Course Title:
Capacity Development Program on DWDM Transmission Network

Mode: **Hybrid**

Phase-01
Where : **Virtual (Using Zoom Platform).**

Phase-02
Where: **BdREN Office, Dhaka, Bangladesh.**

When:
Phase-01
Date : 17 October 2022 to 14 November 2022
Time : 10:30-12:30 [GMT+6]
Phase-02
December, 2022-January, 2023
Specific Dates yet to be scheduled

Overview:
Telecommunication networks today employ optical technology to transport the enormous amounts of data we consume, often across large/long-haul distances. Dense Wavelength Division Multiplexing (DWDM), a fiber-optic transmission technique, involves the process of multiplexing many different wavelength signals onto a single fiber. Each fiber has a set of parallel optical channels and each one uses slightly different "light wavelengths". The fibers employ "light wavelengths" to transmit data parallel-by-bit or serial-by-character. DWDM is a very crucial component of optical network that will allow the transmission of data: Voice, Video, IP, ATM, and SONET/SDH respectively, over the optical layer.

DWDM is used in both terrestrial and subsea networks, and other scenarios, including Data Center to Data Center links. Apart from meeting high-capacity requirements, DWDM also delivers required levels of quality and security. This technology is especially suitable and cost-effective for long distance transmission, i.e., long-haul networking.

Bangladesh Research and Education Network (BdREN) the National Research and Education Network (NREN) of Bangladesh, provides high-speed optical fiber network connectivity to all the Public Universities and a few of the Private Universities spanned across different parts of the country using its own state-of-the-art DWDM Transmission Network.

The purpose of this course is to make capacity development of NREN engineers, especially in the Design, Implementation and Operation of DWDM-based Optical Transport Network (OTN). It will use sophisticated DWDM equipment during the Hands-On Lab Activities.

The training will be held in blended format to save the cost and to make sure that trainees will get the maximum output from the program. The format will be as follows:

- **Virtual Training**: to be conducted over Zoom Platform: 8 classes, 2 classes/week, 2 hours/class.
- **Physical Training:** 4 days (8 hours/day), Mostly hands-on, to be held onsite at Dhaka.

The training is planned in a way that contains an online exam [MCQ] at the end of the "Virtual Training" program. Provided the candidate passes that exam, the candidate will be chosen for physical training. The candidate will get the opportunity to attend the exam twice. In case of his/her failure in

the exam at the first attempt, he/she can take it for the second time. If the candidate fails to pass the exam in both of his/her attempt, he/she will be disqualified to be considered for physical training. However, due to limited seating capacity in "onsite" training, merit of the candidate might come into play in selecting the candidate.

Certificate/Award:

- The successful candidates in virtual training will be awarded with a Digital Certificate.
- The successful candidate in the physical training will also be awarded with a Digital Certificate.

Topics to be covered:

Session	Date	Time (GMT+6)	Topics		Speaker/ Instructor
Day-1 (Class-01)	17/10/2022 (Monday)	10:30-12:30	Describe SDH working principle	SDH Overview	SSB
				The Frame Structure and Multiplexing Method of SDH Signals	ZK
				Overhead and Pointer	ZK
				Logic Composition of SDH Equipment	SSB
Day-2 (Class-02)	20/10/2022 (Thursday)	10:30-12:30		SDH Network Structure and Network Protection Mechanism	SSB
				Types and Parameters of Optical Interfaces	SSB
				Timing and Synchronization	ZK
				Transmission Performance	ZK
Day-3 (Class-03)	24/10/2022 (Monday)	10:30-12:30	Describe WDM working principle	DWDM Overview	SSB
				DWDM Transmission Media	SSB
				DWDM Key Technologies (OTN, FOADM ROADM and ASON)	ZK
Day-4 (Class-04)	27/10/2022 (Thursday)	10:30-12:30		DWDM Networking Design	SSB
				Describe DWDM with FOADM and ROAMD working principle	ZK
				Optical Power Calculation	ZK
Day-5 (Class-05)	31/10/2022 (Monday)	10:30-12:30	Describe the basic concept of CISCO DWDM (ONS15454)	DWDM Fundamentals	AA
				DWDM and Flex spectrum Foundation	AA
				Hardware and Software Basics	AA
				Hardware installation and Multi shelf	AA
Day-6 (Class-06)	03/11/2022 (Thursday)	10:30-12:30		NCS 2006 installation	AA
				EDFA 35	AA
				FS-SMR	AA
				Single Module ROADM, E-PON, G-PON	AA
Day-7 (Class-07)	07/11/2022 (Monday)	10:30-12:30		Cisco Transport Planner	AA
				Node Turn-Up	AA
				Any Rate Xponder	AA
				10G Line card overview	AA
				100+ G line cards overview	AA
Day-8 (Class-08)	10/11/2022 (Thursday)	10:30-12:30		400G-XP	AA
				400G-XP-Encryption	AA
				Passive Unit,	AA
				Comparisons of CISCO DWDM (ONS 15455) and Huawei DWDM (OSN 8800)	AA
				Explain the protection mechanism of BPS, PDH protection, Linear MSP, 2f-MSP, ERP, SNCP, DNI and Synchronization, DCN Management.	AA
				I Converter technology, Alien wave length technology	AA

Instructors		
Serial	Trainer's Full Name	Abbreviation Form
1	Alam Ahamed	AA
2	Simon Sohel Baroi	SSB
3	Zobair Khan	ZK

Participants [For Virtual Training]:

Country	Number of Participants
Bangladesh	39
Bhutan	2
Laos	2
Nepal	2
Pakistan	2
Philippines	1
Sri Lanka	2
Thailand	2
Vietnam	2
Total	**54**

Participants [For Physical Training]:

- **Total: 20 (Twenty)**
  - One from each of the Foreign Country provided they successfully complete the "Virtual Training". In case of both the candidates successfully completes the "Virtual" part, only one will be considered based on merit.
  - Twelve (12) from Bangladesh based on successful completion of the Virtual part and based on merit.