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SURGICAL INSTRUMENTS MANUFACTURING TECHNICIAN

CBT CURRICULUM

National Vocational Certificate Level 4

Version 1 - July, 2019

NAVTTC

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Introduction

Definition/ Description of the training programme for SURGICAL INSTRUMENT MANUFACTURING TECHNICIAN

Surgical Instrument Manufacturing Technician is a course developed to create a technician for the whole surgical industry. The technician has skills and knowledge about all parts of the surgical field within a safe work place environment. He has the ability to handle production from the raw material to the finished inspected packed surgical instruments. In addition he can assign duties, supervision and inspection of surgical instruments. The production process is also involved in the responsibilities of a Surgical Instrument Manufacturing Technician.

Purpose of the training programme

The purpose of training a Surgical Instrument Manufacturing Technician is to enhance the development of the surgical industry in PAKISTAN. The surgical industry is the second largest foreign exchange earning industry in the light engineering sector. After completion of the training, the candidate will be able to start a job or start his own business.

Overall objectives of training programme

Overall objectives of the Surgical Instrument Manufacturing Technician are:

- Giving knowledge and skills about safe workplace environment and attitude
- Giving knowledge and skills about surgical instrument manufacturing process/ operations i.e. (Forging, Machining, Grinding, Polishing, Inspection, Packing etc)
- Selecting and operating of tools and equipment used in surgical instrument manufacturing process
- Sequencing of the process involved in surgical instrument manufacturing process
- Handling the stock and finished surgical instruments
- Assigning the duties
- Working in a team
- Supervising the production
- Operating and knowledge about computer applications i.e. (Microsoft office etc)
- Giving knowledge about office management
- Quality inspection of the surgical instruments
- Packing skills and techniques of surgical instruments

Competencies to be gained after completion of course

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

- Advance communication skills
- Maintain safe work place environment and attitude
- Team work
- Advance computer application skill
- Manage human resource
- Entrepreneurial skill
- Supervision of production
- Ensuring product quality
- Inspection of surgical instruments
- Assigning of duties
- Handle surgical instruments manufacturing
- Team work

Potential job opportunities available immediately and later in the future

After completion the Surgical Instrument Manufacturing Technician training, trainees get employments in firms related to surgical industry. They can also start self-employment by means of small production unit at initial level. The opportunities available in industries after completion of surgical instrument manufacturing technician are:

- Production supervisor
- Foreman
- Forger
- Machinist
- Grinding machine operator
- Furnace operator
- Heat treatment plant operator
- Polishing man
- Ultrasonic machine operator
- Surgical instrument setter and assembler
- Packing worker
- Quality checker and controller

Trainee entry level

Trainee's entry level for Surgical Instrument Manufacturing Technician is minimum 8th grade or equivalent.

Entry requirements

The entry for National Vocational Certificate levels-II to Level-IV Surgical Instrument Manufacturing Technician is given below**:**

QUALIFICATION TITLE	ENTRY REQUIREMENTS
National Vocational Certificate Level-II in Surgical Instrument Manufacturing Technician (Instrument Maker)	The entry requirement for this qualification is minimum 8th Grade or equivalent.
National Vocational Certificate Level-III in Surgical Instrument Manufacturing Technician (Surgical Forger)	The entry requirement for this qualification is National Vocational Certificate Level-II or middle with hands on experience
National Vocational Certificate Level-IV in Surgical Instrument Manufacturing Technician (Supervisor)	The entry requirement for this qualification is National Vocational Certificate Level-III or GIII or middle with 1 year work experience

Minimum qualification of trainer

DAE in Mechanical with minimum three (3) years of experience in surgical field

OR

BSC Mechanical Engineering or BSC Mechanical Engineering Technology or equivalent in Mechanical with one (1) years of experience in surgical field

OR

Minimum one level higher than the qualification with minimum five years work experience in surgical field

Recommended trainer: trainee ratio

The recommended maximum trainer: trainee ratio for Surgical Instrument Manufacturing Technician is 1 trainer and 1 demonstrator for 25 trainees.

Medium of instruction i.e. language of instruction

Medium of instruction for Surgical Instrument Manufacturing Technician are Urdu and English.

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

The level 4 curriculum comprises with 8 Modules. The recommended delivery time is 460 hours. Delivery of course could be full time, 5 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The structure of this module is as follow:

Module Code	Module Name	Theory Hours	Practical Hours	Total Hours
102200848	Contribute to Work Related Health and Safety (WHS) Initiatives			30
041700841	Comply with Workplace Policy and Procedures			30
001100853	Perform Advanced Communication			30
061100858	Develop Advance Computer Application Skills			40

041300869	Manage Human Resource Services			20
041300860	Develop Entrepreneurial Skills			30
	Supervise Production Process	38	122	160
	Ensure Quality of Products	24	96	120

Sequence of the modules

The level 4 is consists of 8 modules. Every module has its own important and measures. We arrange the sequence of module according to working sequence/ steps.

The full structures of the sequence of module within levels are:

LEVEL-4

Sequence No.	Module Code	Module Name	Module Code	Module Name
1		Supervise Production Process	102200848	Contribute to Work Related Health and Safety (WHS) Initiatives
			041700841	Comply with Workplace Policy and Procedures
			001100853	Perform Advanced Communication

2		Ensure Quality of Products	061100858	Develop Advance Computer Application Skills
			041300869	Manage Human Resource Services
			041300860	Develop Entrepreneurial Skills

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Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1: 102200848 Contribute to Work Related Health and Safety (WHS) Initiatives **Aim:** 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).	**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			**30**
Module 2: 041700841 Comply with Workplace Policy and Procedures **Aim:** 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.	**LU1:** Manage work timeframes **LU2:** Manage to convene meeting **LU3:** Decision making at workplace **LU4:** Set and meet own work priorities at instant **LU5:** Develop and maintain professional competence **LU6:** Follow and implement work safety requirements			**30**

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 3: 001100853 Perform Advanced Communication **Aim:** 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.	**LU1:** Demonstrate professional skills **LU2:** Plan and Organize work **LU3:** Provide trainings at workplace			**30**
Module 4: 061100858 Develop Advance Computer Application Skills **Aim:** 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	**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			**40**

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 5: 041300869 Manage Human Resource Services **Aim:** 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.	**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			**20**
Module 6: 041300860 Develop Entrepreneurial Skills **Aim:** 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.	**LU1:** Develop a business plan **LU2:** Collect information regarding funding sources **LU3:** Develop a marketing plan **LU4:** Develop basic business communication skills			**30**

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 7: Supervise Production Process **Aim:** The aim of this module is to develop advanced skills, knowledge and understanding about supervisor duties and production process	**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	38	122	**160**
Module 8: Ensure Quality of Products **Aim:** The aim of this module is to develop advanced skills, knowledge and understanding about ensure quality of product	**LU1:** Establish product quality requirements **LU2:** Develop quality testing procedures **LU3:** Assign jobs to quality inspectors **LU4:** Prepare quality assurance report **LU5:** Ensure compliance to quality management system	24	96	**120**

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Module-1

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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 safety Participate in consultative meetings.		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

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. • scheduling • liaison • administering resources • communication		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

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 to review work-related health and safety measures Assist individuals and parties related to WHS measures in following activities • preparing reports • communicating		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

	review • evaluating outcomes				
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 Assist the development process of WHS measures in following ways • Suggest amendments • Document amendments • Implement amendments Take feedback from concerned persons regarding WHS measures.		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

	Communicate improvements in WHS Measures				

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Module-2

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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 notify them accordingly Carryout meeting arrangements according		**Total** **hrs** **Theory:** hrs **Practical:**	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	to the time Record the minutes of the meeting		hrs		
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 instant	**The trainee will be able to:** Take initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives Use technology efficiently and effectively		**Total** **hrs** **Theory:** hrs **Practical:**	**Consumable :**	

	to manage work priorities and commitments Maintain appropriate work-life balance		hrs		
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 and improve competence		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

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 :**	

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Module-3

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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. Perform Continuous professional development as required at workplace		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	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 Provide opportunity for practice Provide feedback on progress on trainees Review delivery experience		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

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Module-4

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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 document Search required Files/Folders Convert Files in required format.		**Total** **hrs** **Theory:** hrs **Practical:** hrs		**Theory:** Class room with multimedia facility **Practical :** Workshop

	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 template and slides to create a presentation • Use various tools to improve the look of the presentation • Save presentation to the appropriate storage device		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	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. 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		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	• Create a relationship between the two tables • Add data in a table according to information requirements • 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 graphics for Design	**The trainee will be able 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		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

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Module-5

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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 Deliver human resource services that comply with business goals		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	Develop strategic action plan for delivery of human resource services Develop roles and responsibilities of human resource team Develop quality assurance policy				
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 specifications, performance standards and timeframes Document /communicate service • Specifications, • Performance		**Total hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	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 Conduct survey to determine level of satisfaction Analyze feedback of survey Recommend changes to service delivery Support agreed change processes across the organization		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **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 resource functions understand requirements regarding their ethical behavior		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	

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Module-6

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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 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		**Total** **hrs** **Theory:** hrs **Practical:** hrs		**Theory:** Class room with multimedia facility **Practical :** Workshop

	expenses • Profit margin Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses Compile the information collected through the market survey, in the business plan format			**Consumable :**	
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		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room with multimedia facility **Practical :** Workshop

	Include the information of funding sources in the business plan				
LU3: Develop a marketing plan	**The trainee will be able 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		**Total** **hrs** **Theory:** hrs **Practical:** hrs	**Consumable :**	**Theory:** Class room 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		**Total** **hrs** **Theory:** hrs **Practical:**	**Consumable :**	

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

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Module-7

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Module 7: Supervise Production Process

Objective of the module: This standard defines the advanced knowledge, skills and understanding required to supervise production process or by his managers

Duration: 160 Hours **Theory:** 38 Hours **Practical:** 122 Hours

Learning Unit	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 PPE according to process requirement	Understand the steps involved in the surgical instrument production process regarding selection of raw material, forging processes, trimming, machining process, heat treatment processes, polishing, sand blasting etc. Understand the production scheduling and material requirements planning Knowledge about labour and time management/ time and motion study Understanding and knowledge about good communication skill in workplace Knowledge of testing process (e.g. Heat treatment test, passivation test, material test etc) Knowledge and understanding of raw material grades and quality parameters Knowledge about the QA/QC	**Total** **60 hrs** **Theory:** 18 hrs **Practical:** 42 hrs	Computer system along with all accessories Laser printer **Consumables:** Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

		Awareness about production types i.e Mass production, unit production, continuous and batch production Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)			
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 material as per required generated order (metallurgical and physical) Distribute raw material to production processes in required quantities	Understanding safety precautions and Personal Protective Equipment for store. Generate the demand order to store as per production schedule Knowledge of issuance of requisition Understanding and knowledge about good communication skill in workplace Ensure availability of raw material as per required generated order (metallurgical and physical) Distribute raw material to production departments in required quantities Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **25 hrs** **Theory:** 05 hrs **Practical:** 20 hrs	Computer system along with all accessories Laser Printer **Consumable :** Log/form Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

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 workers' performance as per instructions	Task Management as per production requirement Understand production plan Understanding and knowledge about good communication skill in workplace Understanding of time/work force management Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **20 hrs** **Theory:** 04 hrs **Practical:** 16 hrs	Computer system along with all accessories Laser Printer **Consumables:** Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU4: Ensure production operations according to the plan	**The trainee will be able to:** Ensure quality of product as per requirement Ensure quantity of instrument produced as per production plan Make sure the completion of production process within the lead time Confirm data entry at every stage in process travel cards or process production reports	Knowledge and understanding of process travel card Understanding of product drawing and specifications Knowledge about time and labour management skill/ time and motion study Understanding and knowledge about good communication skill in workplace Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **25 hrs** **Theory:** 05 hrs **Practical:** 20 hrs	Computer system along with all accessories Laser printer **Consumables:** Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

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 knowledge about good communication skill in workplace Understanding and usage of MS Office (Word, Excel, Power point etc) Knowledge about office management Knowledge about time management Knowledge about quality charts and graphs Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **30 hrs** **Theory:** 06 hrs **Practical:** 24 hrs	Computer system along with all accessories Laser Printer **Consumables:** Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

SURGICAL INSTRUMENTS MANUFACTURING TECHNICIAN

Module-8

CBT CURRICULUM

National Vocational Certificate Level 4

Version 1 - July, 2019

Module 8: Ensure Quality of Products

Objective of the module: This standard defines the advanced knowledge, skills and understanding required to ensure quality of surgical instruments.

Duration: 120 Hours **Theory:** 24 Hours **Practical:** 96 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Establish product quality requirements	**The trainee will be able to:** Enlist quality parameters of the instruments with their values and tolerances by interpreting product drawing and technical specifications Provide master samples of products to relevant processes Communicate quality requirements to concerned supervisors and quality inspectors	Understand technical drawings and specifications Understand raw material quality parameters Understand instrument functionality i.e. scissors cutting, forceps griping etc. Understand quality requirements of surgical instruments and production samples. Understanding basics of raw material grades Understanding of time management Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **35 hrs** **Theory:** 07 hrs **Practical:** 28 hrs	Quality management system standard and manual Computer system along with all accessories Laser printer Scanner Tool kit **Consumables:** Drawing sheets Log of quality management system standard and manual Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

LU2: Develop quality testing procedures	**The trainee will be able to:** Identify tools, instruments and gauges for testing quality parameters in different processes Prepare standard testing procedures including frequency, sample size, report templates etc. Communicate quality testing procedures to concerned supervisors and quality inspectors	Knowledge about measuring instruments and gauges Understand technical drawings and specifications Knowledge of QA/QC Understand basic computer applications Knowledge about office management Knowledge of MS Office (Word, Excel, Power Point) Understanding of microscopic inspection, visual inspection (e.g. corrosion, cracks and pits etc) and functionality test (e.g. cutting, gripping and ratchet etc) Understanding of time management Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **30 hrs** **Theory:** 06 hrs **Practical:** 24 hrs	quality management system standard and manual Computer system along with all accessories Laser printer Scanner Microscope Magnifying glass with light Vernier clapper Micrometer Gauges Master sample **Consumables:** Drawing sheets Cloth Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

LU3: Assign jobs to quality inspectors	**The trainee will be able to:** Prepare job descriptions of quality inspectors Prepare job schedule for quality inspectors Train quality inspectors on their assigned tasks and communication procedures (recording, reporting, presenting etc.) Monitor work of quality inspectors, provide feedback and make necessary adjustments in job assignments	Understand basics of quality management system i.e. QA / QC Knowledge about computer applications Knowledge about office management Understanding and knowledge about good communication skill in workplace Understanding of time management Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc) Knowledge about supervisory and team work	**Total** **15 hrs** **Theory:** 03 hrs **Practical:** 12 hrs	quality management system standard and manual Computer system along with all accessories Laser Printer Scanner **Consumable :** Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop
LU4: Prepare quality assurance report	**The trainee will be able to:** Gather quality and production reports from quality inspectors and concerned supervisors at defined intervals Consolidate the data in concise form for further	Understanding of data analysis and data consolidation. Understand basics of quality management system i.e. QA / QC Knowledge about computer applications Knowledge about office management Understanding and knowledge about good	**Total** **15 hrs** **Theory:** 03 hrs	quality management system standard and manual Computer system along with all accessories Laser Printer	**Theory:** Class room with multimedia facility **Practical :** Workshop

	analysis Analyse data using relevant quality tools (control charts, bar graphs, normal charts etc.) Compile report of quality conformance Submit and present the report to management within defined timeline	communication skill in workplace Knowledge about quality charts and graphs Understanding of time management Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Practical:** 12 hrs	Scanner **Consumable :** Process travel card (PTC) Quality charts and graphs	
LU5: Ensure compliance to quality management system	**The trainee will be able to:** Prepare checklist for assessment of conformance to quality management system Train quality inspectors to conduct compliance assessment Gather and compile compliance assessment reports Compile summary report of compliance to quality management system	Understand of technical documents regarding product e.g. SOPs, quality management system Knowledge about team work & communications skills Knowledge about time management skills Knowledge about computer applications Knowledge about office management Understanding of time management Understanding of contingency management Understanding process travelling card (PTC) and its applications. (storage of job, quality, quantity etc)	**Total** **25 hrs** **Theory:** 05 hrs **Practical:** 20 hrs	Quality Management System Standard and Manual Computer system along with all accessories Laser printer Scanner **Consumable :** Process travel card (PTC)	**Theory:** Class room with multimedia facility **Practical :** Workshop

	Submit and present the report to management within defined timeline				

General assessment guidance for Surgical Instrument Manufacturing Technician

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 to produce the final qualification result.

Sessional assessment is an ongoing process. 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 done on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is formal process. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assumes 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 Surgical Instrument Manufacturing Technician include:

- Work performances, for example preparing the work place according to the need of surgical operation process with respect to health, safety and environment.
- Demonstrations, for example demonstrating machining operations, parts and its functions.
- Direct questioning, where the assessor would ask the student why he has manufactured such surgical item in this way, or how the student will find out about the current and future requirements for the surgical instrument manufacturing technician
- Paper-based tests, such as multiple choices, fill in the blanks and short answer questions on surgical instrument manufacturing processes, preparing the work station or developing productive working relationships with associates.

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

Examples for indirect assessment of a Surgical Instrument Manufacturing Technician include:

- Work products, such as completed surgical instruments.
- Workplace documents, such as process travel card, sessional test and assignments, attendance register etc.

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 the assessment assesses what it claims to assess. For example, if complex heat treatment skills are to be assessed, the assessment should involve performance criteria that are directly related to that heat treatment activity. An interview about the effect of the heat treatment processes on different surgical jobs may not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of polishing the surgical instruments 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 has to 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 student's needs.

Assessment strategy for Surgical Instrument Manufacturing Technician

The curriculum of level 4 consists of eight modules.

Module No.	Module Name
01	Contribute to Work Related Health and Safety (WHS) Initiatives
02	Comply with Workplace Policy and Procedures
03	Perform Advanced Communication
04	Develop Advance Computer Application Skills
05	Manage Human Resource Services
06	Develop Entrepreneurial Skills
07	Supervise Production Process
08	Ensure Quality of Products

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 assessment lasting at least one hour per module. This can be a combination of multiple choice, fill in the blanks 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

Final assessment shall be 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 one hour paper for each module. This can be a combination of multiple choice, fill in the blanks and short answer questions.

The final practical assessment, all procedures and methods for the modules must be assessed. The time schedule for assessment depends upon the nature of assessment guide.

The assessment team

The number of national assessors must meet the needs of the students and the training provider. For example, where one assessor is conducting the assessment, there must be a maximum of five students per assessor in a day. In this example, a group of 25 students shall therefore require assessments to be carried out over a five-day period.

Planning for assessment

Sessional assessment: assessors need to plan in advance 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 the operations performed for practical assessments in advance.

Complete list of tools and equipment

Sr. #	Name of Item/ Equipment/ Tools	Quantity
1	Steel rule (Different sizes)	26
2	Measuring tape (Different sizes)	26
3	Tri square (Different sizes)	26
4	Scriber	26
5	Compass	26
6	Manual venier caliper	12
7	Digital vernier caliper	6
8	Manual micrometer	12
9	Digital micrometer	6
10	Thickness gauge	6
11	Feeler gauges	6
12	Sheet gauges	6
13	Thread gauge	6
14	Depth gauge	6
15	Work holding devices and attachments(jigs and fixtures)	6
16	Hammers (assorted range)	26
17	Spanners (Different sizes)	6
18	Clamping set	5
19	Tool kit	2
20	Number and alphabet punch	2
21	Drop forging hammer	5
22	Gas heating furnace	5

23	Height gauge	6
24	Forging die	5
25	Tongs (For holding forged work piece)	12
26	Power press	5
27	Trimming dies for different product	5
28	Dial Indicator with magnet stand	6
29	Lathe machine (with standard accessories)	5
30	Hand hacksaw	26
31	Lathe machine work holding devices and attachments (face plate, mandrill, chuck, drill chuck, lathe centers)	5 each
32	Pedestal grinder with cutting angle support	5
33	Radius gauge - concave & convex (assorted range)	6
34	Threads gauge -inches / millimeters (assorted range)	6
35	Boring head	5
36	Plug and snap gauges	6
37	Vertical milling machine with standard accessories	5
38	Horizontal milling machines with standard accessories	5
39	Power hacksaw	5
40	Shaper machine	5
41	Tool and cutter grinder	5
42	Surface grinder	5
43	Milling machine work holding devices and attachments (clamping sets, machine vices, tool holders and collets set, spacer etc)	5 each
44	Dividing head and rotary table	5 each
45	Shearing press	5
46	Blanking dies	5

47	Punching press	5
48	Punching dies	5
49	Hydraulic press	5
50	Bending dies	5
51	Deep draw dies	5
52	Spinning lathe machine (with standard accessories)	5
53	Different range of spinning lathe tools	26
54	Bench/ pedestal grinding machine with dust collector	5
55	Container for coolant	5
56	Bench vices (different sizes)	12
57	Pedestal drilling machine with accessories (chucks, sleeves etc.)	5
58	Fixtures and vices	5
59	Annealing furnace	5
60	Conventional heating furnace	5
61	Vacuum furnace	5
62	Conveyor belt heat treatment furnace	5
63	Rockwell hardness tester	5
64	Standard chart of materials	26
65	Quenching tank	5
66	Basket (to carry work piece in annealing furnace)	5
67	Hangers (to carry work pieces in furnace)	5
68	Riveting press	5
69	Orbital riveting punch “peen” (to develop the shape on the rivets)	5
70	Pin grinder	5
71	Wheel grinding machine	5
72	Mallets	26

73	Screw drivers set	6
74	Combination pliers	6
75	Allen key set	6
76	Anvil/ work station (brass block etc)	6
77	Polishing lathe with attachments	5
78	Magnifying glass with light	6
79	Production gauges	6
80	Electrochemical polishing plant	5
81	Sand blasting machine with complete accessories	5
82	Ultrasonic cleaning machine with complete accessories	5
83	Trichloroethylene transfer pump	5
84	Hanging jigs (stands, container hanger) for Ultrasonic cleaning machine	5
85	Passivation tubs	5
86	Heating equipment for passivation	5
87	Passivation tray	5
88	Laser marking machine	5
89	Fixtures for laser marking	5
90	Computer system along with all accessories	5
91	Punching hammer	5
92	Stamping die	5
93	Etching machine with accessories	5
94	Label printer	5
95	Bar code printer	5
96	Bar code reader	5
97	Strapping machine	5

98	Quality Management System Standard and Manual	26
99	Scanner	5
100	Laser Printer	5
101	Microscope	5
102	Master sample of surgical instruments	26
103	Vibratory polish machine	2
104	Ring grinding machine	2
105	Blade grinding machine	2

List of Consumables supplies

Sr. #	Name of Consumables Supplies
1	Metal sheets
2	First aid box with complete accessories
3	Safety helmet
4	Safety goggles
5	Safety gloves
6	Safety shoe
7	Ear plugs/ muffs
8	Apron
9	Face mask
10	Process travel card (PTC)
11	Metal strip
12	Forged pieces
13	Work piece material (mild steel, teflon, aluminium stainless steel, brass etc)
14	Different grades of grinding wheel (for HSS tool bits and tungsten carbide tip tool)
15	Drill set
16	Range of lathe cutting tools (HSS tool bit, Tungsten carbide tips tool etc)
17	Coolant
18	Cleaning brushes

19	Hacksaw blades
20	Range of milling cutters according to material (HSS cutter, carbide cutters etc) and its operations (end mill cutter, t-slot cutter, concave and convex cutters, saw cutter etc)
21	Lubricant oil
22	Blanked work pieces
23	Punched work piece
24	Grinding wheel
25	Wheel dresser
26	Files (different sizes and shapes)
27	Tap set
28	Reamers
29	Furnace oil/ natural gas (for heating furnace)
30	Quenching media (water, quenching oil, ammonia gas, nitrogen gas etc)
31	Stainless steel hangers (to hold the work pieces)
32	Stainless steel basket (to hold the work pieces)
33	Rivets
34	Pin grinder tools (cutters and stones etc)
35	Different size of screws
36	Paraffin oil
37	Drawing sheet
38	Dull stick
39	Polish sticks

40	Belts
41	Polishing wheels
42	Polishing lusters
43	Lubricant (for lusters)
44	Cotton
45	Emery belts
46	Buff
47	Sulphuric acid
48	Phosphoric acid
49	Glycerine
50	Wooden husk
51	Copper wire
52	Sand (silicon carbide)
53	Rubber gloves
54	Long shoe
55	Trichloroethylene
56	LPG
57	Passivation chemical solution (combination of nitric and citric acid etc)
58	Polythene bag
59	Surgical sheet (scissors cutting inspection)

60	Permanent marker
61	Cleaning clothes (flees)
62	Stencil
63	Etching chemical and cleaner
64	Scotch tape/ double tape
65	Silicon caps (tip protectors for tip)
66	Bubble sheet
67	Packing boxes
68	Labels
69	Packing tape
70	Straps
71	Log of Quality Management System Standard and Manual
72	Paper for printer
73	Quality charts and graphs
74	Polishing media of different grains for vibratory polish
75	Grinding wheel

Credit values

The credit value of the National Certificate Level 4 in Surgical Instrument Manufacturing Technician 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
A:	Contribute to Work Related Health and Safety (WHS) Initiatives	30	3
B:	Comply with Workplace Policy and Procedures	30	3
C:	Perform Advanced Communication	30	3
D:	Develop Advance Computer Application Skills	40	4
E:	Manage Human Resource Services	20	2
F:	Develop Entrepreneurial Skills	30	3
G:	Supervise Production Process	160	16
H:	Ensure Quality of Products	120	12

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