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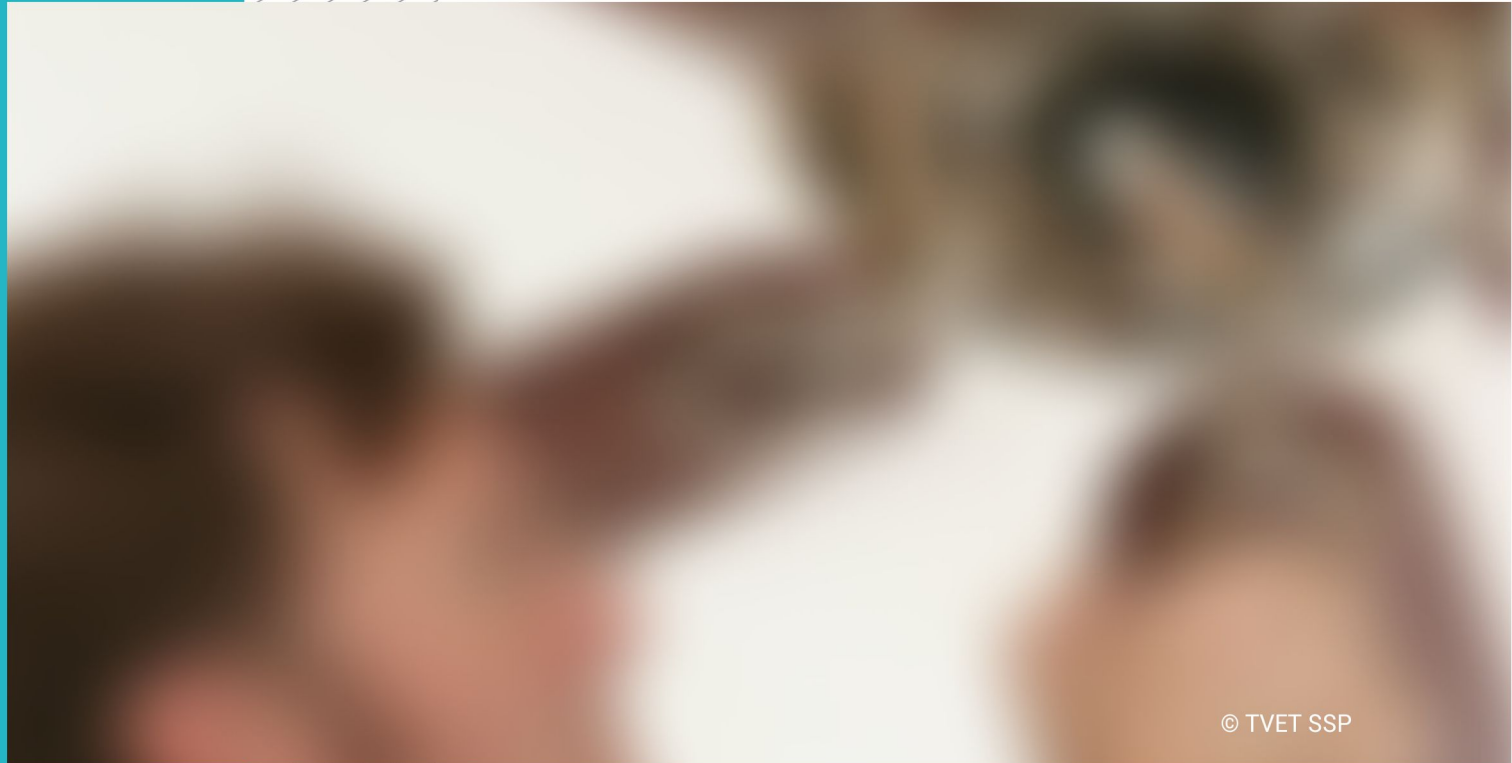
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FAN MANUFACTURING TECHNICIAN



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TRAINER GUIDE

National Vocational Certificate Level 3

Version 4 - October, 2019



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Introduction

Competence-based training helps to bridge the gap between what is taught in training and what tasks will be performed on the job. Training trainees to perform actual job functions helps to ensure that future front-line workers have the skills, knowledge and abilities required to perform their jobs properly, safely and effectively. In addition to competence-based training, assessment based on the performance of actual work competencies helps to ensure that:

- trainees are performing their work tasks as safely as possible
- performance gaps are recognized prior to serious incidents
- training can be implemented to improve competence.

There are significant benefits to competence-based training:

1. Cost effectiveness

Since training activities and assessments in a competence-based approach are goal-oriented, trainers focus on clearly defined areas of skills, knowledge and understanding that their own industry has defined in the competence standards. At the same time, trainees are more motivated to learn when they realize the benefits of improved performance.

2. Efficiency

The transfer gap between the training environment and working on the job is reduced substantially in a competence-based approach. This is because training and assessment are relevant to what needs to be done on the job. As a result, it takes less time for trainees to become competent in the required areas. This, in turn, contributes to improved efficiency where training and assessment are concerned.

3. Increased productivity

When trainees become competent in the competence standards that their own industry has defined, when they know what the performance expectations are and receive recognition for their abilities through successful assessments, they are likely to be more motivated and experience higher job satisfaction. The result is improved productivity for organizations. The communication and constructive feedback between future employers and employees will improve as a result of a competence-based approach, which can also increase productivity.

4. Reduced risk

Using a competence-based approach to training, development, and assessment, employers are able to create project teams of people with complementary skills. A trainee's record of the skills, knowledge and understanding relating to the competence standards they have achieved can be used by a future employer to identify and provide further relevant training and assessment for new skills areas. Competence standards can shape employee development and promotional paths within an organization and give employees the opportunity to learn more competencies beyond their roles. It can also provide organizations with greater ability to scale and flex as needed, thereby reducing the risk they face.

5. Increased customer satisfaction

Employees who have been trained and assessed using a competence-based approach are, by the definition of the relevant competence standards, able to perform the required tasks associated with a job. The knock-on effect is that, in service-related industries, they are able to provide high service levels, thereby increasing customer satisfaction. In production or manufacturing industries, they are able to work closely to industry standards in a more effective and efficient way.

Lesson plans

This manual provides a series of lesson plans that will guide delivery of each module for the *Assembler* qualification. It is important for trainers to be flexible and be ready to adapt lesson plans to suit the context of the subject and the needs of their trainees.

Good teachers acknowledge that CBT means each and every trainee in the class learns at a different speed. The good teacher is prepared to throw aside the day's lesson plan and do something different (and unplanned) for the class even if it means 'writing' a lesson plans for each trainee to match their learning pace for that day or week.

Learning by doing is different from learning theory and then applying it. To learn to do something, trainees need someone looking over their shoulder saying 'it's not quite like that, it's like this', 'you do it like this because ...', or even 'tell me why you chose to do it like this?'

In this way, trainees learn that theoretical knowledge is meaningless if it is not seen in the context of what they are doing. In other words, if a trainee doesn't know why they do something, they will not do it competently (skills underpinned by knowledge = competent performer).

This is how an *assembler* acquires a practical grasp of the standards expected. It's not by learning it in theory, but because those standards are acquired through correction by people who show what the standards are, and correct the trainee where they do not meet those standards, and where they repeat it correction until they have internalised those standards.

Modelling of skill

Modelling (or demonstrating) a skill is a powerful tool, which is used in vocational training. The instructions for trainers for demonstration are as under:

- a) Read the procedure mentioned in the Trainer Guide for the relevant Learning Unit before demonstration.
- b) Arrange all tools, equipment and consumable material, which are required for demonstration of a skill.
- c) Practice the skill before demonstration to trainees, if possible.
- d) Introduce the skill to trainees clearly at the commencement of demonstration.
- e) Explain how the skill relates to the skill(s) already acquired and describe the expected results or show the objects to trainees.
- f) Carry out demonstration in a way that can be seen by all trainees.
- g) Use the same tools and materials that the learner will be using.
- h) Go through EACH of the steps involved in performing the skill.
- i) Go SLOWLY - describe each step as it is completed.
- j) Encourage the learners to move around and watch what you are doing from a number of different angles.

- k) Identify critical or complex steps, or steps that involve safety precautions to be followed.
- l) Explain theoretical knowledge where applicable and ask questions to trainees to test their understanding.
- m) Try to involve the learners: Ask them questions about why they think the process may work that way.
- n) Repeat critical steps in demonstration, if required.
- o) Summarize the demonstration by asking questions to trainees.

Involvement in the process (actively seeing) is important at this stage. When you work on getting involved, getting people to participate, you make them a part of what is happening. Questions for clarification or explanation are important throughout the demonstration. It is up to the learners to ask questions about things they do not understand, but it is also important for trainers to seek out and elicit questions from learners. A trainer may need to do repeated demonstrations of difficult or complex skills.

FORMAT FOR LESSON PLAN

Module 6: 072200907 Perform parts assembling

Learning Unit 7: Install fan blades

Methods	Key Notes	Media	Time
	The tools, equipment and methods used to install fan blades		

Introduction

This session will introduce learners to tools, equipment and methods used to install fan blades by using presentation, demonstration, question and answer, and practical skills development.

Main Body

- Place jane between plate and blades
- Mount the blades with screws and spring washers

Conclusion

To conclude the session, review the the tools, equipment and methods used to install fan blades. Give learners the opportunity to ask questions.

Assessment

Question and answer, discussion groups with feedback, observation of practice skills development

Total time: 10 Hours

Modules and Learning Units

Course: Fan Manufacturing Technician Level-3 Assembler	Total Course Duration: 310 Hours
Course Overview:	
<p>The purpose of the Fan Manufacturing Technician Level-2 (Fabricator) course is to engage young people with a programme of development that will provide them with the knowledge, skills and understanding to start this career in Pakistan. The course has been developed to address specific issues, such as the work force availability within the country, and meeting and exceeding the needs and expectations of leather products industry.</p>	

Module	Learning Unit	Duration
Module 6: Perform parts assembling	LU1: Perform balancing of ceiling fan body & plates LU2: Press bearings in body and plates LU3: Perform rotor balancing LU4: Press armature (for DC fans) / stator (for AC fans) in fan body housing LU5: Assemble fan body and plate LU6: Perform fan motor testing LU7: Install fan blades LU8: Test fan with blades	160 Hours

Teaching & Learning Activities

Module 6: 072200907 Perform parts assembling			
Delivery Context	Delivery Context	Delivery Context	Delivery Context
<p>LU1: Perform balancing of ceiling fan body and plates</p>	<p>Deliver an illustrated presentation which focuses on following points</p> <ul style="list-style-type: none"> • What is balancing • Importance of balancing in rotating parts • Mounting of ceiling fan body and plates on mandrel • Remove or add weights from body and plates for balancing if required <p>Show learners videos or illustrations on balancing of rotating parts</p> <p>Demonstrate the process of how to perform balancing of ceiling fan body and plates by removing or adding weights if required.</p> <p>Organize an activity in training assembly shop to teach learner about how to perform balancing of fan body and plates. Each learner will have to perform balancing of provided fan body and plates.</p> <p>Prepare either:</p> <ul style="list-style-type: none"> • A flip chart • A PowerPoint slide • A handout <p>...showing key topics for balancing of ceiling fan body and plates. Learners need to work in small groups discussing the key topics. Each group should make notes from their discussions that identify three main points that related to each key topic.</p> <p>After the discussion, begin the feedback session. Ask</p>	<p>Classroom Training assembly shop Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Videos or illustrations related to fan body and plates balancing Balancing machine Drill machine Punching plier Weights for balancing machine Drill bits Ceiling fan body and plates Air compressor Adhesives</p>

	<p>one group to share the main points they have recorded for the first key topic for balancing of ceiling fan body and plates. Discuss these main points briefly with the whole group. Learners should make additional notes to record additional points their group had not identified.</p> <p>Then ask the next group to share the main points they have recorded for the second key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p> <p>End the group discussion activity with a summary.</p> <p>Learners must be able to demonstrate their knowledge and skills related to balancing. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU2: Press bearings in fan body and plates</p>	<p>Deliver an illustrated presentation which focuses on following points</p> <ul style="list-style-type: none"> • Bearing types, uses and their numbering method • Bearing fitting and size requirements • Setting press machine as per requirement • Selecting bearing as per requirement • Pressing bearing in housing <p>Show learners videos or illustrations related to bearing and their fittings</p> <p>Demonstrate the operating of bearing press machine and process of selecting bearing as per requirement and pressing bearing in the housing.</p> <p>Organize an activity in training assembly shop to teach learner about how to press bearings in fan body and plates. Each learner will have to practically perform the pressing of provided bearing in fan body</p>	<p>Classroom Training assembly shop Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Videos or illustrations related to bearings and their uses Bearing press machine Bearings Fan body and plates</p>

	<p>and plates</p> <p>Learners must be able to demonstrate their knowledge and skills related to press bearings in fan body and plates .Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU3: Perform rotor balancing</p>	<p>At this stage, learners already have the idea about basic concept of balancing, why it is done and how to operate balancing machine. Deliver an illustrated presentation which focuses on following points</p> <ul style="list-style-type: none"> • Loading of rotor on balancing machine as per requirement • Removing weights (if required) from rotor for balancing <p>Show learners videos or illustrations related to rotor balancing.</p> <p>Invite an industrial expert to share his industrial knowledge with learners about balancing of different fan parts.</p> <p>Demonstrate the process of how to perform balancing of fan rotor.</p> <p>Organize an activity in training assembly shop to teach learner about how to perform rotor balancing. Each learner will have to perform balancing of provided rotor.</p> <p>Learners must be able to demonstrate their knowledge and skills related to perform rotor balancing. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom Training assembly shop Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Videos or illustrations related to rotor balancing Balancing machine Drill machine Punching plier Weights for balancing machine Drill bits</p>
<p>LU4: Press armature (for DC fans) stator (for AC</p>	<p>Learners already know about armature and fan stator, studied in previous modules. you can recall their concepts by asking them some questions about</p>	<p>Classroom Training assembly shop</p>	<p>Videos or illustrations on pressing of armature (for DC fans) stator (for AC fans) in fan body housing</p>

<p>fans) in fan body housing</p>	<p>armature and stator for example, what is stator? How stator is made? etc.</p> <p>Deliver an illustrated presentation which focuses on following points</p> <ul style="list-style-type: none"> • Loading fixture on press machine • Loading fan body in the jig • Placing stator/armature in the body and press accordingly • Checking air gap with filler gauge <p>Show learners videos or illustrations on pressing of armature (for DC fans) stator (for AC fans) in fan body housing</p> <p>Demonstrate the process of how to perform pressing of armature (for DC fans) stator (for AC fans) in fan body housing</p> <p>Organize an activity in training assembly shop to teach learner about how to press armature (for DC fans) stator (for AC fans) in fan body housing. Each learner will have to perform pressing of armature (for DC fans) stator (for AC fans) in provided fan body housing</p> <p>Learners must be able to demonstrate their knowledge and skills related to press armature (for DC fans) stator (for AC fans) in fan body housing. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Hydraulic press machine Fixture for holding fan body on hydraulic press machine Filler gauge Stator/armature Fan body housing</p>
<p>LU5: Assemble fan body and plate</p>	<p>Deliver an illustrated presentation which focuses on following points</p> <ul style="list-style-type: none"> • Placing plate on the body • Aligning screw holes of fan body and plate accordingly. • Pressing the plate on the body and fasten the 	<p>Classroom Training assembly shop Real or realistic Assembly Shop in Fan Manufacturing</p>	<p>Videos or illustrations on assembling of fan body and plates Fan body and plate Screw driver</p>

	<p>screws</p> <p>Show learners videos or illustrations on assembling of fan body and plates</p> <p>Demonstrate the process of assembling fan body and plates in front of learners</p> <p>You can perform an activity in the workshop to ask each learner to assemble provided fan body and plate</p> <p>Learners must be able to demonstrate their knowledge and skills related to Assemble fan body and plate. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	Environment	Filler gauge
<p>LU6:</p> <p>Perform fan motor testing</p>	<p>Deliver an illustrated presentation which focuses on how to</p> <ul style="list-style-type: none"> • Mount the fan motor onto the hanger. • Connect to the power supply • Inspect eccentricity, noise and short circuit/continuity • Inspect motor direction • Inspect volt, ampere, watts and power factor <p>It also includes</p> <ul style="list-style-type: none"> • Construction of fan motor and its functional testing • Understanding of ensuring quality testing parameters (eccentricity, noise, short circuit/continuity, vibration, direction of rotation, volt, ampere, watts, etc.) • Knowledge of using different motor testing equipment. <p>Show learners videos or illustrations about fan motor testing.</p> <p>Demonstrate the process of fan motor testing in front</p>	<p>Classroom</p> <p>Training assembly shop</p> <p>Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Videos or illustrations about fan motor testing</p> <p>Fan motor</p> <p>Watt meter</p> <p>Volt meter</p> <p>Ampere meter</p> <p>Frequency meter</p> <p>Tachometer</p> <p>Sound level meter</p>

	<p>of learner to improve their understanding.</p> <p>This activity is based on a visit to an organization. Learners will experience the process of fan motor testing and gather information on how this is completed.</p> <p>Prepare a short case study giving background information of the organization you have chosen to visit. The information should include:</p> <ul style="list-style-type: none"> • The organization's name • Address of the organization's premises • How long the organization has been in business for? • How many staff are employed? <p>Discuss the visit with your contact at the organization. The organization needs to prepare a short introduction they can deliver to the learners. The organization will also need suitable staff to explain to the learners about fan motor testing. Ask whether there is any guidance the organization has prepared on fan motor testing that is documented and request a copy of the document.</p> <p>A week before the visit, provide learners with a copy of the case study you have prepared describing the organization. Hold a discussion with the learners on the key points of fan motor testing. Record these as bullet points on a flipchart and ensure learners make a copy.</p> <p>Ask learners to work in small groups. Each group needs to devise five questions about fan motor testing that they can ask when they visit the organization. Ensure that learners bring their questions with them for the visit.</p>		
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	<p>Visit the organization's premises with the learners. The organization needs to deliver a short presentation to the learners about his business. The organization then needs to introduce the staff members that will explain to the learners about fan motor testing. The staff members will then explain to the learners about fan motor testing.</p> <p>After the visit, ask learners to identify the main points identified during the visit that they found interesting or challenging. List these key points on a flip chart.</p> <p>Organize an activity in training assembly. Provide a fan motor to each learner and ask him to test by using different fan motor testing equipment.</p> <p>Learners must be able to demonstrate their knowledge and skills related to fan motor testing. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU7: Install Fan blades</p>	<p>Deliver an illustrated presentation which focuses on how to</p> <ul style="list-style-type: none"> • Place jane between plate and blades • Mount the blades with screws and spring washers <p>Show learners videos or illustrations of installing Fan blades.</p> <p>Demonstrate the process of installing fan blades with fan motor in front of learners</p> <p>Organize an activity in training assembly shop and ask each learner to install fan blade with fan motor</p> <p>Learners must be able to demonstrate their knowledge and skills related to Install Fan blades. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom Training assembly shop Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Videos or illustrations of installing Fan blades. Fan blades Pneumatic screw driver along with compressor Fan motor Screws Jane Spring washers</p>

<p>LU8: Test Fan with Blades</p>	<p>Deliver an illustrated presentation which focuses on how to</p> <ul style="list-style-type: none"> • Hang the fan on the ceiling hook • Make connections and supply power to the fan • Check speed with tachometer • Check ampere, volt, and watt • Check balancing and air flow of blades <p>Invite an industrial expert to deliver a lecture to learners about his experience in fan manufacturing industry regarding testing of fans.</p> <p>Show learners videos or illustrations on testing of fan with blades.</p> <p>Demonstrate the process of testing fan with blades in front of learners for their better understanding.</p> <p>Prepare either:</p> <ul style="list-style-type: none"> • A flip chart • A PowerPoint slide • A handout <p>...showing key topics for testing fan with blades.</p> <p>Learners need to work in small groups discussing the key topics. Each group should make notes from their discussions that identify three main points that related to each key topic.</p> <p>After the discussion, begin the feedback session. Ask one group to share the main points they have recorded for the first key topic for testing fan with blades. Discuss these main points briefly with the whole group. Learners should make additional notes to record additional points their group had not identified.</p> <p>Then ask the next group to share the main points they</p>	<p>Classroom Training assembly shop Real or realistic Assembly Shop in Fan Manufacturing Environment</p>	<p>Videos or illustrations on testing of fan with blades. Assembled Fan Watt meter Volt meter Ampere meter Frequency meter Tachometer Sound level meter</p>
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	<p>have recorded for the second key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p> <p>End the group discussion activity with a summary.</p> <p>Organize an activity in training assembly shop. Each learner will be provided with an assembled fan and he has to test it completely which includes speed of the fan, ampere, volt, watt, balancing of the fan and air flow of the fan blades</p> <p>Learners must be able to demonstrate their knowledge and skills related to test fan with blades. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
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Frequently Asked Questions

<p>1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?</p>	<p>Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.</p>
<p>2. What is the passing criterion for CBT certificate?</p>	<p>You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>3. What are the entry requirements for this course?</p>	<p>The entry requirement for this course is National Vocational Certificate Level-2 in Fan Manufacturing Technician(Fabricator) or National Vocational Certificate Level-2 in Fan Manufacturing Technician(Painter) or National Vocational Certificate Level-2 in Fan Manufacturing Technician(Foundry Man)</p>
<p>4. How can I progress in my educational career after attaining this certificate?</p>	<p>You shall be eligible to take admission in the National Vocational Certificate Level-4 in Fan Manufacturing Technician (Supervisor). You shall be able to progress further to a level-5, DAE or equivalent course in relevant trade. In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).</p>
<p>5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?</p>	<p>You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.</p>
<p>6. What is the entry requirement for Recognition of Prior Learning program (RPL)?</p>	<p>There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.</p>
<p>7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?</p>	<p>There are no age restrictions to enter this course or take up the Recognition of Prior Learning program.</p>
<p>8. What is the duration of this course?</p>	<p>The duration of the course work is 310 Hours</p>
<p>9. What are the class timings?</p>	<p>The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may</p>

	vary according to the practices of certain institutes.
10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualifications framework, the level-4 certificate is equivalent to Matriculation. The criteria for equivalence and equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in the fan manufacturing industries in assembly shop
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the mentioned amount.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The teaching language of this course is Urdu and English.
19. Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.

<p>20. What is the examination / assessment system in this program?</p>	<p>Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>21. Does this certificate enable me to work as freelancer?</p>	<p>You can start your small business of stitching leather garments, gloves or other products; or offer services in pattern making and fashion designing. You may need additional skills on entrepreneurship to support your initiative.</p>

Test Yourself (Short & Multiple Choice Questions)

1	Why does fan wobble?	Answer: Ceiling fan wobble is caused by imbalances in the fan blades or blade holders, misalignment of blades, excess dust accumulation or just loose blade holder mounting screws
2	What is fan balancing?	Answer: Fan balancing is a procedure that enables the correction of unbalance in rotating equipment, while the machine is in its working environment.
3	Air delivery of fan depends upon which part?	Answer: Fan blades
4	Which tool is used to measure the air gap between rotor and stator?	Answer: Feeler Gauge
5	Why ceiling fan have three blades?	Answer: With higher number of blades, the fan tends to be slower in speed and thus quieter but circulates less air. Additional blades increase the drag on a ceiling fan's motor and slow it down. The shape of the blades also matters.
6	In fan assembly shop, hydraulic press is used for a) Winding fan motor b) Varnishing fan motor c) Inserting armature in fan body housing d) To test fan motor	Answer: c) Inserting armature in fan body housing
7	Why bearings are used in fan?	Answer: The major function of fan bearing is to make fan blades operated fluently. The purpose of fan bearing is to reduce rotational friction and support axial loads.
8	Bearing number shows	Answer: b). Size of bearing

	<ul style="list-style-type: none"> a) Size of bearing b) Quality of bearing c) Price of bearing d) Usage of bearing 	
9	<p>Which part of pedestal fan is balanced</p> <ul style="list-style-type: none"> a) Stator b) Fan blades c) Fan housing d) Fan base plate 	<p>Answer: b). Fan blades</p>
10	<p>Magnets are used in</p> <ul style="list-style-type: none"> a) AC Fans b) DC Fans c) Pedestal Fan d) Table Fan 	<p>Answer: b). DC Fan</p>
11	<p>How DC fan works?</p>	<p>Answer: A DC ceiling fan works pretty much on the same principle as the DC motor. A DC motor uses an internal arrangement of magnets with opposing polarity. As current passes through the coil around this arrangement, a strong magnetic field is produced. This magnetic field then creates a torque that causes the motor to rotate</p>
12	<p>Capacitor is used to start fan motor</p> <ul style="list-style-type: none"> a) True b) False 	<p>Answer: b). False</p>

