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FAN MANUFACTURING TECHNICIAN

CBT CURRICULUM

National Vocational Certificate Level 4

Version 1 - May, 2019

NAVTTC

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Introduction

Description of the training programme for Fan Manufacturing Technician

In order to build the capacity of technical and vocational training institutes in Pakistan through provision of demand driven competency-based trainings in manufacturing sector, the NAVTTC, and TEVT Sector Support Program (TSSP) have joined hands together to develop qualifications for the manufacturing sector. These qualifications will not only build the capacity of existing workers of this sector but also support the youth to acquire skills best fit for this sector. The benefits and impact of development of these qualifications will be on both demand and supply side.

Based upon this demand of industry, these competency-based qualifications for Fan Manufacturing Technician are developed under National Vocational Qualification Framework (NVQF) (Level 2 to 4). The qualifications mainly cover competencies along with related knowledge and professional skills which are essential for getting a job or self-employment.

The qualifications are also in line with the vision of Pakistan's National Skills Strategy (NSS), National TVET Policy and National Vocational Qualification Framework (NVQF). NSS provides policy directions, support and an enabling environment to the public and private sectors to impart training for skills development to enhance the social and economic profile. The National Vocational & Technical Training Commission (NAVTTC) has approved the Qualification Development Committee (QDC). The QDC consisted of experts from the relevant industries from different geographical locations across Pakistan and academicians, who were consulted during the development process to ensure input and ownership of all the stakeholders. The National Competency Standards could be used as a referral document for the development of curricula to be used by training institutions.

Purpose of the training programme

The purpose of the training is to provide skilled manpower to improve the existing capacity of the manufacturing sector. This training will provide the requisite skills to the trainees to manufacture fans. It will enable the participants to meet the challenges in the field of the manufacturing industry. Further, to improve the skill level of the technician and to prepare them for the manufacturing industry to meet the market competition nationally and internationally.

The core purpose of this qualification is to produce employable fan manufacturing technicians, who could manufacture fans according to national and international standards.

In addition, this qualification will prepare unemployable youths to find employment in manufacturing sector.

Competencies to be gained after completion of course

At the end of the course, the trainee must have attained the following competencies:

- Contribute to Work Related Health and Safety (WHS) Initiatives
- Analyse Workplace Policy and Procedures
- Perform Advanced Communication
- Develop Advance Computer Application Skills
- Manage Human Resource Services
- Develop Entrepreneurial Skills
- Ensure quality
- Supervise production process

Possible available job opportunities available immediately and later in the future

Fan Manufacturing Technicians are employed in Fan related industries. Experienced Fan Manufacturing Technicians may advance through promotions with the same employer or by moving to more advanced positions with other employers. They can become:

- Fan Quality Inspector
- Fan Supervisor

Trainee entry level

The entry in National Vocational Certificate Level IV" Fan Manufacturing Technician (Supervisor)" is given below:

Title	Entry requirements
National Vocational Certificate Level IV" Fan Manufacturing Technician (Supervisor)	Entry for assessment of this qualification is open. However, entry requirement into formal training institute for this qualification is holding all the National Vocational Certificates of level 3, in "Fan Manufacturing Technician"

Minimum qualification of Trainer

Teaching staff should have at least Bachelors in Engineering or Technology with 2 years' experience in relevant field **OR** DAE with 5 years' experience in relevant field

Teaching staff should also hold or be working towards a formal teaching qualification.

Other formal qualifications in the light engineering industry would be useful in addition to the above.

Recommended Trainer: Trainee ratio

The recommended maximum trainer: trainee ratio for this programme is 1 trainer for 20 trainees.

Medium of instruction i.e. language of instruction

Instruction will be in Urdu and English language.

Duration of the course (Total time, Theory & Practical time)

This curriculum comprises of 08 modules. The recommended delivery time is 430 hours. Delivery of the course could therefore be full time, 6 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

Module	Total Duration (Hours)	Theory[1] (Hours)	Practical[2] (Hours)
Contribute to Work Related Health and Safety (WHS) Initiatives	30	6	24
Analyse Workplace Policy and Procedures	30	6	24
Perform Advanced Communication	30	6	24
Develop Advance Computer Application Skills	40	8	32
Manage Human Resource Services	20	4	16
Develop Entrepreneurial Skills	30	6	24
Ensure quality	110	22	88
Plan work	140	28	112

[1] Learning Module hours in training provider premises
[2] Training workshop, laboratory and on-the-job workplace

Sequence of modules

This National Vocational Certificate is made up of 08 modules. A suggested distribution of these modules for each National Vocational Certificate Level is presented below. This is not prescriptive and training providers may modify this if they wish.

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons. The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught.

The sequence of different modules for each National Vocational Certificate Level is shown below:

Sequence of the modules for National Vocational Certificate Level 4 in "Fan Manufacturing Technician (Supervisor)

Module 7: Ensure quality	Module 1: Contribute to Work Related Health and Safety (WHS) Initiatives
	Module 2: Analyse Workplace Policy and Procedures
	Module 3: Perform Advanced Communication
Module 8: Plan work	Module 4: Develop Advance Computer Application Skills
	Module 5: Manage Human Resource Services
	Module 6: Develop Entrepreneurial Skills

Summary – Overview of the curriculum

Module Title and Aim	Learning Units	Theory (Hours)	Workplace (Hours)	Timeframe of modules
Module 1: Contribute to Work Related Health and Safety (WHS) Initiatives	LU1. Contribute to initiate work-related health and safety measures LU2. Contribute to establish work-related health and safety measures LU3. Contribute to ensure legal requirements of WHS measures LU4. Contribute to review WHS measures LU5. Evaluate the organization's WHS system	6	24	30
Module 2: Analyse Workplace Policy and Procedures	LU1. Manage work timeframes LU2. Manage to convene meeting LU3. Decision making at workplace LU4. Set and meet own work priorities at instent LU5. Develop and maintain professional competence LU6. Follow and implement work safety requirements	6	24	30

Module Title and Aim	Learning Units	Theory (Hours)	Workplace (Hours)	Timeframe of modules
Module 3: Perform Advanced Communication	LU1. Demonstrate professional skills LU2. Plan and Organize work LU3. Provide trainings at workplace	6	24	30
Module 4: Develop Advance Computer Application Skills	LU1. Manage Information System to complete a task LU2. Prepare Presentation using computers LU3. Use Microsoft Access to manage database LU4. Develop graphics for Design	8	32	40
Module 5: Manage Human Resource Services	LU1. Determine strategies for delivery of human resource services LU2. Manage the delivery of human resource services LU3. Evaluate human resource service delivery LU4. Manage integration of business ethics in human resource practices	4	16	20

Module Title and Aim	Learning Units	Theory (Hours)	Workplace (Hours)	Timeframe of modules
Module 6: Develop Entrepreneurial Skills	LU1. Develop a business plan LU2. Collect information regarding funding sources LU3. Develop a marketing plan LU4. Develop basic business communication skills	6	24	30
Module 7: Ensure Quality **Aim:** The aim of this module is to develop knowledge, skills and understanding required to ensure quality of fan	**LU1:** Ensure good atmosphere at workplace **LU2:** Ensure safe environmental concerns are addressed **LU3:** Ensure quality of materials **LU4:** Implement quality standards **LU5:** Perform electrical and mechanical tests as per relevant standards	22	88	110

Module Title and Aim	Learning Units	Theory (Hours)	Workplace (Hours)	Timeframe of modules
Module 8: Supervise production process **Aim:** The aim of this module is to develop knowledge, skills and understanding required to plan work	**LU1:** Prepare departmental production plan **LU2:** Acquire material from store **LU3:** Assign duties to workers **LU4:** Ensure production operations according to the plan **LU5:** Prepare production report	28	112	140

Modules

Module 1: Contribute to Work Related Health and Safety (WHS) Initiatives (102200848)

Objective of the module: This unit describes the skills and knowledge required to manage the identification, review, development, implementation and evaluation of effective participation and consultation processes as an integral part of managing work health and safety (WHS).

Duration: 30 Hours **Theory:** Hours **Practical:** Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Contribute to initiate work-related health and safety measures	**The trainee will be able to:** Compile database on work-related health and safety Identify measures that address legal obligations. Consult with individuals/ parties to formulate measures and initiatives Consult with individuals/parties to identify factors impacting on work-related health and		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	safety Participate in consultative meetings.				
LU2: Contribute to establish work-related health and safety measures	**The trainee will be able to:** Assist in planning of work-related health and safety measures Contribute to the development of work-related health and safety measures Identify to implement work-related health and safety measures i.e. • resourcing requirements, • timelines • responsibilities Assist to implement work-related health and safety measures and initiatives i.e.		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	• scheduling • liaison • administering resources • communication				
LU3: Contribute to ensure legal requirements of WHS measures	**The trainee will be able to:** Identify WHS legal requirements Apply knowledge of all aspects of WHS measures to • Consultation • workplace policies • participation processes Ensure, WHS measures are in accordance with legal requirements		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU4: Contribute to review WHS measures	**The trainee will be able to:** Develop effective practices		**Total** **hrs**		

	to review work-related health and safety measures Assist individuals and parties related to WHS measures in following activities • preparing reports • communicating review • evaluating outcomes		**Theory:** hrs **Practical:** hrs	**Consumable :**	
LU5: Evaluate the organization's WHS system	**The trainee will be able to:** Assess ongoing compliance with OHS (Occupational Health and safety) Take feedback from concerned persons regarding WHS measures. Assess the overall effectiveness of WHS management practices		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

	Assist the development process of WHS measures in following ways • Suggest amendments • Document amendments • Implement amendments Take feedback from concerned persons regarding WHS measures. Communicate improvements in WHS Measures				

Module 2: Comply with Workplace Policy and Procedures (041700841)

Objective of the module: This unit describes the skills and knowledge required to implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Duration: 30 Hours **Theory:** Hours **Practical:** Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Manage work timeframes	**The trainee will be able to:** Complete work tasks within deadlines in according to order of priority Supervisors are informed of any delays in work times or projects		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU2: Manage to convene meeting	**The trainee will be able to:** Develop agenda in line with meeting purpose Select participants and		**Total** **hrs** **Theory:**		**Theory:** Class room with multimedia facility **Practical :** Workshop

	notify them accordingly Carryout meeting arrangements according to the time Record the minutes of the meeting		hrs **Practical:** hrs	**Consumable :**	
LU3: Decision making at workplace	**The trainee will be able to:** Define the problem, challenge, or opportunity Generate an array of possible solutions or responses Evaluate the costs and benefits, or pros and cons, associated with each option Assess the impact of the decision and modify the course of action as needed		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU4: Set and meet own work priorities at	**The trainee will be able to:**		**Total** **hrs**		

instant	Take initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives Use technology efficiently and effectively to manage work priorities and commitments Maintain appropriate work-life balance		**Theory:** hrs **Practical:** hrs	**Consumable :**	
LU5: Develop and maintain professional competence	**The trainee will be able to:** Assess personal knowledge and skills against competency Participate in networks to enhance personal knowledge, skills and work relationships Seek feedback from employees, clients and colleagues to develop		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

	and improve competence				
LU6: Follow and implement work safety requirements	**The trainee will be able to:** Identify and report emergency incidents Practice organizational policy and procedures for responding to emergency incidents Identify and implement workplace procedures and work instructions for controlling risks		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

Module 3: Perform Advanced Communication (001100853)

Objective of the module: This unit describes the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organise work and conduct trainings at workplace, along with demonstrating professional skills independently.

Duration: 30 Hours **Theory:** Hours **Practical:** Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Demonstrate professional skills	**The trainee will be able to:** Use different modes of communication to communicate • Speaking • Reading • Writing • Listening • Presentation • visual representation etc Develop CV Skills according requirements Upgrade professional skills by attending trainings, webinars, conferences etc.		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	Perform Continuous professional development as required at workplace Develop interview skills				
LU2: Plan and Organize work	**The trainee will be able to:** Identify task requirements. Plan steps to complete tasks. Review planning and organizing process. Organize work.		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU3: Provide trainings at workplace	**The trainee will be able to:** Assess the need for training Prepare trainees for the learning experience Present training session Support trainees in managing their own learning Facilitate group learning		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	Provide opportunity for practice Provide feedback on progress on trainees Review delivery experience				

Module 4: Develop Advance Computer Application Skills (061100858)

Objective of the module: This unit provides an overview of Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards, i.e. Data Entry, Power Point Presentation and managing data base and graphics for Design

It applies to individuals employed in a range of work environments who need to be able to present a set range of data in simple and direct forms

Duration: 40 Hours **Theory:** Hours **Practical:** Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Manage Information System to complete a task	**The trainee will be able to:** Perform Data Entry in MS office Manage File/folder in MS office Perform Scanning of document Maintain Office Record in drives Perform Printing of		**Total hrs** **Theory:** hrs **Practical:** hrs		**Theory:** Class room with multimedia facility **Practical :** Workshop

	document Search required Files/Folders Convert Files in required format. Manage sizes of Files/Folders • Compress • Zip /unzip			**Consumable :**	
LU2: Prepare Presentation using computers	**The trainee will be able to:** Prepare presentation as per requirements, i.e. • Open blank presentation and add text / graphics • Create a simple design for a presentation • Apply existing styles within a presentation • Use presentation		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	template and slides to create a presentation • Use various tools to improve the look of the presentation • Save presentation to the appropriate storage device and folder with required name Customize basic settings to meet user requirements Format presentation as require • Develop organizational charts • Add objects and manipulate to meet presentation purposes • Modify slide layout, including				

	text and colors, to meet presentation requirements • Save presentation in another format • Save to storage device and close presentation Add slide show effect into presentation as required to enhance the presentation • Incorporate pre-set Animation • Apply Multimedia effects • Record Narration • Apply hyperlink • Apply video • Rehearse Timings • Test presentation for overall effect Print the presentation • Select				

	appropriate print format for presentation • Select preferred slide orientation • Add notes and slide numbers • Preview slides and run spell check before presentation • Print selected slides and submit presentation to appropriate person for feedback Practice verbal presentation Practice presentation through AV Aids				
LU3: Use Microsoft Access to manage database	**The trainee will be able to:** Collect the data using a standard data base package.		**Total** **hrs** **Theory:**		**Theory:** Class room with multimedia facility **Practical :** Workshop

	Start access to manage database .i.e. • identify problem statement of Data • Develop a table with fields /attributes according to database usage/ user requirements • Create a primary key and establish an index for each table • Modify table layout and field attributes as required • Create a relationship between the two tables • Add data in a table according to information requirements		hrs **Practical:** hrs	**Consumable :**	

	• Add records as required • delete records as required • Save database to storage area • close down database to storage area • Apply criteria in the following Query • SQL view of Query • Wildcards of query • Query Criteria Customize basic settings: • Adjust page layout to meet user requirements • Open and view different toolbars • Format font as appropriate for the purpose of the database				

	entries • Create reports • Design reports to present data in a logical sequence • Modify reports to include or exclude additional requirements • Distribute reports to appropriate person in a suitable format Create forms • Use a wizard to create a simple form • Open existing database and modify records through a simple form Rearrange objects within the form to accommodate information requirements				
LU4: Develop	**The trainee will be able**		**Total**		

graphics for Design	**to:** Develop graphic design concepts based on a thorough understanding of the communication need Use design techniques confidently to produce designs Integrate design tools skillfully to produce designs Evaluate the success of completed designs to meet objectives Evaluate feedback from client / peers		**hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

Module 5: Manage Human Resource Services (041300869)

Objective of the module: This unit describes the skills and knowledge required to plan, manage and evaluate delivery of human resource services, integrating business ethics. It applies to individuals with responsibility for coordinating a range of human resource services across an organization. They may have staff reporting to them.

Duration: 20 Hours **Theory:** Hours **Practical:** Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Determine strategies for delivery of human resource services	**The trainee will be able to:** Analyze business strategy and operational plans to determine human resource requirements Review external business environment that likely impact on organization's human resource requirements Consult line and senior managers to identify human resource needs in their areas Review organization's requirements for diversity in the workforce		**Total** **hrs** **Theory:** hrs **Practical:** hrs		**Theory:** Class room with multimedia facility **Practical :** Workshop

	Deliver human resource services that comply with business goals Develop strategic action plan for delivery of human resource services Develop roles and responsibilities of human resource team Develop quality assurance policy			**Consumable :**	
LU2: Manage the delivery of human resource services	**The trainee will be able to:** Communicate human resource strategies and services to internal and external stakeholders Develop and negotiate service agreements between • The human resource team, • Service providers • Client groups Document service		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	specifications, performance standards and timeframes Document /communicate service • Specifications, • Performance standards • Timeframes Monitor Quality assurance processes Ensure that services are delivered by appropriate providers, according to service agreements and operational plans Identify underperformance of human resource team or service providers				
LU3: Evaluate human resource service delivery	**The trainee will be able to:** Establish Management information system for human resource services		**Total** **hrs**		**Theory:** Class room with multimedia facility

	Conduct survey to determine level of satisfaction Analyze feedback of survey Recommend changes to service delivery Support agreed change processes across the organization		**Theory:** hrs **Practical:** hrs	**Consumable :**	**Practical :** Workshop
LU4: Manage integration of business ethics in human resource practices	**The trainee will be able to:** Ensure ethics in personal behavior Ensure code of conduct is observed across the organization, Observe confidentiality requirements in dealing with all human resource information Deal promptly with unethical behavior Ensure all persons responsible for human		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

	resource functions understand requirements regarding their ethical behavior				

Module 6: Develop Entrepreneurial Skills (041300860)

Objective of the module: This Competency Standard identifies the competencies required to develop entrepreneurial skills, in accordance with the organization's approved guidelines and procedures. You will be expected to develop a business plan, collect information regarding funding sources, develop a marketing plan and develop basic business communication skills. Your underpinning knowledge regarding entrepreneurial skills will be sufficient to provide you the basis for your work.

Duration: 30 Hours **Theory:** Hours **Practical:** Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Develop a business plan	**The trainee will be able**		**Total**		**Theory:** Class room with multimedia facility

	to: Conduct a market survey to collect following information • Customer /demand • Tools, equipment, machinery and furniture with rates • Raw material • Supplier • Credit / funding sources • Marketing strategy • Market trends • Overall expenses • Profit margin Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses		**hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Practical :** Workshop

	Compile the information collected through the market survey, in the business plan format				
LU2: Collect information regarding funding sources	**The trainee will be able to:** Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate Choose the best available option according to investment requirement Prepare documents according to the loan agreement requirement Include the information of funding sources in the business plan		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU3: Develop a	**The trainee will be able**		**Total**		**Theory:** Class room

marketing plan	**to:** Make a marketing plan for the business including product, price, placement, promotion, people, packaging and positioning Include the information of marketing plan in the business plan		**hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	with multimedia facility **Practical :** Workshop
LU4: Develop basic business communication skills	**The trainee will be able to:** Communicate with internal customers e.g.: labor, partners and external customers e.g.: suppliers, customers etc., using effective communication skills Use different modes of communication to		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

	communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc. Use specific business terms used in the market				

Module 7: Ensure Quality

Objective of the module: The aim of this module is to develop knowledge, skills and understanding required to ensure quality of fan

Duration: 110 hours **Theory:** 22 hours **Practical:** 88 hours

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Ensure good atmosphere at workplace	**The trainee will be able to:** • Ensure proper lighting at workplace • Ensure appropriate ventilation • Ensure good housekeeping	• Knowledge about adequate lighting for the job requirement • Knowledge about the forced ventilation for safe human working conditions • Understanding about good housekeeping for safe operation in the workshop	**Total** 15 Hours **Theory:** 3 Hours **Practical:**	• LEDs and hooded lights with reflectors • Exhaust fans	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical**

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
			12 Hours		Laboratory OR Workshop, Industrial visits
LU2: Ensure safe environmental concerns are addressed	**The trainee will be able to:** • Dispose-off waste chemicals as per environmental standards • Dispose-off cotton waste as per SOP • Ensure and follow hazardous instructions	• Knowledge about storing the chemicals that are harmful for workplace environment • Knowledge about safely disposing off the harmful materials • Knowledge about SOPs for disposing off cotton waste • Knowledge about placement of instruction charts to counter hazardous situations • Understanding of dealing with hazardous situations according to instructions	**Total** 15 Hours **Theory:** 3 Hours **Practical:** 12 Hours	• Storage Drums • Waste Box • Different sample data sheets of chemicals	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits
LU3: Ensure quality of materials	**The trainee will be able to:** • Check gauge of supplied material as per specification • Check weight as per specification • Check dimensions as per specification • Inspect material quality as per specification	• Knowledge and understanding about conducting visual, dimensional, electrical, destructive testing and NDT testing	**Total** 30 Hours **Theory:** 6 Hours **Practical:** 24 Hours	• Magnifying glass • Steel Rule • Measuring tape • Digital micrometre • SWG gauge • Go and Not Go gauges • Digital Vernier calliper • Digital weighing scale	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				• Mili Ohm Meter • Jigs and Fixtures	
LU4: Implement quality standards	**The trainee will be able to:** • Interpret relevant national and international standards • Adopt relevant national standard • Adopt relevant international standard	• Knowledge about National and International relevant standards • Understanding of adaptation for National and International standards	**Total** 20 Hours **Theory:** 4 Hours **Practical:** 16 Hours	• Relevant standard documents	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits
LU5: Perform electrical and mechanical tests as per relevant standards	**The trainee will be able to:** • Interpret electrical/mechanical tests as per relevant standards • Adopt electrical/mechanical tests as per relevant standards	• Knowledge about fan testing techniques as per relevant standards. • Knowledge of practically examining the test parameters as per required standards.	**Total** 30 Hours **Theory:** 6 Hours **Practical:** 24 Hours	• Anemometer • Watt meter • Volt meter • Ampere meter • Power factor meter • Frequency meter • Tachometer • Sound level meter • Temperature meter • Insulation tester • Die electric tester • Multi meter • Brinel, Rockwell and Vickers hardness testers	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				• Viscosity meter • Gloss meter • Film thickness meter • Different fan parts and complete fan for testing	

Module 8: Supervise production process

Objective of the module: The aim of this module is to develop knowledge, skills and understanding required to supervise production process

Duration: 140 hours **Theory:** 28 hours **Practical:** 112 hours

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare departmental production plan	**The trainee will be able to:** • Identify the machinery required for relevant process • Ensure the availability of required tools and equipment for relevant process • Incorporate machine maintenance schedule in the production plan • Prepare machine wise production schedule to ensure in-time delivery • Ensure the usage of PPEs according to process requirement	• Understand the production processes involved in the fan manufacturing industry • Understand the production scheduling and material requirements planning • Knowledge of labour and time management • Knowledge and understanding of raw material grades and their quality parameters • Knowledge about the Quality Control and Quality Assurance • Understanding about production types i.e. mass production, unit production, continuous and batch production	**Total** 30 Hours **Theory:** 6 Hours **Practical:** 24 Hours	• Relevant Information material	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits
LU2: Acquire material from store	**The trainee will be able to:** • Generate the demand order to raw material store as per production schedule • Ensure availability of raw	• Knowledge about usage of different raw materials required in fan manufacturing • Knowledge about issuance of requisition • Ensure availability of raw material as	**Total** 20 Hours **Theory:** 4 Hours	• Relevant Information material	**Theory** Classroom equipped with teaching aids (multimedia and

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	material as per required generated order • Distribute raw material to production processes in required quantities	per required generated order • Understanding about distribution of raw material to production processes in required quantities	**Practical:** 16 Hours		flip charts) **Practical** Laboratory OR Workshop, Industrial visits
LU3: Assign duties to workers	**The trainee will be able to:** • Assign jobs to the workers along with work instructions • Train workers on their assigned tasks and work instructions • Monitor the worker's performance as per instructions	• Knowledge about task management as per production requirement • Understanding of production plan • Knowledge and understanding of time and work force management • Understanding of contingency planning	**Total** 30 Hours **Theory:** 6 Hours **Practical:** 24 Hours	• Relevant Information material	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits
LU4: Ensure production operations according to the plan	**The trainee will be able to:** • Ensure quality of product as per requirement • Make sure the completion of production process within the lead time • Confirm data entry at every stage in process travel cards or process	• Knowledge and understanding of process travel card • Understanding of product specification	**Total** 30 Hours **Theory:** 6 Hours **Practical:** 24 Hours	• Relevant Information material	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop,

Learning units	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	production reports				Industrial visits
LU5: Prepare production report	**The trainee will be able to:** • Gather and consolidate the production data in concise form for further analysis • Analyse data using relevant quality tools (control charts, bar graphs, normal charts etc.) • Compile production report and submit and present the report to management within defined timeline	• Understanding and knowledge of report writing • Understanding and usage of MS Office (Word, Excel, Power point)	**Total** 30 Hours **Theory:** 6 Hours **Practical:** 24 Hours	• Computer with Internet connection • Printer	**Theory** Classroom equipped with teaching aids (multimedia and flip charts) **Practical** Laboratory OR Workshop, Industrial visits

General assessment guidance for Fan Manufacturing Technician Curriculum

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

Sessional assessment is going on all the time. Its purpose is to provide feedback on what students are learning:

- to the student: to identify achievement and areas for further work
- to the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

Final assessment is the assessment, usually on completion of a course or module, which says whether or not the student is "competent". It is – or should be – undertaken with reference to all the objectives or outcomes of the course and is usually formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student’s performance.

Examples for direct assessment of a Fan Manufacturing Technician include:

- Work performances, for example Perform cast iron casting
- Demonstrations, for example demonstrating calibration of different measuring instruments
- Direct questioning, where the assessor would ask the student why he is performing winding continuity test
- Paper-based tests, such as multiple choice or short answer questions on usage of different electrical and mechanical tools or different fabrication processes

Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Fan Manufacturing Technician include:

- Work products, such as a winded fan motors, aluminium die casted fan parts
- Workplace documents, such as a log of raw materials that has been tagged ready for storage
- Indirect assessment should only be a second choice (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed)

Principles of assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess. For example, if winding of fan motor skills are to be assessed and certificated, the assessment should involve performance criteria that are directly related to that winding activity. An interview about the effect of the different wires and insulation papers on fan motor would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of preparing sand mould as per pattern has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor must be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

Assessment strategy for Fan Manufacturing Technician Level IV (Supervisor)

This curriculum consists of 08 modules:

- Contribute to Work Related Health and Safety (WHS) Initiatives
- Analyse Workplace Policy and Procedures
- Perform Advanced Communication
- Develop Advance Computer Application Skills
- Manage Human Resource Services
- Develop Entrepreneurial Skills
- Ensure quality
- Supervise production process

Sessional assessment

The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

Final assessment

In general, the final assessment shall be conducted in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

The final theoretical assessment shall consist of two sub-parts. Part A shall last for 2 hours and shall consist of half multiple choice and half short-answer questions. Part B shall last for 1 hour and shall consist of short answer and at least two extended answer questions.

For the final practical assessment, each student shall be assessed over a period of two days, with two 3-hour sessions on each day. This represents a total of four sessions comprising 12 hours of practical assessment for each student.

The assessment team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 20 students shall therefore require assessments to be carried out over a four-day period. For a group of only 10 students, assessments would be carried out over a two-day period only.

Planning for assessment

Sessional assessment: Assessors need to plan how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree on different work performances for practical assessments in advance.

Complete list of tools and equipment

Sr. No.	Description	Specification (for example)	Quantity in numbers or sets or units (for example)
General Tools and Equipment			
1.	Measuring tape	0-15Ft	**10**
2.	Venire calipers	0-304mm	10
3.	Micro meter	0-25mm	10
4.	Steel ruler	0-12 INCH	10
5.	Wire gauge	0-32 mm	10
6.	Digital micrometer	0-25mm	10
7.	SWG gauge	0-25mm	10
8.	Go and Not Go gauges for Quality inspection	0-25mm	10
9.	Digital Venire caliper	0-304mm	5
10.	Digital weighing scale	0-7kg	5
11.	Feeler gauge	2-40 Thousand	10
12.	Pneumatic screw driver along with compressor	0-3 bar	5
13.	Punching pliers	3.5-7.5mm	10
14.	Hand grinder	0.800watt	5
15.	Rubber Hammer		10
16.	Soldering iron	100-300wats	5
17.	Coil tamping tools	1-3500(cst) centistokes	5
18.	Viscosity meter	0-1000 GU	5
19.	Gloss meter	0-1500 µm	5
20.	Film thickness meter	0-1000 Ċ	5
21.	Pyrometer	0-3 bar	5
22.	Spray gun		5
23.	Mechanical Tool kit		5

24.	Master gauges of measuring instruments		5
25.	Maintenance kit for measuring instruments		5
26.	Scissor/cutter	0-8 inches	10
27.	steel wire brush	0-200 mm	5
28.	Lacing needle	0-3 mm	10
29.	Allen Key set	1.5-36mm	10
30.	Racks		4
31.	Trolleys		4
32.	Fire Extinguishers	CO_2 Fire/DRV Powder/Foam Extinguisher	5
33.	Magnifying glass	40-100mm	10
34.	Thermocouple	0-75 Ċ	10
35.	Sound level meter	30-130 dBA	5
36.	Varnishing booth		2
37.	Paint booth with accessories		2
38.	Powder coating booth		2
39.	PPEs (Goggles, Heat resistant fireproof gloves, Safety Helmet with protective glass shield, Safety Shoes, Heat resistant fireproof Apron with hood, Mask) for metal casting		
40.	Computer		10
41.	printer		4
Electric Tools and Equipment			
1.	Ampere meter	0-50 Amp	5
2.	Ohm meter	400 Ω	5
3.	Resistance decade box	400 Ω	5
4.	Volt meter	250 Volts	5
5.	Series and parallel circuits		5
6.	AC/DC power supply	220-250	5
7.	Watt meter	200 Watt	5
8.	Different types of load (lamp, fan, electric iron, single phase motor)	0.5A – 1.5 hP	3 each
9.	Capacitors of different values	2.0-4.5 µf 450 Volt	5 each

10.	Inductors of different values	20.200 nH	5 each
11.	LCR meter	1-100MΩ	5
12.	Low voltage transformer	22 KV	5
13.	Step down transformer	500 VA	5
14.	Diodes of different values	6-10 A	5 each
15.	Resistors of different values	2.7 K – 5.7 K	5 each
16.	Oscilloscope	0-10 GSa/sec	5
17.	Bread board		10
18.	Mili Ohm Meter		5
19.	Anemometer	(80cm)0.4m/s – 30.0 m/s	5
20.	Power factor meter	0.5-10	5
21.	Temperature meter	40.300Ċ	5
22.	Insulation tester	50-1000 V	5
23.	Die electric tester	110-230 V˜	5
24.	Frequency meter	50-60 Hz	5
25.	Tachometer	1500 rpm	5
26.	Test Bench (ampere meter, volt meter, ohm meter, watt meter, test lamp)		5
27.	Insulation tester (High voltage tester)	0-2500 V	5
28.	Multi meter		5
29.	Electric Toolkit		5
Foundry Shop Tools			
1.	Wheel barrow	200 KG	2
2.	Flasks		5
3.	Trowels		10
4.	Slicks		10
5.	Lifters		4
6.	Bellows		4
7.	Vent wires		10
8.	Steel boards		5
9.	Riddles		10

10.	Shovels		10
11.	Rammers		10
12.	Strike off bars		10
13.	Draw spikes		5
14.	Sprue pins		20
15.	Ladles		5
16.	Tong		5
17.	Skimmer		10
18.	Ladle shank		5
19.	Grinder		5
20.	Hammer		10
21.	Pouring cup		5
22.	Mallet		
Machines			
1.	Coil making machine		2
2.	Ceiling fan winding machine		2
3.	Paper cutting machine		2
4.	Paper insertion machine		2
5.	Fan winding machine (for AC and DC)		2
6.	Powder coating machine		2
7.	Baking oven	200 Ċ	2
8.	Curing Oven(Powder Coating)		2
9.	Drying oven(varnishing process)		2
10.	Air compressor with filter unit	1-7.5 bar	2
11.	Core baking ovens(Sand casting)	0-700 F^o	2
12.	Crucible furnace		2
13.	Aluminum die casting machine		1
14.	• Mould for aluminum die casting machine		
15.	Centrifugal/rotary casting machine		1
16.	• Mould for aluminum Centrifugal/rotary casting machine		

17.	Spot Welding machine	3.5 KVA – 15 KVA	1
18.	• Jigs and fixtures for spot welding machine		
19.	Riveting press	35 – 140 KG / cm^2	1
20.	• Jigs and fixtures for riveting press		
21.	Balancing machine		2
22.	Drill machine	1.50-1400 KW/rpm	5
23.	Bearing press machine		1
24.	Brinell, Rockwell and Vickers hardness testers	250 – 3000	1 each
25.	Power Press Machine	0-7 KG /cm^2	2
26.	Hydraulic press	30 MPa	2
27.	• Different types of jigs and fixtures for hydraulic press machine		
28.	Wire cutting machine for fan safeguard		1
29.	Cutting die for cutting fan blades and shanks on die press machine (punch and cavity)	35-140 KG / cm^2	2
30.	Punching die for punching holes in fan blades and shanks		2
31.	Bending die for bending fan blades and shanks as per design		2
32.	Cutting die for cutting rotor/stator as per design (punch and cavity)		2
33.	Punching die as per requirement for punching slots in stator and rotor sheets		2
34.	Bending die for bending steel wires as per design (punch and cavity)		2

List of consumable supplies

Appropriate quantities of:

- De-greasing chemicals
- Cotton cloth
- Pages for printer
- Leatherized/ insulated paper
- Insulation paper
- Insulated winding wire
- Coarse cotton thread
- Insulation sleeves
- Soldering wire
- Soldering paste
- Varnish
- Paint
- Solvent
- Cotton cloth
- Sand paper
- Buffing mob
- Polishing lustre
- Powder paints
- Sand papers of different grains
- Different filler material
- Different types of corrugated sheets
- Thermo-pore sheets
- Coarse paper sheet
- Bubble sheets
- Packing tape
- Boring bits
- Fillet rods
- Wooden planks
- Different types of nails.
- Sandpapers
- Polishing material (spirit, lacquer, thinner & shellac).
- Soft cotton cloth
- Elfie
- Wooden glue
- Paint and paint brushes
- Putty
- Moulding sand
- Bentonite
- Molasses
- Chalk powder
- Graphite powder
- Dust bag
- Fuel for furnace (gas/coal/oil)
- Aluminium blocks/scraps
- Fire clay and fire bricks
- Cast iron blocks/scraps

- Flux (limestone) for cast iron casting
- Flux for aluminium melting
- Degasser
- Grain refiner
- Different types of thermoplastic materials
- Colorants
- Different types of cutters and knives
- Aluminium or its alloys
- Crucible
- Cotton cloth
- Fuel for aluminium casting furnace
- Lubricants used during aluminium melting process
- Aluminium sheet (for cutting of fan blades)
- Mild steel (for cutting of fan blades shank)
- Aluminium fan blade
- Mild steel shanks
- Electrical sheet
- Steel wire
- Inner and outer mild steel ring
- Axle/Shaft
- Armature
- Fan body and plate
- Cutting bits of lathe machine
- Taps
- Boring tool for lathe machine
- Lubricants used for lathe machine
- Coolants used for lathe machine
- Metal wire brush
- Rotor and stator
- Steel rod
- Threading tool for lathe machine
- Flat file for finishing 10”
- Drill bits
- Steel pipe
- Grinding wheel dresser
- Weights for balancing machine
- Bearings
- Screws
- Jane
- Spring washers
- Plastic bags

Credit values

The credit value of the National Vocational Certificate (Level 2 to Level 4) of Fan Manufacturing Technician Qualification is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines.

The credit values are as follows:

Competency Standard	**Estimate of hours**	**Credit**
Contribute to Work Related Health and Safety (WHS) Initiatives	30	3
Analyse Workplace Policy and Procedures	30	3
Perform Advanced Communication	30	3
Develop Advance Computer Application Skills	40	4
Manage Human Resource Services	20	2
Develop Entrepreneurial Skills	30	3
Ensure quality	110	11
Plan work	140	14

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