Training Program:

PRACTICAL FIBER OPTIC TECHNOLOGY

INTRODUCTION:

This is a comprehensive workshop that provides the necessary background to understand the fundamentals of fiber optics systems and their individual components including fibers, cable construction, connectors, splices and optical sources and detectors. Participants will use this knowledge to develop the required techniques for design, installations and maintenance of fiber optics systems.

The workshop places significant emphasis on the practical techniques of components installations and system design. Attendees will have the opportunity to get hands-on experience with mechanical and fusion splicing and with fitting the popular industrial fiber connectors. Furthermore, participants will practice using various fiber optics test equipment's such as optical sources and power meters. The workshop is a practical, hands-on one enabling participants to work through practical exercises which reinforces the concepts discussed during the workshop.

WHO SHOULD ATTEND?

Instrumentation and control engineers and technicians, Telecommunications engineers and technicians, Maintenance engineers and technicians, process control engineer, project engineers, Electrical engineers, consulting engineers, systems engineers, project managers, electricians.

CERTIFICATE

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

COURSE OBJECTIVES:

Participant will be able to:

- Differentiate between analog and digital instruments
- Understand how digital signal sampling works in digital instruments
- Identify the strengths and weaknesses of digital instruments
- Explain the basics of serial digital communications
- Understand the effects of using digital instruments in closed loop control
- Configure and calibrate smart/digital field devices
- Configure intelligent control valves
- Recognize the capabilities of HART™ communication
- Understanding digital multivariable transmitter

COURSE OUTLINE:

INTRODUCTION TO FIBRE OPTICS SYSTEMS

- Introduction
- Workshop outline
- Historical background to fiber optics
- Comparison of fiber optics and copper systems

- Data communications
- Communications channel
- Transmission modes
- Electromagnetic spectrum
- Revisiting copper

Other types of fibers

- Fundamentals principles of operations
- Light transmission nature of glass
- Numerical aperture
- Model propagation in fiber
- Multimode/ single mode/step index/ graded index
- Bandwidth of fibers
- Modal and chromatic dispersion
- Absorption/scatter/ bending/ radiation/mismatches
- Other types of fibers

Construction of Fiber optics cables

- Cable objective, Tensile ratings, structural elements & Strengthening members
- Housing- loose tube/ slotted core/ tight buffers
- Classes of cables- aerial/ underground/ subaqueous/ indoor

Connecting fiber

Optical connection issues

Fiber end preparation

Splicing fibers- fusion/mechanical

Connectors & Optical couplers

Optical drivers and detectors

Light emitting diodes & Lasers

Transmitter's modulus

Safety considerations

PIN photodiodes & Receiver modules

Optical amplifiers

Installing fiber optics cables

Preparation- site survey and design

Installation rules and procedures

Bending radius, cable tension/ cable reels

Cable trays/ conduits/ lubricants

Indoor cable installation

Outdoor cable installation/ environmental conditions

Splicing trays/ organizers/ termination

Cabinets/ patch panels/ distribution panels/ breakout boxes

Practical sessions

Fiber optics system design

Initial design considerations

Future capacity/ reliability/ operating wavelength

Repeaters and amplifiers

Design loss calculations / link loss budgets

Testing fiber optics systems

Concepts of optical measurements

Continuity testing

Optical time domain reflectometry (OTDR)

Bit Error Rate (BER) testing

Practical Sessions (a complete day)

Technologies that use optical fibers

PDH

SDH

WDM

- New trends in fiber optics systems and components