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NORTHEAST
WI Technical College

10-451-202 061919 Telecommunications Networks

Course Outcome Summary

COURSE INFORMATION

Alternate Title: Telecommunications Networks

Description:

10-451-202 TELECOMMUNICATIONS NETWORKS ...prepares students for the differing telecommunications networks that are utilized in the industry.

Instructional Level: 10

Total Credits: 2

Total Hours: 72

COURSE HISTORY

Status: Active

Active Date: 5/23/2021

Last Revision Date: 9/15/2023

Revised By: Kristina Wendricks (15002977)

Last Approval Date: 9/15/2023

Approved By: Kristina Wendricks (15002977)

COURSE COMPETENCIES

1. Discuss terminology, fiber optic basics and applications

Status: Active

Assessment Strategies

1.1. Discussion

1.2. Quiz

Criteria

Learners will be successful when they are able to:

1.1. Describe the three main parts of a fiber optic network and how the signals are transmitted

1.2. Match terminology and acronyms to definitions

1.3. Differentiate between different fiber optic cables

1.4. Identify the different occupations and job roles in the telecommunications industry

1.5. Characterize the differences between single mode and multimode cables

1.6. Characterize the differences between different connector types

1.7. Characterize the differences between different splicing apparatus

1.8. Explain bandwidth requirements in the past, present, and future for effective internet connectivity

Learning Objectives

1.a. Describe the basic elements of fiber optic networks

1.b. Identify what types of fiber optic cables and apparatus to use in different applications

1.c. Recognize the importance of reliable internet and communications

1.d. Recognize fiber optic terminology and basic fiber optic characteristics

2. Discuss basic fiber theory and wavelengths

Status: Active

Assessment Strategies

2.1. Discussion

2.2. Quiz

Criteria

Learners will be successful when they are able to:

2.1. Explain principles of light tranmission

2.2. Explain attenuation

2.3. Explain dispersion

2.4. Explain reflectance

2.5. Explain light transmission bands

2.6. Explain refractive index

2.7. Explain index of refraction

2.8. Explain reflection issues

2.9. Explain dispersion and polarization

Learning Objectives

2.a. Discuss basic fiber theory

2.b. Discuss wavelengths and bands

3. Identify the anatomy of fiber optics

Status: Active

Assessment Strategies

3.1. Discussion

3.2. Quiz

Criteria

Learners will be successful when they are able to:

3.1. Discuss all ITU standards for singlemode fiber optic cable

3.2. Discuss the most commonly used ITU standards most commonly used today (ITU-T G.652D and ITU-T G.657)

3.3. Discuss macro-bending and the use of ITU-G.657 fiber optic cables

3.4. Discuss bend loss vs wavelength

3.5. Discuss bending loss for current and next generation fiber optic systems

3.6. Discuss common locations most commonly affected by bending losses

3.7. Recall TIA-598 optical fiber cable color coding standards

3.8. Recall color coding for connectors types

Learning Objectives

3.a. Identify manufacturer industry standards of fiber optic cable

3.b. Distinguish the type of cable to use in the network and in what application

3.c. Recall fiber optic color codes and connector color identification

4. Discuss fiber optic geometry, manufacturing and reliability

Status: Active

Assessment Strategies

4.1. Discussion

4.2. Quiz

Criteria

Learners will be successful when they are able to:

4.1. Discuss how the core and cladding both carry the fiber optic signals

4.2. Discuss fiber optic mode field diameter

4.3. Discuss fiber optic tolerances

4.4. Discuss the process of manufacturing a fiber optic cable

4.5. Discuss how the deposition process affects fiber optic parameters

4.6. Discuss manufacturing reliability tests and measurements

Learning Objectives

4.a. Discuss how light is carried through fiber optic cables

4.b. Discuss manufacturing of fiber optic cables

5. Discuss basic topologies and FTTX topologies

Status: Active

Assessment Strategies

5.1. Discussion

5.2. Quiz

Criteria

Learners will be successful when they are able to:

5.1. Discuss point to point or star topology

5.2. Discuss star topology

5.3. Discuss ring or mesh topology

5.4. Discuss PON, G-PON, GE-PON and Point to Point topologies and their bandwidth capabilities

5.5. Comprehend the components of a Fiber to the Home (FTTH) network such as OLTs, ONTs, and Splitters

5.6. Carry out loss budget calculations for fiber optic networks to determine acceptable losses per connection

Learning Objectives

5.a. Recognize basic fiber optic topologies

5.b. Recognize Fiber to the "X" (FTTX) topologies

6. Discuss troubleshooting of fiber optic networks

Status: Active

Assessment Strategies

6.1. Discussion

6.2. Quiz

Criteria

Learners will be successful when they are able to:

6.1. Discuss how to determine if there is a service issue or failure in the network

6.2. Discuss what test equipment can be used to troubleshoot a fiber optic network

6.3. Discuss outside plant common failure points

6.4. Discuss inside plant common failure points

6.5. Discuss component failures

6.6. Discuss the impact of contamination during splicing work

6.7. Discuss how environmental impacts and pests can affect networks and potential mitigation practices

Learning Objectives

6.a. Discuss issues that can cause outages or service disruption in fiber optic networks

6.b. Discuss failure points in a fiber optic network

6.c. Discuss how poor installation practices can increase chances of network failures