I – Software Testing** | | | | | | | | |
| Introduction, Evolution, Myths & Facts, Goals, Psychology, definition, Model for testing, Effective Vs Exhaustive Software Testing. Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, Software Testing Methodology. Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low-level designs, verifying code, Validation.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. Understand the fundamentals of testing. 2. Analyze Software Testing Life Cycle. 3. Illustrate Software Testing Methodology. | | | | | | | | |
| **Unit II – Testing Techniques** | | | | | | | | |
| Dynamic Testing: Black Box testing techniques, Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table-based testing, Cause-Effect Graphing based testing, Error guessing. White-Box Testing: need, Logic Coverage criteria, Basis Path testing, Graph matrices, Loop testing, data flow testing, mutation testing.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. Understand the process of various Black Box testing techniques. 2. Understand the process of various White Box testing techniques. 3. Differentiate between Black Box testing and White Box testing techniques. | | | | | | | | |
| **Unit III – Static Testing** | | | | | | | | |
| Inspections, Structured Walkthroughs, Technical Reviews. Validation activities: Unit testing, Integration Testing, Functional testing, system testing, acceptance testing. Regression testing: Progressive Vs regressive testing, Regression test ability, Objectives of regression testing, Regression testing types, Regression testing techniques.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. Understand the process of static testing. 2. Analyze various validation activities. 3. Differentiate between Progressive and Regressive testing. 4. Understand the Regression Testing Techniques. | | | | | | | | |
| **Unit IV – Efficient Test Suite Management** | | | | | | | | |
| Growing nature of test suite, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite Software Quality Management: Software Quality metrics, SQA models. Debugging: process, techniques, correcting bugs.  **Learning Outcomes:**  At the end of this unit, the student will be able to   1. Understand test suite minimization. 2. Understand the test case prioritization techniques. 3. Understand the Software Quality Management. 4. Analyze the application of a cost of software quality system. | | | | | | | | |
| **Unit V – Automation and Testing Tools** | | | | | | | | |
| Need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools such as Win Runner, Load Runner, Jmeter and JUnit. Test Automation using Selenium tool.  **Testing Object Oriented Software**: basics, Object oriented testing.  **Testing Web based Systems**: Challenges in testing for web-based software, quality aspects, web engineering, testing of web-based systems, Testing mobile systems  **Learning Outcomes:** At the end of this unit, the student will be able to   1. Understand the process of automation. 2. Implement automated testing using Selenium tool. 3. Implement Object Oriented Software Testing. 4. Implement web based software testing. | | | | | | | | |
| **Text Books:** | | | | | | | | |
| * 1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford.   2. Software Testing, Yogesh Singh, CAMBRIDGE. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| * + 1. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson.     2. Software testing techniques – Baris Beizer, Dreamtech, second edition.     3. Software Testing, Principles, techniques and Tools, M G Limaye, TMH. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods. 2. Design and conduct a software test process for a software project. 3. Analyze the needs of software test automation. 4. Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects. 5. Basic understanding and knowledge of contemporary issues in software testing, such as component-based, web based and object-oriented software testing problems.   6. Write test cases for given software to test it before delivery to the customer and write test scripts for both desktop and web-based applications. | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Computer Networks and Operating Systems Lab**

**(Computer Science & Engineering)**

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| **III B.Tech - I Semester: SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05509** | **PCC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| Objectives   * + 1. To Verify the fundamental concepts with experiments | | | | | | | | |
| **List of Experiments:** | | | | | | | | |
| 1. Submit a report on the computer network facility available in the college including the devices used, topology used, specification of all the equipment used  2. Submit a report on the Internet facility available in the college including the specification of the devices used and logical configuration.  3. Implement the algorithm for parity method for error control.  4. Implement the algorithm on hamming method for error correction (both single and block errors).  5. Implement the algorithm for check sum computation.  6. Implement the distance vector routing algorithm.  7. Implement the link state routing algorithm.  8. Study any simulator available in the market and submit a report containing executive summary of it and detail description of the features  9. Write a program to implement the following system calls:  a) fork b) exec c) getpid d) wait  10. Implement the following CPU Scheduling Algorithms:  a) FCFS b) SJF (Pre-emptive) c) Round Robin d) Priority.  11. Implement the following synchronization problems:  a) Producer Consumer Problem  b) Dining Philosopher’s Problem.  12. Write a program which shows the performance improvement in using threads as compared with process.  13. Implement Banker’s Algorithm for Deadlock Avoidance and Detection. Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock has occurred or not. Consider number of resources are three and Jobs are five as shown in the figure:   |  |  |  |  | | --- | --- | --- | --- | | **Process** | **Allocation** | **MAX** | **Available** | | **A B C** | **A B C** | **A B C** | | P0 | 0 1 0 | 7 5 3 | 3 3 2 | | P1 | 2 0 0 | 3 2 2 | | P2 | 3 0 2 | 9 0 2 | | P3 | 2 1 1 | 2 2 2 | | P4 | 0 0 2 | 4 3 3 |   14. Simulate Paging Technique of memory management.  15. Implement the following Algorithms:  a) First Fit b) Best Fit c) Worst Fit  16. Implement the following Page Replacement Algorithms:  a) FIFO b) LFU c) LRU d) Optimal  Consider number of frames are three and Reference string  is: 2 3 2 1 5 2 4 5 3 2 4 2 4 5  17. Write a program to demonstrate File Permissions. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. “Computer Networking: A Top-Down Approach Featuring the Internet”, J.F. Kurose and K.W.Ross, 6th Ed., Pearson Education, 2012. 2. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI. 3. Compilers: Principles, Techniques, and Tools (Second Edition)Alfred Aho, Monica Lam, Ravi Sethi, and Jeffrey Ullman.Addison-Wesley. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| At the end of the lab, students will be able to   1. Prepare a report on networking facilities available in the campus. 2. Implement Error Control Techniques. 3. Implement various routing algorithms. 4. Stimulate the File and Memory Allocation techniques. 5. Implement IPC between process and its synchronization techniques. 6. Simulate the algorithms of CPU scheduling, Disk scheduling, Page replacement and deadlock scenarios. | | | | | | | | |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**Web Development Technologies Lab**

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| **III B.Tech-I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05510** | **PCC** | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| Objectives   1. To develop client-server application using modern technologies. 2. To build single-page web applications using AngularJS. 3. Create dynamic web pages using Java Script and AJAX. 4. To enhance the knowledge to Node.js, ReactJS and mongodb. | | | | | | | | |
| **List of Experiments** | | | | | | | | |
| * 1. Write a procedure to download and Installation of Apache HTTP Server, Apache Tomcat Server and XAMPP Server.   2. To create an HTML page by using basic HTML Tags, Table Tags, List Tags, Image Tags, anchor Tags.   3. To create a simple student Bio - data form using html5. It should contain the following First Name, Last Name (text box), address (multiline text box), Gender (radio button Male, Female, Transgender), Email Id, Phone No., Known Technologies (checkboxes – C, Java, Angular JS, ReactJS, Node.js etc.), Extracurricular activities (text box), Nationality (combo box), Submit and Reset button.   4. Design an HTML page by using frames such that page is divided into 3 frames 20% on top to show contents of College Name and Department Name, 40% in left to show list of faculty names, remaining on right to show faculty profiles/details (Note: if you click particular faculty, it will display only that faculty details).   5. Design the webpage by applying the different styles using inline, internal & external style sheets.   6. Write an XML file which will display the Book information which includes the following: a) Title of the book b) Author Name c) ISBN number d) Publisher name e) Edition f) Price.   7. Create a Schema to describe a library. Library has one or more - books, members and staffs. (a) Each book has BookID (Attribute), Title, one or more Authors, Publisher Year of Publication, ISBN and Price. (b) Each Member has MemeberID (Attribute), Name, Address, Phone number (c) Each Staff has StaffID(Attribute), Name, Address, Phone number. Each Author has AuthorID(Attribute), Name, Address, Phone number. (d) Each Publisher has PublisherID(Attribute), Name, Address, Phone number. Use the above DTD in a sample XML document.   8. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.   9. Implement the web application using PHP, the user is first served a login page which takes user’s name and password. After submitting the details, the server checks these values against the data from a database and takes the following decisions. If name and password match, serves a welcome page with user’s full name. If name matches and password doesn’t match, then serves “password mismatch” page If name is not found in the database, serves a registration page, where user’s full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password).   10. Write a PHP program to Insert, update and delete using student database.   11. a). Implement the web application using PHP, A web application that lists all cookies stored in the browser on clicking “List Cookies” button. Add cookies if necessary.   b). Implement the web application using PHP, which takes a name as input and on submit it shows a hello <name> page where<name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).   * 1. Write a Program to hide paragraph using jQuery.   2. Create a web page using Bootstrap.   3. Create a Single page Application (SPA) where navigation between the pages is performed without refreshing the whole page using AngularJS.   4. Create an HTML page to perform CRUD operations using ReactJS, Node.js and mongodb. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, And AJAX, Black Book, KOGENT LEARNING SOLUTIONS INC. 2. Web Technologies, Uttam K. Roy, 1st edition 7th impression, 2012, Oxford Higher Education | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Create HTML and CSS, JavaScript effectively to create interactive and dynamic websites. 2. Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms. 3. Implement client and server-side scripting. 4. Develop XML, XSLT based web applications. 5. Develop application using recent environment like JSON, AJAX, Node.js and Angular JS. 6. Design Web applications. | | | | | | | | |

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

**IoT Lab**

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| **III B.Tech-I Semester SRIT R20** | | | | | | | | |
| **Course Code** | **Category** | **Hours/Week** | | | **Credits** | **Maximum Marks** | | |
| **R204GA05511** | PCC | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| **Objectives:**  This course will enable students to   * + - 1. Implement the IoT concepts for the given applications.       2. Able to design and program the IoT based system. | | | | | | | | |
| **Lab Experiments:** | | | | | | | | |
| 1. 1.Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board. 2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors. 3. Control any two actuators connected to the development board using Bluetooth. 4. Read data from sensor and send it to a requesting client. (using socket communication) 5. Note: The client and server should be connected to same local area network. 6. Create any cloud platform account, explore IoT services and register a thing on the platform. 7. Push sensor data to cloud. 8. Control an actuator through cloud. 9. Access the data pushed from sensor to cloud and apply any data analytics or visualization services. 10. Create a mobile app to control an actuator. 11. Design an IoT based air pollution control system which monitors the air pollution by measuring carbon monoxide, ammonia, etc and gives alarm or sends message when the pollution level is more than permitted range 12. Design an IoT based system which measures the physical and chemical properties of the water and displays the measured values. 13. Identify a problem in your local area or college which can be solved by integrating the things you learned and create a prototype to solve it (Mini Project). 14. Design a business model canvas for a digital display | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012.  2. Alexander Osterwalder, and Yves Pigneur – Business Model Generation – Wiley, 2011. | | | | | | | | |
| **Course Outcomes:** | | | | | | | | |
| **At the end of the course, student will be able to**   1. Understand the components of hardware. 2. Choose the sensors and actuators for an IoT application. 3. Select protocols for a specific IoT application. 4. Utilize the cloud platform and APIs for IoT application. 5. Experiment with embedded boards for creating IoT prototypes. 6. Design Smart application like smart cities, smart home etc. | | | | | | | | |