

Government of Pakistan
National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"



Course Contents/ Lesson Plan

Course Title: Fiber Optic Technician

Duration: 3 Months

Course Details / Description & Preliminaries

Course Title	Fiber Optic Technician
Objectives and Expectations	<p><u>Employable skills through an intensive course on Fiber Optic Technician</u></p> <p>This is a special course designed to address unemployment in the youth. The course aims to achieve the above objective through hands on practical training delivery by a team of dedicated professionals having rich market/work experience. This course is therefore not just for developing a theoretical understanding/back ground of the trainees. Contrary to that it is primarily aimed at equipping the trainees to perform commercially in a market space in independent capacity or as a member of a team.</p> <p>The course therefore is designed to impart not only technical skills but also soft skills (i.e. interpersonal/communication skills; personal grooming of the trainees etc.) as well as entrepreneurial skills (i.e. marketing skills; free lancing etc.). The course also seeks to inculcate work ethics to foster better citizenship in general and improve the image of Pakistani work force in particular.</p> <p>Main Expectations:</p> <p>In short, the course under reference should be delivered by professional instructors in such a robust hands- on manner that the trainees are comfortably able to employ their skills for earning money (through wage/self-employment) at its conclusion.</p> <p>This course thus clearly goes beyond the domain of the traditional training practices in vogue and underscores an expectation that a market centric approach will be adopted as the main driving force while delivering it. The instructors should therefore be experienced enough to be able to identify the training needs for the possible market roles available out there. Moreover, they should also know the strengths and</p>

Key Features of Training & Special Modules

weaknesses of each individual trainee to prepare them for such market roles during/after the training.

- i. Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. The record of all tasks performed individually or in groups must be preserved by the management of the training Institute clearly labeling name, trade, session etc so that these are ready to be physically inspected/verified through monitoring visits from time to time. The weekly distribution of tasks has also been indicated in the weekly lesson plan given in this document.
- ii. In order to materialize the main expectations, a special module on **Job Search & Entrepreneurial Skills** has been included in the later part of this course (5th & 6th month) through which, the trainees will be made aware of the Job search techniques in the local as well as international job markets (Gulf countries). Awareness around the visa process and immigration laws of the most favored labor destination countries also forms a part of this module. Moreover, the trainees would also be encouraged to venture into self-employment and exposed to the main requirements in this regard. It is also expected that a sense of civic duties/roles and responsibilities will also be inculcated in the trainees to make them responsible citizens of the country.
- iii. A module on **Work Place Ethics** has also been included to highlight the importance of good and positive behavior at work place in the line with the best practices elsewhere in the world. An outline of such qualities has been given in the Appendix to this document. Its importance should be conveyed in a format that is attractive and interesting for the trainees such as through PPT slides +short video

Training Tools/ Methodology

documentaries. Needless to say that if the training provider puts his heart and soul into these otherwise non-technical components, the image of Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

In order to maintain interest and motivation of the trainees throughout the course, modern techniques such as:

- Motivational lectures
- Success stories
- Case studies

These techniques would be employed as an additional training tool wherever possible (these are explained in the subsequent section on Training Methodology).

Lastly, evaluation of the competencies acquired by the trainees will be done objectively at various stages of the training and proper record of the same will be maintained. Suffice to say that for such evaluations, practical tasks would be designed by the training providers to gauge the problem solving abilities of the trainees.

(i) Motivational Lectures

The proposed methodology for the training under reference employs motivation as a tool. Hence besides the purely technical content, a trainer is required to include elements of motivation in his/her lecture to inspire the trainees to utilize the training opportunity to the full and strive towards professional excellence. Motivational lectures may also include general topics such as the importance of moral values and civic role & responsibilities as a Pakistani. A motivational lecture should be delivered with enough zeal to produce a deep impact on the trainees. It may comprise of the following:

- Clear Purpose to convey message to trainees effectively.
- Personal Story to quote as an example to follow.

- Trainees fit so that the situation is actionable by trainees and not represent a just idealism.
- Ending Points to persuade the trainees on changing themselves.

A good motivational lecture should help drive creativity, curiosity and spark the desire needed for trainees to want to learn more.

Impact of a successful motivational strategy is amongst others commonly visible in increased class participation ratios. It increases the trainees' willingness to be engaged on the practical tasks for longer time without boredom and loss of interest because they can clearly see in their mind's eye where their hard work would take them in short (1-3 years); medium (3 -10 years) and long term (more than 10 years).

As this tool is expected that the training providers would make arrangements for regular well planned motivational lectures as part of a coordinated strategy interspersed throughout the training period as suggested in the weekly lesson plans in this document.

(ii) Success Stories

Another effective way of motivating the trainees is by means of Success Stories. Its inclusion in the weekly lesson plan at regular intervals has been recommended till the end of the training.

A success story may be disseminated orally, through a presentation or by means of a video/documentary of someone that has risen to fortune, acclaim, or brilliant achievement. A success story shows how a person achieved his goal through hard work, dedication and devotion. An inspiring success story contains compelling and significant facts articulated clearly and easily comprehensible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. Optimum impact is created when the story is revealed in the form of:-

- Directly in person (At least 2-3 cases must be arranged by the training institute)
- Through an audio/ videotaped message (2-3 high quality videos

must be arranged by the training institute)

It is expected that the training provider would collect relevant high quality success stories for inclusion in the training as suggested in the weekly lesson plan given in this document.

Suggestive structure and sequence of a sample success story and its various shapes can be seen at annexure III.

(iii) Case Studies

Where a situation allows, case studies can also be presented to the trainees to widen their understanding of the real life specific problem/situation and to explore the solutions.

In simple terms, the case study method of teaching uses a real life case example/a typical case to demonstrate a phenomenon in action and explain theoretical as well as practical aspects of the knowledge related to the same. It is an effective way to help the trainees comprehend in depth both the theoretical and practical aspects of the complex phenomenon in depth with ease. Case teaching can also stimulate the trainees to participate in discussions and thereby boost their confidence. It also makes class room atmosphere interesting thus maintaining the trainee interest in training till the end of the course.

Depending on suitability to the trade, the weekly lesson plan in this document may suggest case studies to be presented to the trainees.

The trainer may adopt a power point presentation or video format for such case studies whichever is deemed suitable but it's important that only those cases are selected that are relevant and of a learning value.

The Trainees should be required and supervised to carefully analyze the cases.

For the purpose they must be encouraged to inquire and collect specific information / data, actively participate in the discussions and intended solutions of the problem / situation.

Case studies can be implemented in the following ways:-

- i. A good quality trade specific documentary(At least 2-3

	<p>documentaries must be arranged by the training institute)</p> <p>ii. Health & Safety case studies(2 cases regarding safety and domestic accidents must be arranged by the training institute)</p> <p>iii. Field visits(At least one visit to a trade specific major industry/ site must be arranged by the training institute)</p>
Learning Outcome of the Course	<p>By the end of the course the trainees will be able to have following competencies and skills.</p> <ul style="list-style-type: none"> • Explain the importance and uses of Fiber Optics. • Explain Optical fiber modes and Configuration. • Set up Fiber to the Desk and Home • Explain Single Mode and Graded-Index fiber structure. • Use Photo Detectors • Use Optical Transmitter and receivers • Explain Splicing Technique • Perform Fiber Testing and Measurement • Perform Optical Joint Enclosure and Line Interface Unit • Perform Testing and Commissioning of Fiber Systems.
Course Execution Plan	<p>Total duration of course: 3 months (12 Weeks)</p> <p>Class hours: 4 hours per day</p> <p>Theory: 20%</p> <p>Practical: 80%</p> <p>Weekly hours: 20 hours per week</p> <p>Total contact hours: 240 hours</p>
Companies Offering Jobs in the respective trade	<p>Public/Private industries including:</p> <ol style="list-style-type: none"> 1. All Telecom Companies. 2. All IT Companies. 3. Cable TV Networks. 4. TV Channels. 5. Internet Service Providers (ISP).

Job Opportunities	<ul style="list-style-type: none"> • Installation Contractor • Field Network Maintenance Technician • Network Technician
No of Students	25
Learning Place	Classroom / Lab / Workshop
Instructional Resources	<p>Fiber-Optic-Communications-Fundamentals Applications. https://www.amazon.com/Fiber-Optic-Communications-Fundamentals-Applications/dp/0470518677</p> <p>Understanding Fiber Optics. https://www.amazon.com/Understanding-Fiber-Optics-Jeff-Hecht/dp/1511445653</p> <p>Fiber Optic Test and Measurement. https://www.amazon.com/Fiber-Optic-Measurement-Dennis-Derickson/dp/0135343305</p> <p>Optical Fiber Fusion Splicing. https://www.barnesandnoble.com/w/optical-fiber-fusion-splicing-andrew-d-yablon</p> <p>Fiber-Optic Communication Systems. https://www.amazon.com/Fiber-Optic-Communication-Systems-Govind-Agrawal/dp/0470505117</p>

WEEKLY SCHEDULE OF TRAINING

Scheduled Week	Module Title	Learning Units	Remarks
Week 1	Basic Electrical and Electronics	<p>Motivational Lecture (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • Electricity • DC Fundamentals • AC Fundamentals • Semiconductors • Diode 	<p>Task-1 Task-2 Task-3 Task-4 Task-5</p> <p>(Details may be seen at Annexure-I)</p>
Week 2		<p>Success stories (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • Rectifiers • Optical Transmitter and Receiver • Number System • Logic Gates 	<p>Task-6 Task-7 Task-8 Task-9 Task-10</p> <p>(Details may be seen at Annexure-I)</p>
Week 3	Introduction to Fiber Optics	<p>Motivational Lecture (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • History of optical fiber technology • Fundamentals of fiber optics • Light propagation through optical fiber 	<p>Home Assignment-1 (Details may be seen at Annexure-II)</p> <p>Task-11 Task-12 Task-13 Task-14 Task-15</p> <p>(Details may be seen at Annexure-I)</p>

	Build your CV	Download professional CV template from any good site (https://www.coolfreecv.com or relevant) <ul style="list-style-type: none"> • Add Personal Information • Add Educational details • Add Experience/Portfolio • Add contact details/profile links 	
Week 4	Testing and commissioning Equipment	Success stories (For further detail please see Page No: 3& 4) <ul style="list-style-type: none"> • Understanding types of Testing Equipment • Optical Time Domain Reflectometer • Fusion Splicing Machine • Optical Power Meter 	Task-16 Task-17 Task-18 (Details may be seen at Annexure-I) Monthly Test 1
Week 5		Motivational Lecture (For further detail please see Page No: 3& 4) <ul style="list-style-type: none"> • Fault Analyzer • Fiber Preparation Tools • Switches and SFP Module • Hand Tools • Safety 	Task-19 Task-20 (Details may be seen at Annexure-I)
Week 6	Fiber Optic Cable Preparation	Success stories (For further detail please see Page No: 3& 4) <ul style="list-style-type: none"> • Understanding the Cable Preparation 	Task-21 (Details may be seen at Annexure-I)
Overview of the previous weeks & Mid Term Examination			
Week 7		Motivational Lecture (For further detail please see Page No: 3& 4) <ul style="list-style-type: none"> • Loose Tube Cable Preparation • Patch Panel and Splice closure Preparation 	Task-22 (Details may be seen at Annexure-I)

Week 8	Splicing	<p>Success stories (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • Understanding the Splicing Techniques • Fiber Handling and cleaving 	<p>Home Assignment-2 (Details may be seen at Annexure-II)</p> <p>Task-23</p> <p>(Details may be seen at Annexure-I)</p>
	Create an account profile on Fiverr (at least two gigs) and Upwork	<p>Create an account by following these steps: Step 1: Personal Info Step 2: Professional Info Step 3: Linked Accounts Step 4: Account Security</p>	
Week 9		<p>Motivational Lecture (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • Fusion/Mechanical splicing • Safety 	<p>Task-24 Task-25 Task-26</p> <p>(Details may be seen at Annexure-I)</p> <p>Monthly Test 2</p>
Week 10	Optical Loss Testing	<p>Success stories (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • Understanding the fiber loss • Material absorption losses • Linear scattering losses • Bending loss • Insertion Loss 	<p>Task-27 Task-28 Task-29 Task-30</p> <p>(Details may be seen at Annexure-I)</p>
Week 11	Fiber Optic Testing & Troubleshooting	<p>Motivational Lecture (For further detail please see Page No: 3& 4)</p> <ul style="list-style-type: none"> • Use of visual tracer or fault locator • Testing of insertion loss after installation • Testing and Troubleshooting Patch 	<p>Task-31 Task-32 Task-33 Task-34</p> <p>(Details may</p>

		cords • Testing & Troubleshooting steps	be seen at Annexure-I)
	How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)	<ul style="list-style-type: none"> • Browse the following website and create an account on each website <ul style="list-style-type: none"> ▪ Bayt.com – The Middle East Leading Job Site ▪ Monster Gulf – The International Job Portal ▪ Gulf Talent – Jobs in Dubai and the Middle East • Find the handy 'search' option at the top of your homepage to search for the jobs that best suit your skills. • Select the job type from the first 'Job Type' drop-down menu, next, select the location from the second drop-down menu. • Enter any keywords you want to use to find suitable job vacancies. • On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search. • Search for jobs by: <ul style="list-style-type: none"> ▪ Company ▪ Category ▪ Location ▪ All jobs ▪ Agency • Industry 	

Week 12	Entrepreneurship and Final Assessment in project	Success stories <i>(For further detail please see Page No: 3& 4)</i> <ul style="list-style-type: none"> • Job Market Searching • Self-employment • Introduction • Fundamentals of Business Development • Entrepreneurship • Startup Funding • Business Incubation and Acceleration • Business Value Statement • Business Model Canvas • Sales and Marketing Strategies • How to Reach Customers and Engage CxOs • Stakeholders Power Grid • RACI Model, SWOT Analysis, PEST Analysis • SMART Objectives • OKRs • Cost Management (OPEX, CAPEX, ROCE etc.) 	Final Assessment
Projects & Final Assessment			

Annexure-I

Note: The following tasks are required to be performed multiple times by each trainee/group until sufficient proficiency level is acquired. The trainer is required to determine the number of times, each task needs to be repeated by a trainee as per his/her low/medium/high level of skill and proficiency during any stage of the course.

Tasks for Fiber Optic Technician

Task No.	Task Description	Week
1.	Explain basic electrical principles	Week-1
2.	Perform electrical circuit measurements	
3.	Use electrical terms, formulas and meters	
4.	Determine electrical values in a circuit	
5.	Explore semiconductor components (Diode, Transistor, FET)	
6.	Explore types of rectifiers used for rectification.	Week-2
7.	Explore the Diodes used in Optical fiber as transmitter & Receiver	
8.	Inter convert the values of different numbering systems (Binary, Octal, Decimal, Hexa-decimal)	
9.	Explore the types of digital gates.	
10.	Verify the truth table of Logic gates	
11.	Explore How fiber works	Week-3
12.	Explore Fiber types, designs, sizes	
13.	Explore Cable types & specifications	
14.	Explore Cable types and applications	
15.	Explore the process of Choosing a cable appropriate for the application	
16.	Explore Purpose and functions of Optical Time Domain Reflectometer	Week-4
17.	Explore Purpose and functions of Fusion Splicing Machine	
18.	Explore Purpose and functions of Optical Power Meter	
19.	Explore Purpose and functions of Fault Analyzer	Week-5
20.	Explore Purpose and use of Fiber Preparation Tools	
21.	Cable Prep- Stripping Cladding, Armour & Buffer Materials, Safe Cable Handling	Week-6
22.	Installing connectors: pigtails, SOC or field installable connectors to industry specifications.	Week-7
23.	Prepare fibers for splicing	Week-8
24.	Make mechanical splices	Week-9
25.	Make fusion splices	

26.	Optimize the mechanical splice	
27.	Explore Material absorption losses in optical fiber	Week-10
28.	Explore Linear scattering losses in optical fiber	
29.	Explore Bending loss in optical fiber	
30.	Explore Insertion Loss in optical fiber	
31.	Use the fiber optic test equipment Properly	Week-11
32.	Make use of Testing cables, connectors, splices and network equipment	
33.	find faults and measure splice loss	
34.	Test and certify new and existing installations	

Home Assignment

Designing Effective Homework

To achieve a positive impact on student learning, homework assignments must be well-designed and carefully constructed. Some specific research findings include:

- ▶ Homework is most effective when it covers material already taught.
- ▶ Homework is most effective when it is used to reinforce skills learned in previous weeks or months.
- ▶ Homework is less effective if it is used to teach complex skills.

Characteristics of Good Assignments

When teachers plan homework, they should consider the characteristics listed below:

- ▶ Provide clear instructions for students;
- ▶ Can be completed successfully;
- ▶ Are not too long;
- ▶ Can be completed within a flexible time frame;
- ▶ Use information and materials that are readily available;
- ▶ Reinforce and allow practice of previously taught skills;
- ▶ Must not be unfinished class work;
- ▶ Are interesting to students and lead to further exploration and study;
- ▶ Stimulate creativity and imagination in the application of skills;
- ▶ Stimulate home and class discussion

Homework Don'ts

Do not assign homework that:

- ▶ Is unfamiliar, boring or impossible to do
- ▶ Requires complex skills or requires unreasonable time frames
- ▶ Is a “time filler” to keep students busy or a punishment for not doing class work
- ▶ Do not wait until the last minute to organize and assign the *homework* (*You may give useless or impossible tasks and/or giving inadequate directions*)
- ▶ Do not assume that all homes have equal resources, that all parents have equal skills and talents to support their children as learners
- ▶ Do not collect any homework you do not intend to check, review or grade.
- ▶ Do not assign homework that is so difficult and unfamiliar to students that their parents are tempted to:
 - Do the work for them;
 - Accuse their children of being inattentive in class; or
 - Accuse their children of failing.

Fiber Optic Technician

MOTIVATIONAL LECTURES LINKS.

TOPIC	SPEAKER	LINK
How to Face Problems In Life	Qasim Ali Shah	https://www.youtube.com/watch?v=OrQte08MI90
Just Control Your Emotions	Qasim Ali Shah	https://www.youtube.com/watch?v=JzFs_yJt-w
How to Communicate Effectively	Qasim Ali Shah	https://www.youtube.com/watch?v=PhHAQEGehKc
Your ATTITUDE is Everything	Tony Robbins Les Brown David Goggins Jocko Willink Wayne Dyer Eckart Tolle	https://www.youtube.com/watch?v=5fS3rj6eIFg
Control Your EMOTIONS	Jim Rohn Les Brown TD Jakes Tony Robbins	https://www.youtube.com/watch?v=chn86sH0O5U
Defeat Fear, Build Confidence	Shaykh Atif Ahmed	https://www.youtube.com/watch?v=s10dzfbozd4
Wisdom of the Eagle	Learn Kurooji	https://www.youtube.com/watch?v=bEU7V5rJTtw
The Power of ATTITUDE	Titan Man	https://www.youtube.com/watch?v=r8LJ5X2ejqU
STOP WASTING TIME	Arnold Schwarzenegger	https://www.youtube.com/watch?v=kzSBrJmXqdq
Risk of Success	Denzel Washington	https://www.youtube.com/watch?v=tbnzAVRZ9Xc

What is freelancing and how you can make money online - BBCURDU

<https://www.youtube.com/watch?v=9jCJN3Ff0kA>

What Is the Role of Good Manners in the Workplace? By Qasim Ali Shah | In Urdu

<https://www.youtube.com/watch?v=Qi6Xn7yKIIQ>

Hisham Sarwar Motivational Story | Pakistani Freelancer

https://www.youtube.com/watch?v=CHm_BH7xAXk

21 Yr Old Pakistani Fiverr Millionaire | 25-35 Lakhs a Month Income | Interview

<https://www.youtube.com/watch?v=9WrmYYhr7S0>

Failure to Millionaire - How to Make Money Online | Fiverr Superhero Aaliyaan Success Story

<https://www.youtube.com/watch?v=d1hocXWSpus>

Workplace/Institute Ethics Guide

Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue or value to strengthen character and individual abilities. It is a set of values centered on importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for employee's success:

1. Attendance:

Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.

2. Character:

Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.

3. Team Work:

The ability to get along with others including those you don't necessarily like. The ability to carry your own weight and help others who are struggling. Recognize when to speak up with an ideas and when to compromise by blend ideas together.

4. Appearance:

Dress for success, set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are, can last a life time

5. Attitude:

Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems and procedures in light of changing responsibilities.

6. Productivity:

Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your

work, do things the best you know how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.

7. Organizational Skills:

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Takes an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

8. Communication:

Written communication, being able to correctly write reports and memos.

Verbal communications, being able to communicate one on one or to a group.

9. Cooperation:

Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing workplace situations and the application of new or different skills.

10. Respect:

Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions and suggestions.

Suggestive Format and Sequence Order of Success Story

S. No	Key Information	Detail/Description
1.	Self & Family background	<ul style="list-style-type: none"> • Self-introduction • Family background and socio economic status, • Education level and activities involved in • Financial hardships etc
2.	How he came on board NAVTTC Training/ or got trained through any other source	<ul style="list-style-type: none"> • Information about course, apply and selection • Course duration, trade selection • Attendance, active participation, monthly tests, interest in lab work
3.	Post training activities	<ul style="list-style-type: none"> • How job / business (self-employment) was set up • How capital was managed (loan (if any) etc). • Detail of work to share i.e. where is job or business being done; how many people employed (in case of self-employment/ business) • Monthly income or earnings and support to family • Earning a happy life than before
4.	Message to others (under training)	<ul style="list-style-type: none"> • Take the training opportunity seriously • Impose self-discipline and ensure regularity • Make Hard work pays in the end so be always ready for the same.

Note: Success story is a source of motivation for the trainees and can be presented in a number of ways/forms in a NAVTTC skill development course as under: -

1. To call a passed out successful person of institute. He/she will narrate his/her success story to the trainees in his/her own words and meet trainees as well.
2. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful person Audio video recording that has to cover the above mentioned points.
3. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning per month etc) and narrates his/her story in teacher's own motivational words.