Introduction to Fiber Optic Technology

3-Day Training
West Chester, Pennsylvania

This three-day course has been developed with 12 hours of classroom and 12 hours of hands-on skills labs to provide a strong foundation for understanding the basic principles of fiber optic technology. Beginning with a short history of the industry and major growth steps to the state of the art today.

Topics covered include fiber construction and fabrication techniques, numerical aperture, multimode and singlemode transmission theory, intermodal and intramodal dispersion, fiber attenuation, bending losses, fiber scattering mechanisms, fiber splicing and connector termination hardware, system testing and troubleshooting.

Fiber transmission theory is supplemented with hands on training in the safe handling of fibers, removal of the buffer coating, fiber cleaving, mechanical and fusion splicing, connector termination, insertion and return loss measurements, and optical time domain reflectometry.

Instructor: Carl Durkow
Carl Durkow currently works as a Senior Optical Engineer at Microwave Photonic Systems. He graduated from Rutgers University with his Bachelor's degree in Physics. He is a member of the Principle Professional Staff at Camden County College in Blackwood, NJ, with 26 years of fiber optic teaching experience at the college level. Carl has over 33 years of fiber optic research and development experience. Awarded 3 US patents; 2 in the fiber optics field and both are currently utilized products. He was presented the Excellence in Teaching Award in 2002.

Course Objectives

1. A perspective of the electromagnetic , optical and visible spectrum
2. An understanding of basic optical terms and concepts
3. A knowledge of the types of fibers and cables available
4. An understanding of fiber optic theory and operation, including past, present and future applications as well as its advantages and disadvantages.
5. An insight into the broad and diversified applications of fiber optic technology
6. Hands on testing experience and the safe handling of optical cables.

Course Outline

Day One:

Classroom:

Fiber optic technology overview
Benefits and applications
Propagation and material interaction
Fiber construction and fabrication
Modes in a dielectric waveguide
Intermodal dispersion and fiber bandwidth
Multimode and singlemode transmission
Optical cable construction

Day One Lab:

Handling optical cable
Removing tight buffer fiber, and primary buffer
Fiber strength testing
Cleaving optical fibers
Mechanical splicing techniques

Day Two:

Classroom:

Dispersion
– Chromatic
– Polarization mode dispersion
Spectral attenuation
Optical fiber interconnects
Test methodologies
– Light sources and optical power meters

Day Two Lab:

Fusion Splicing
Connector termination and polishing
Connector inspection and cleaning
Testing with a light source and optical power meter
Power ratio testing

Day Three:

Classroom:

Optical Time Domain Reflectometry (OTDR)
Light sources for fiber optics
Semiconductor laser diodes
Optical detectors

Day Three Lab:

Test methods for optical interconnects
– Return loss measurements
– Insertion loss measurements
– OTDR system characterization