Assignment 1: Assignment based on FHSS and DSSS

Problem Statement: Spread Spectrum Communication System Design

Background:

You are tasked with designing a spread spectrum communication system for a mission-critical application in a noisy and interference-prone environment. The system must ensure reliable and secure data transmission while operating in the presence of intentional jamming and other forms of interference.

Objective:

Design and implement a spread spectrum communication system using either Direct Sequence Spread Spectrum (DSSS) or Frequency Hopping Spread Spectrum (FHSS) technique to achieve robust and secure wireless communication.

Deliverables:

Complete system design documentation.

Simulation code and results.

Performance analysis report.

Presentation slides summarizing the project findings.

Assignment 2: Assignment based on generations and drivers of 5g

Prepare a case study on any of the mentioned topic on 5G with suitable diagram.

Case Study Scenario:

Imagine a mid-sized city that is eager to embrace smart technologies to enhance quality of life, improve public services, and drive economic growth. The city administration is considering the deployment of 5G infrastructure to support its smart city aspirations.

Topics:

Smart Transportation:

Analyze how 5G connectivity can improve traffic management, enable real-time monitoring of public transportation systems, and support the deployment of autonomous vehicles. Evaluate the potential for 5G-enabled vehicle-to-everything (V2X) communication to enhance road safety and reduce congestion.

Smart Utilities:

Assess the role of 5G in optimizing energy distribution, water management, and waste management systems. Explore how 5G-powered IoT sensors and smart meters can enable better resource allocation and conservation efforts.

Smart Public Safety:

Investigate how 5G networks can facilitate the deployment of advanced surveillance systems, emergency response services, and predictive analytics for crime prevention. Discuss privacy and security considerations associated with the use of 5G-enabled surveillance technologies.

Smart Healthcare:

Examine the potential of 5G to support telemedicine services, remote patient monitoring, and augmented reality-assisted surgeries. Assess the impact of 5G on improving access to healthcare services and addressing healthcare disparities in urban areas.

Smart Governance:

Explore how 5G technology can enable better citizen engagement, e-governance initiatives, and data-driven decision-making processes. Discuss the challenges of ensuring digital inclusion and accessibility for all residents in the context of 5G-enabled smart governance.

Assignment 3: Assignment based on GSM,EDGE,GPRS

Prepare a report for following mentioned topics

Topic: Comparison of GSM/GPRS with Other Mobile Communication Technologies:

Conduct a comparative analysis of GSM/GPRS with other cellular technologies such as CDMA, LTE, and 5G. Evaluate the strengths and weaknesses of each technology in terms of coverage, data rate, mobility support, and compatibility with different devices. Discuss the implications of these comparisons for network operators, device manufacturers, and end-users in different regions and market segments.

Assignment 4: Assignment based on UMTS, WCDMA, LTE

Prepare a minute paper for any of the technology mentioned above

Points to be covered

1. Overview of technology
2. data rates, spectral efficiency, and system capacity, architecture
3. Challenges and considerations
4. Evolution
5. future prospects

Assignment 5: Assignment on IEEE 802.11

Take home test

Solve the following questions

1 Explain the protocol architecture of IEEE 802.11.
2 Explain the physical layer of IEEE 802.11.
3 Define Wi-Fi keep various applications advantages and disadvantages of Wi-Fi give the comparison between IEEE 802.11 a/b/g/PHY.

Assignment 6: Assignment on IEEE 802.16

Open Book test

1 Write a short note on IEEE 802.16 protocol architecture
2 What are the functions of security services in IEEE 802.16

Assignment 7: Assignment on IEEE 802.15.1 and zigbee

Pop quiz based on wireless personal area network (Bluetooth and Zigbee)

Assignment 8: Assignment on Adhoc Networks

Technical Paper review

Select any technical paper based on mobile ad hoc network and prepare one page report on the following mentioned points

1. Name of paper
2. Author's name
3. Year of publication
4. Abstract
5. Introduction
6. Key concept
7. Challenge
8. Advancement and future scope

Assignment 9: Assignment on security in GSM and UMTS security

Puzzle on the following mentioned points

1 Access control and authentication in GSM
2 Authentication A3 algorithm in GSM
3 Data decryption process using A8 in GSM
4 layered architecture and protocol stack

Assignment 10: Assignment on WPA and WPA 2

Student seminar

Student seminar is planned on the following mentioned topics

1 Different protocol used in WPA and WPA2?
2 WAP 2.0.
3 WEP

Assignment 11: Assignment on wireless network design consideration

Design Problems

Prepare a document for any one of the mentioned problem statements with suitable diagrams

Problem 1: You are tasked with designing a wireless network infrastructure for a branch office of a multinational corporation. The branch office has approximately 100 employees and occupies a three-story building with a total area of 10,000 square feet. The office requires reliable wireless connectivity to support various business operations, including email communication, file sharing, video conferencing, and access to cloud-based applications.

Considering the requirements and challenges of designing a wireless network for the branch office, please address the following design considerations:

1. Network Topology:
2. Security Measures:
3. Quality of Service (QoS):
4. Management and Monitoring:
5. Redundancy and High Availability:
6. Budget and Cost Considerations:
7. User Experience and Satisfaction:

Your design proposal should include a detailed explanation of each design consideration, along with justification for the chosen approach and recommendations for implementation. Additionally, discuss any potential challenges or risks associated with the proposed design and mitigation strategies to address them effectively.

Problem 2: As a network architect tasked with designing a wireless network for a college campus, encompassing various academic buildings, residence halls, outdoor spaces, and recreational areas, please address the following design considerations:

1. Coverage and Capacity Planning:
2. Network Infrastructure:
3. Wireless Standards and Technologies:
4. Security and Authentication:
5. Quality of Service (QoS):
6. Guest Access and BYOD:
7. Location-Based Services (LBS):
8. Management and Monitoring:
9. Budget and Resource Allocation:
10. Campus Community Engagement:

Your design proposal should encompass detailed explanations of each design consideration, along with rationale for the chosen approach and recommendations for implementation. Additionally, discuss any potential challenges or risks associated with the proposed design and mitigation strategies to address them effectively.