GOVERNMENT OF TAMILNADU

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-25

STATE PROJECT COORDINATION UNIT

(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	**OPTICAL NETWORKING**
Course Code	**EC/2020/021**
Course Duration	60 Hours
Minimum Eligibility Criteria	10th/+2 /ITI/Diploma/Graduate
Pre-requisites (if any)	-
Course Objectives	Training module has been designed for the participants to • Understand the first and second generation optical network • Learn the function of various components of optical network • Study the transmission system Engineering
Course Outcomes	At the end of training, the trainees will be able to • Explain the first and second generation optical network • Explain the function of various components • Explain the concept of Transmission system Engineering
Expected Job Roles	Optical Network Technician

TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of Examination
				Min	Max	
EC/2020/021	OPTICAL NETWORKING	Theory	24	10	20	3 Hours
		Practical	36	40	80	
		Total	60	50	100	

EC/2020/021 – OPTICALNETWORKING

DETAILED SYLLABUS

Unit No	Modules	No.of.Hours	
		Theory	Practical
I	**INTRODUCTION TO OPTICAL NETWORKS**	06 Hours	
1.1	Telecommunication networks	02	04
1.2	First generation optical networks		
1.3	Multiplexing techniques		
1.4	Second generation optical networks,		
II	**COMPONENTS**	18 Hours	
2.1	Couplers	08	10
2.2	Isolators and Circulators		
2.3	Multiplexes and filters Optical amplifiers.		
2.4	Transmitters		
2.5	Wavelength converters.		
2.6	detectors		
2.7	Switches		
III	**TRANSMISSION SYSTEM ENGINEERING**	16 Hours	
3.1	System model	06	10
3.2	Power penalty		
3.3	optical amplifiers		
3.4	Crosstalk, Dispersion, Overall design Consideration.		
IV	**FIRST GENERATION NETWORKS**	10 Hours	
4.1	SONET/SDH,	04	06
4.2	Computer interconnects		
4.3	Mans, Layered architecture for SONET and second generation networks.		
V	**WAVELENGTH ROUTING NETWORKS**	10 Hours	
5.1	Optical layer	04	06
5.2	Node design		
	Total Theory / Practical Hours	**24**	**36**
	Total hours	**60**	

HARDWARE REQUIREMENT

S.NO	LIST OF TOOLS /EQUIPMENTS
1	Couplers
2	Isolators
3	Connectors
4	Multiplexer and Demultiplexer
5	Optical Switches

SOFTWARE REQUIREMENT

NAME OF THE SOFTWARE
NIL

REFERENCE BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Integrated Optics	T. Tamir	Springer-Verlag,
2	Optical Fiber Communication	Gerd Keiser	MGH,2008
3	Fiber optic Communication Systems	G. Agrawal	Wiley India
4	Optical Networking	Debra Cameron,	Wiley, December 2001
5	Understanding Optical Communications	Harry J. R. Dutton	Prentice Hall, January 1999
6	Fiber-Optic Communication Systems	Govind P. Agrawal	Wiley, August 1997
7	Optical Fiber Communication	John M.Senoir	Pearson Education

ASSESSMENT AND CERTIFICATION

S.No	Criteria for assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the CIICP Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the CIICP Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max. Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Objective and Circuit Diagram	20
	b)Procedure and Connections / Execution	20
	c)Result and Viva	20
	d)Record	20
	Total Marks	**100**

THEORY MODEL QUESTION PAPER

EC/2020/021 – OPTICAL NETWORKING

(Maximum Marks: 20)

(N.B: Answer any Twenty questions) 20x1= 20 Marks

1. Write any two elements of optical network.
2. Name any two types of telecommunication networks.
3. What is the use of multiplexing technique?
4. Name the types of multiplexing technique.
5. Define TDM.
6. What is Coupler?
7. Write any two types of optical amplifiers.
8. Expand MEMS.
9. Write any two types of wavelength converters.
10. Write any two importance of optical detectors.
11. What is cladding?
12. Writ two types of optical fibers.
13. Define power penalty.
14. What is crosstalk?
15. Define chromatic dispersion.
16. Expand SONET.
17. Write any two computer interconnect components.
18. Define OTDM.
19. Why SONET is called a Synchronous Network?
20. What is switch?
21. Write any two function of optical layer.
22. Write any two node design.
23. Write any two advantages of layering.
24. Define electro optical node.
25. Define simple all optical node.