

TRAINING REGULATIONS



TOOL AND DIE MAKING NC II

METALS AND ENGINEERING SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY

East Service Road, South Superhighway, Taguig City, Metro Manila

METALS AND ENGINEERING SECTOR
TOOL AND DIE MAKING NC II

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**TRAINING REGULATIONS FOR
TOOL AND DIE MAKING NC II**

SECTION 1 TOOL AND DIE MAKING NC II QUALIFICATION

The Tool and Die Making NC II Qualification consists of competencies that a person must achieve to machine die components, fit and assemble dies and test and try die.

The Units of Competency comprising this qualification include the following:

Code No.	BASIC COMPETENCIES
500311101	Participate in workplace communication
500311102	Work in team environment
500311103	Practice career professionalism
500311104	Practice occupational health and safety procedures

Code No.	COMMON COMPETENCIES
MEE722204	Perform shop computations (Intermediate)
MEE722205	Measure workpiece (Intermediate)
MEE722207	Perform preventive and corrective Maintenance

Code No.	CORE COMPETENCIES
MEE722301	Machine Die Components
MEE722302	Fit and Assemble Dies
MEE722303	Test and Try Die

A person who has achieved this qualification is competent to be:

- Tool Maker, Die maker, Machinist

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in TOOL AND DIEMAKING NC II.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from appropriate sources 1.2 Effective questioning , active listening and speaking skills are used to gather and convey information 1.3 Appropriate medium is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and storage of information are used 1.7 Personal interaction is carried out clearly and concisely
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established protocols 2.4 Workplace interactions are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented
3. Complete relevant work related documents	3.1 Range of forms relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	4.1. Personnel forms, telephone message forms, safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocol	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1. Prepared written communication following standard format of the organization 1.2. Accessed information using communication equipment 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting the formal or informal communication
<p>2. Underpinning Knowledge</p>	<ul style="list-style-type: none"> 2.1. Effective communication 2.2. Different modes of communication 2.3. Written communication 2.4. Organizational policies 2.5. Communication procedures and systems 2.6. Technology relevant to the enterprise and the individual's work responsibilities
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1. Follow simple spoken language 3.2. Perform routine workplace duties following simple written notices 3.3. Participate in workplace meetings and discussions 3.4. Complete work related documents 3.5. Estimate, calculate and record routine workplace measures 3.6. Basic mathematical processes of addition, subtraction, division and multiplication 3.7. Ability to relate to people of social range in the workplace 3.8. Gather and provide information in response to workplace Requirements
<p>4. Resource Implications</p>	<ul style="list-style-type: none"> 4.1. Fax machine 4.2. Telephone 4.3. Writing materials 4.4. Internet
<p>5. Methods of Assessment</p>	<ul style="list-style-type: none"> 5.1. Direct Observation 5.2. Oral interview and written test
<p>6. Context for Assessment</p>	<ul style="list-style-type: none"> 6.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY: **WORK IN TEAM ENVIRONMENT**

UNIT CODE : **500311106**

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Describe team role and scope	1.1. The <i>role and objective of the team</i> is identified from available <i>sources of information</i> 1.2. Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources
2. Identify own role and responsibility within team	2.1. Individual role and responsibilities within the team environment are identified 2.2. Roles and responsibility of other team members are identified and recognized 2.3. Reporting relationships within team and external to team are identified
3. Work as a team member	3.1. Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2. Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and <i>workplace context</i> 3.3. Observed protocols in reporting using standard operating procedures 3.4. Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OHS and environmental standards
3. Workplace context	3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1. Operated in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job 1.6. Reported outcomes
<p>2. Underpinning Knowledge and Attitude</p>	<ul style="list-style-type: none"> 2.1. Communication process 2.2. Team structure 2.3. Team roles 2.4. Group planning and decision making
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1. Communicate appropriately, consistent with the culture of the workplace
<p>4. Resource Implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 4.2. Materials relevant to the proposed activity or tasks
<p>5. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1. Observation of the individual member in relation to the work activities of the group 5.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
<p>6. Context for Assessment</p>	<ul style="list-style-type: none"> 6.1. Competency may be assessed in workplace or in a simulated workplace setting 6.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY: PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Integrate personal objectives with organizational goals	1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships is are maintained in the course of managing oneself based on performance evaluation 1.3 Commitment to the organization and its goal is demonstrated in the performance of duties
1. Set and meet work priorities	2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 Resources are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures
2. Maintain professional growth and development	3.1 Trainings and career opportunities are identified and availed of based on job requirements 3.2 Recognitions are -sought/received and demonstrated as proof of career advancement 3.3 Licenses and/or certifications relevant to job and career are obtained and renewed

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra – and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
2. Underpinning Knowledge	<ul style="list-style-type: none"> 2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 2.2 Company policies 2.3 Company-operations, procedures and standards 2.4 Fundamental rights at work including gender sensitivity 2.5 Personal hygiene practices
3. Underpinning Skills	<ul style="list-style-type: none"> 3.1 Appropriate practice of personal hygiene 3.2 Intra and Interpersonal skills 3.3 Communication skills
4. Resource Implications	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 Case studies/scenarios
5. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Simulation/Role-plays 5.4 Observation 5.5 Third Party Reports 5.6 Exams and Tests
6. Context for Assessment	<ul style="list-style-type: none"> 6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY: PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

UNIT CODE 500311108

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify hazards and risks	1.1 Safety regulations and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3 Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures
2. Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
3. Control hazards and risks	3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies 3.3 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices 3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol
4. Maintain OHS awareness	4.1 Emergency-related drills and trainings are participated in as per established organization guidelines and procedures 4.2 OHS personal records are completed and updated in accordance with workplace requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety regulations	May include but are not limited to: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Philippine Occupational Safety and Health Standards 1.6 DOLE regulations on safety legal requirements 1.7 ECC regulations
2. Hazards/Risks	May include but are not limited to: 2.10 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.11 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors
3. Hazards/Risks	May include but are not limited to: 2.12 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.13 Ergonomics <ul style="list-style-type: none"> • Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles • Physiological factors – monotony, personal relationship, work out cycle

VARIABLE	RANGE
4. Contingency measures	May include but are not limited to: 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel
5. PPE	May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits
6. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management
7. OHS personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OHS-related training completed

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices 1.7 Completed and updated OHS personal records in accordance with workplace requirements
<p>2.14 Underpinning Knowledge</p>	<ul style="list-style-type: none"> 2.1 OHS procedures and practices and regulations 2.2 PPE types and uses 2.3 Personal hygiene practices 2.4 Hazards/risks identification and control 2.5 Threshold Limit Value –TLV 2.6 OHS indicators 2.7 Organization safety and health protocol 2.8 Safety consciousness 2.9 Health consciousness
<p>2.15 Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1 Practice of personal hygiene 3.2 Hazards/risks identification and control skills 3.3 Interpersonal skills 3.4 Communication skills
<p>3. Resource Implications</p>	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 OHS personal records 4.3 PPE 4.4 Health records
<p>4. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation
<p>5. Context for Assessment</p>	<p>6.1 Competency may be assessed in the work place or in a simulated work place setting</p>

COMMON COMPETENCIES

UNIT OF COMPETENCY : PERFORM SHOP COMPUTATIONS

UNIT CODE : MEE722204

UNIT DESCRIPTOR : This unit covers the competencies required to perform basic calculations involving triangles and tapers.

ELEMENTS	PERFORMANCE CRITERIA
	<i>Italicized terms</i> are elaborated in the Range of Variables
1. Perform calculations involving triangles	1.1 Problems involving right triangles performed using <i>trigonometric functions</i> 1.2 Problems involving non-right triangles performed using sine law and cosine law
2. Calculate tapers	2.1 Taper of work calculated correctly using appropriate formula.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Trigonometric functions	1.1 Sine 1.2 Cosine 1.3 Tangent 1.4 Cotangent 1.5 Secant 1.6 Cosecant

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate performed calculations: 1.1 Involving right triangles 1.2 Involving non-right triangles 1.3 Involving tapers
2. Underpinning knowledge and attitude	2.1 Property of right triangles 2.2 Trigonometric functions 2.3 Non-right triangles 2.4 Sine law 2.5 Cosine law
3. Underpinning skills	3.1 Performing calculations using pen and paper or on a calculator.
4. Resource implications	The following resources MUST be provided: 4.1 Tools, equipment and facilities appropriate to processes or activity 4.2 Materials relevant to the proposed activity 4.3 Trigonometric table
5. Method of assessment	Competency may be assessed through: 5.1 written or oral short answer questions 5.2 practical exercises
6. Context for assessment	Competency may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : MEASURE WORKPIECE

UNIT CODE : MEE722205

UNIT DESCRIPTOR : This unit covers the competencies required to measure workpieces using angular measuring instruments

ELEMENTS	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Select and use angular measuring tools	1.1 Angular measuring tools are selected according to the the level of accuracy required. 1.2 Measurements taken are accurate to the finest graduation of the selected measuring instrument. 1.3 Measuring technique used to correct and appropriate to the device used.
2. Maintain angular measuring tools	2.1 Measuring tools adjusted and maintained to the required accuracy utilizing manufacturer's or worksite procedures.
3 Clean and store measuring tools	3.1 Care and storage of devices undertaken yo manufacturer's specifications or standard operating procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Angular measuring tools	Measuring tools include 1.1 Bevel protractor 1.2 Gage blocks 1.3 Sine bar
2. Measurements	2.1 angle 2.2 taper

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Selected and used angular measuring instruments 1.2 Maintained / adjusted instruments 1.3 Cleaned and stored measuring instruments
<p>2. Underpinning knowledge and attitude</p>	<ul style="list-style-type: none"> 2.1 Types, purposes and accuracy of angular measuring instruments 2.2 Capability of measuring tools 2.3 Techniques for measuring angles and tapers
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Safe handling of measuring tools 3.2 Reading vernier scale 3.3 Reading micrometer
<p>4. Resource implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Tools, equipment and facilities appropriate to the activity 4.2 Specimen component or part to the proposed activity
<p>5. Method of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 direct observation 5.2 demonstration 5.3 written or oral short answer questions 5.4 portfolio
<p>6. Context for assessment</p>	<p>Competency may be assessed in the workplace or in simulated workplace environment.</p>

UNIT OF COMPETENCY : **PERFORM PREVENTIVE AND CORRECTIVE MAINTENANCE**

UNIT CODE : **MEE722207**

UNIT DESCRIPTOR : This unit covers the knowledge and skills required in performing preventive and corrective maintenance such as inspection and repair of hand tools, cleaning and lubrication of machine parts and changing drive pulley and belts.

ELEMENTS	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Perform inspection of machine	1.1 Machine <i>inspected</i> according to worksite procedures. 1.2 Status/Report recorded on proforma or reported orally according to worksite procedure.
2. Perform cleaning and lubricating of machine	2.1 <i>Machines</i> lubricated as per manufacturer's recommendation using appropriate <i>tools and materials</i> 2.2 Fluids and lubricants replaced and/or topped up according to prescribed schedule.
3. Perform minor machine repair and adjustments	3.1 Minor machine repairs performed according to manufacturer's instruction or worksite procedures. 3.2 Machine moving parts adjusted to manufacturer's specifications.
4. Maintain hand tools	4.1 Tool cutting ground to recommended specifications 4.2 Hand tools lubricated and stored according to prescribed procedure

RANGE OF VARIABLES

VARIABLES	RANGE
1. Inspected	Inspected machine parts include: 1.1 V-belt 1.2 Bearing 1.3 Gears 1.4 Clutch 1.5 Drive pulley
2. Machines	Machine include but not limited to: 2.1 Lathe machine 2.2 Milling machine 2.3 Grinding machine 2.4 Mechanical press machine
3. Tools and materials	Tools and materials used include: 3.1 Lubricants 3.2 Oil can 3.3 Grease gun 3.4 Oil 3.5 Coolant or compound

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that that the candidate: 1.1 performed inspection of machine 1.2 performed cleaning and lubricating of machine performed minor machine repairs and adjustments
2. Underpinning knowledge	2.1 Proper cleaning and oiling 2.2 Kinds of oil 2.3 Parts and function of machine tools 2.4 Cutting oil, coolant or compound 2.5 Pulleys and belts 2.6 Location of main switches of the machine 2.7 Handling and storage of tools 2.8 Checklist of safe working conditions 2.9 Procedures in cleaning and disposal of waste materials
3. Underpinning skills	3.1 Inspecting and repairing hand tools 3.2 Inspecting and changing drive pulleys and belts 3.3 Replacing and adjusting machine parts 3.4 Distinguishing old and new coolant 3.5 Distinguishing odor of polluted coolant 3.6 Selecting coolant, cutting oil or compounds 3.7 Changing coolant 3.8 Inspecting work area for safe working environment 3.9 Cleaning work area 3.10 Disposing metal scraps, chips and waste materials.
4. Resource Implications	The following resources MUST be provided: 4.1 Tools, equipment and facilities appropriate to processes or activity 4.2 Materials relevant to the proposed activity
5. Method of Assessment	Competency may be assessed through: 5.1 direct observation of activities 5.2 oral or written questioning
6. Context for Assessment	Competency may be assessed in the workplace or in simulated workplace environment.

CORE COMPETENCIES

UNIT OF COMPETENCY : **MACHINE DIE COMPONENT**

UNIT CODE : **MEE722301**

UNIT DESCRIPTOR : This unit covers the knowledge and skills involved in the machining of die components such as die blocks, die plates and punches utilizing conventional turning, milling and grinding but does not cover non-conventional machine such as EDM and CNC machines

ELEMENTS		PERFORMANCE CRITERIA	
		<i>Italicized</i> Terms Are Elaborated in the Range Of Variables	
1.	Determine job requirements	1.1	<i>Drawings</i> analyzed and cleared with designer for correct interpretation.
		1.2	<i>Job instructions</i> clearly understood from superior as to what part to machine, and what to job out.
		1.3	<i>Materials</i> to be used for each part with sufficient allowances listed.
		1.4	Sequence of <i>machining operations</i> for each part determined according to work procedures
2.	Machine die components	2.1	Plan sequence of operation for each part specifying equipment, tools, speeds and feeds requirement.
		2.2	Die plate parts initially milled to required dimensions, parallelity and squareness
		2.3	Hole locations and die block hole opening and punch contours marked according the drawing.
		2.4	Die <i>parts of cylindrical section</i> turned and finished to required dimension
		2.5	Die <i>parts of non-cylindrical sections</i> milled to required shape according the drawing and specification.
		2.6	Die block openings milled to slightly undersize dimensions to allow for final finishing and fitting operation.
		2.7	Die parts are ground and finished according the specifications.
		2.8	Die block, punch plate or pedestal punch drilled with assembly holes according drawing specifications.
3.	Measure and check dimension	3.1.	Dimensions and quality are checked for compliance to specifications.
		3.2	Details and dimensional errors are identified against specification and reported to standard operation procedure (SOP).

RANGE OF VARIABLES

	VARIABLE		RANGE
1	Drawings	1.1 1.2 1.3	Product drawing Assembly drawing Detailed die part drawings
2.	Job instructions	2.1 2.2 2.3	Which parts to machine Which parts to job put What semi-finished materials to buy <ul style="list-style-type: none"> • Die set • Springs • Stripper bolts • Fasteners
3	Materials	3.1 3.2 3.3 3.4 3.5	Low carbon steel Medium carbon steel Low alloy steel High alloy steel Heat treatment <ul style="list-style-type: none"> • hardening • tempering • flame hardening
4	Sequence of operations	4.1	Logical sequence of operation <ul style="list-style-type: none"> • equipment • cutting tools • rpm • feeds
5.	Die parts of cylindrical sections	5.1 5.2 5.3 5.4 5.5 5.6 5.7	Blanking punch Piercing punch Guide pins Pilots Bushings Shanks Guide bush
5.	Die parts of non-cylindrical section	5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9	Die block Punch plate Pedestal punch Stripper plate Back guide Back gage Fixed stripper Spring stripper Die sections
6.	Machining Operations	6.1	Conventional machine tools <ul style="list-style-type: none"> -turning -milling -grinding band sawing -non-conventional machining EDM; CNC (knowledge only)

EVIDENCE GUIDE

1.	Critical aspects of competency	1.1 1.2 1.3 1.4 1.5	Assessment requires evidence that the candidates: Determined the job requirements. Identified all the parts of a die. Planned all machining work to be done. Machined parts safely and according to procedures. Dimensions of die parts checked with specifications.
2.	Underpinning Knowledge	2.1 2.2 2.3	Presswork technology -pressworking operations -clearance applications -center of pressure - types of die - parts of a die Machining -cutting speed & Rpm -feed rate -workholding devices -cutting tools -hardening -polishing - heat treatment Measurement
3.	Underpinning Skills	3.1 3.2 3.3 3.4 3.5 3.6	Safe working practices Layout Turning of cylindrical parts Milling of non-cylindrical parts Grinding Drilling of holes
4	Resource Implication	4.1 4.2 4.3 4.4 4.5 4.6 4.7	The following resources must be provided Lathe Horizontal milling machine with DRO attachment Vertical milling machine with DRO Tool and cutter grinder for grinding punches Indexing head Surface grinder Measuring tools
5.	Method of Assessment	5.1 5.2 5.3 5.4	Competency must be assessed by Direct observation of machining, Written test oral short answer questions Demonstration.
6.	Context for Assessment		Competence may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : **FIT AND ASSEMBLE DIE**

UNIT CODE : **MEE722302**

UNIT DESCRIPTOR : This unit covers the knowledge and skills in the fitting and assembly of simple blanking and piercing dies and bending dies and limited to 2-station progressive dies utilizing blanking and piercing, chop off and parting principle.

ELEMENTS		PERFORMANCE CRITERIA	
		<i>Italicized Terms Are Elaborated in the Range Of Variables</i>	
1.	Determine die parts to be fitted with one another.	1.1	Assembly drawings interpreted to determine which part to be fitted with another part.
		1.2	Machined parts are checked to determine additional fitting or finishing work.
		1.3	Fitting tools and equipment are identified according to fitting requirements.
2	Fit die parts	2.1	Template of product prepared as reference for finish filing.
		2.2	Die holes are finish-filed to template size and required angle clearance
		2.3	Stripper plate openings fitted with punches
3.	Drill assembly holes	3.1	Die base assembled to bottom die holder according to work procedure.
		3.2	Punch plate or punch pedestal drilled for mounting to punch holder according to work procedure
		3.3	Stripper plate and punch plate and guide pin holes drilled and tapped according to work procedure.
		3.4	Drilling operations of screw holes done according work procedure.
4.	Assemble die	4.1	Die base assembled to bottom die holder according to work procedure.
		4.2	Punch plate and pedestal punch mounted to punch holder according to work procedure
		4.3	Fixed stripper plate mounted to die block or spring stripper mounted on punch plate as per drawing
		4.4	Other parts assembled as required
		4.5	Die tested for alignment as per work procedure
		4.6	Adjustment made according to found errors
		4.7	Dowel holes drilled according to work procedure

RANGE OF VARIABLES

	VARIABLE		RANGE
1	Fitting tools and equipment	1.1	Tools <ul style="list-style-type: none"> • set of files • vise with soft jaws • transfer screws • transfer punches • angle plate • vernier height gage • center punch • parallel clamps • set of twist drills • hand taps • counter bore • portable electric drill • parallel set • reamers • allen wrench • scribes • shims • dowels
		1.2	Equipment <ul style="list-style-type: none"> • filing machine • die lifter
2.	Drilling operations	2.1	Drilling with tap drill size
		2.2	Drilling with clearance holes
		2.3	Counterboring
		2.4	Chamfering
		2.5	Tapping

EVIDENCE GUIDE

1.	Critical aspects of competency	1.1 1.2 1.3	Assessment requires evidence that the candidate Die hole filed to a template and angle clearance Assembly holes drilled following the standard work procedure Die assembled according to the right sequence
2.	Underpinning knowledge.	2.1 2.2 2.3 2.4	Punch and die clearances and applications. Types of file 2-reference method of layout Determining tap drill size
3.	Underpinning skills.	2.1 2.2 2.3 2.4 2.5 2.6 2.7	Layout using Vernier height gauge. Filing of die hole using a template Drilling of holes on mating parts Filing radius of punch corners Hole tapping. Counter boring of holes. Use of transfer screws and transfer punch
5.	Resource implications	5.1 5.2	The following resources must be provided: Layout tools: -vernier height gauge -angle plate -center punch -machinist hammer -parallels -parallel clamps -transfer screws -required drills -required files -required hand taps -tap wrench Assembly tools -allen wrench -mallet
6.	Method of assessment	6.1 6.2 6.3 6.4	Competency must be assessed through Observation of the candidate performing a range of tasks while performed in the workplace Written test Oral short answer questions Inspection of assembled die and resulting product.
7.	Context of assessment	7.1 7.2	Competency may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : **TEST AND TRY DIE**

UNIT CODE : **MEE722 303**

UNIT DESCRIPTOR : This unit covers the knowledge and skills involved in the die setting and the press adjustment for the testing of dies and press run.

ELEMENTS		PERFORMANCE CRITERIA	
		<i>Italicized</i> Terms Are Elaborated in the Range Of Variables	
1.	Prepare for testing of dies	1.1	Press checked for suitability to die shut off height.
		1.2	Material strip or blank cut to required size or width and grain orientation.
2.	Set up press and die	2.1	Die set on the bolster plate and punch shank inserted into ram hole and tightened.
		2.2	Die set clamped on the bolster plate using the right tightening sequence.
		2.3	Press ram adjusted to bottom dead center with the punch end to the required punch setting.
		2.4	Press operated manually to check position of punch.
3.	Operate press	3.1	Press started up safely and correctly.
		3.2	Press operated according to standard procedure.
		3.3	Material is loaded and the press is tripped for sample product.
4.	Inspect product	4.1	Sample inspected for dimensional errors and deviations.
5.	Rectify die	5.1	Die corrected according to deviations found and standard procedures..

RANGE OF VARIABLES

	VARIABLE		RANGE
1.	Press	1.1	Types of Press
		1.2	Capacity
		1.3	Press shut height
		1.4	Parts of a Press and their Functions
2.	Press Work Materials	2.1	Low carbon steel
		2.2	Silicon steel
		2.3	Brass
		2.4	Copper
		2.5	Blank <ul style="list-style-type: none">• Strip material• Single blank material• Coiled material
		2.6	Grain orientation
3.	Die	3.1	Die shut height

EVIDENCE GUIDE

1.	Critical aspects of competence	<ul style="list-style-type: none"> 1.1 Selected the right press for use in testing. 1.2 Prepared the blank materials required 1.3 Set the die to the according to procedures 1.4 Operated the press safely as per SOP 1.5 Inspected the sample produced 1.6 Rectified the die to correct deviation if needed
2.	Underpinning knowledge	<ul style="list-style-type: none"> 2.1 Press principle of operation 2.2 Safety operation of the press 2.3 Common faults in pressed materials 2.4 Safe operating of a press. 2.5 Plate strip shearing 2.6 Single blank shearing
3.	Underpinning skills	<ul style="list-style-type: none"> 3.1 Ram adjustment 3.2 Bolt tightening sequence 3.3 Use of wrenches and spanners 3.4 Use of measuring tools
4.	Resource implication	<p>The following resources should be provided</p> <ul style="list-style-type: none"> 4.1 Press 4.2 Die 4.3 Blank material 4.4 Product drawing 4.5 Measuring tools
5.	Method of assessment	<p>The following assessment method are suggested</p> <ul style="list-style-type: none"> 5.1 Direct observation 5.2 Written or oral question demonstration
6.	Context of assessment	<ul style="list-style-type: none"> 6.1 Competency may be assessed in the workplace or in workplace Simulated environment

SECTION 3. TRAINING STANDARDS

These guidelines are set to provide the Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for TOOL AND DIE MAKING NC II.

3.1 CURRICULUM DESIGN

Course Title : TOOL AND DIE MAKING NC Level: NC II

Nominal Training Duration : 598 Hours

This qualification is designed to develop knowledge, desirable attitudes and skills in Tool and Die Making NC II

It covers the competencies required to Machine Die Components, Fit and Assemble Dies and Test and Try Dies.

To obtain this, all units of competency prescribed for this qualification must be achieved.

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Participate in workplace communication	1.1 Explain routinary speaking & messages in a workplace 1.2 Follow routinary speaking & messages 1.3 Perform work duties following written notices	<ul style="list-style-type: none"> • Group discussion • Interaction 	<ul style="list-style-type: none"> • Interviews/questioning • Observation
2. Work in team environment	2.1 Identify the objective of the team, and his role in the team 2.2 Contribute to work group activities	<ul style="list-style-type: none"> • Group discussion • Interaction 	<ul style="list-style-type: none"> • Interviews/questioning • Demonstration • Observation
2.16 Practice career professionalism	3.1 Identified key result areas of the job 3.2 Participate in job enhancement trainings 3.3 Acquire trade certifications according to requirement of the job 3.4 Acquire membership in trade associations	<ul style="list-style-type: none"> • Group discussion • Interaction 	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews/questioning
4. Practice occupational health and safety procedures	4.1 Follow organization safety regulations 4.2 Identify hazards in the workplace 4.3 Follow contingency measures during accidents, fire and other emergencies 4.4 Use of personal protective equipment 4.5 Participate in emergency related drills 2.17 Practice personal hygiene in the work	<ul style="list-style-type: none"> • Group discussion • Interaction 	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews/questioning

COMMON COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Perform shop computations	Right triangle 1.1 Leg length calculated es 1.2 Angle calculated Non-right triangle 1.3 Leg length calculated 1.4 Angle of taper found	<ul style="list-style-type: none"> • Lecture • Group discussion 	<ul style="list-style-type: none"> • Written test • Practical exercises
2. Measure workpiece	2.1 Select and use measuring tools 2.18 Clean and store measuring tools	<ul style="list-style-type: none"> • Lecture • Group discussion 	<ul style="list-style-type: none"> • Written test • Practical exercises
2.19 Perform preventive and corrective maintenance	3.1 Perform inspection of machine 3.2 Perform cleaning and lubricating of machine 3.3 Perform minor machine repair and adjustments 2.20 Maintain hand tools	<ul style="list-style-type: none"> • Lecture • Group discussion • Interaction 	<ul style="list-style-type: none"> • Observation • Demonstration • Interview / Questioning

CORE COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
<p>1. Machine Die Components</p>	<p>1.1 Clarify job instructions as to extent of job and work deadline.</p> <p>1.2 Discuss with die designer or supervisor the die design, parts drawing, parts for machining, for purchase, for jobbing out.</p> <p>1.3 Gather all materials and check for right specifications and sufficient machining allowances.</p> <p>1.4 Plan sequence of operation of each part specifying equipment, tools, speeds and feeds..</p> <p>1.5 Machine all plate parts square and flat.</p> <p>1.6 Mark hole locations, die openings and punch contours according to drawing.</p> <p>1.7 Turn all die parts of circular shapes with allowances for grinding and die clearances.</p> <p>1.8 Mill all regular- or irregular-shaped parts according to drawing.</p> <p>1.9 Mill die openings slightly undersized to allow for final fitting operation. (or arrange for EDMing of die hole)</p> <p>1.10 Mill holes on stripper for the punch to pass through.</p>	<ul style="list-style-type: none"> • Lecture/ discussion • Self-paced instructions • Workshop project • On-the-job training 	<ul style="list-style-type: none"> • Observation over time • Written or oral • Demonstration
	<p>1.11 Mill back gage and front spacer if required.</p> <p>1.12 Machine template of the product with applied tolerance.</p> <p>1.13 Arrange for heat treatment of parts to be hardened except die block which is still to be finished manually..</p> <p>1.14 Grind die</p>		

<p>2. Fit and assemble die</p>	<p>2.1 File die block opening to the template..</p> <p>2.2 Determine which part to be fitted another part.</p> <p>2.3 Drill holes to assemble die block with die holder</p> <p>2.21 Position the punch on the die opening with shim all around representing the die clearance. Drill holes to assemble the punch with the punch holder.</p> <p>2.22 Drill holes simultaneously on the fixed stripper plate, back gage, front spacer and die block</p> <p>2.23 In case of movable stripper, drill holes on stripper plate and punch holder to accommodate springs and stripper bolts.</p> <p>2.24 Fabricate front stop and automatic stop for fitting with the die block.</p> <p>2.8 Assemble die to the die holder</p> <p>2.25 Assemble the punch to the punch holder</p>	<ul style="list-style-type: none"> • Lecture/ discussion • Self-paced instructions • Workshop project • On-the-job training 	<ul style="list-style-type: none"> • Observation over time • Written or oral • Demonstration
	<p>2.26 Assemble fixed stripper, Back gage, and front spacer with the die block.</p> <p>2.27 In case of movable stripper, assemble stripper with the punch holder with springs and stripper bolts.</p> <p>2.28 Try the die using paper as the workpiece and examine the results.</p>		

<p>3. Test and try Die</p>	<p>3.1 Prepare the press for testing</p> <p>3.1 Mount the press on the die. Insert punch shank to the ram hole.</p> <p>3.2 Adjust ram to the bottom dead center and adjust punch end to position a little below the thickness of material.</p> <p>3.3 Clamp die and tightened using the correct tightening sequence.</p> <p>3.4 Turn press manually to test the alignment of the die.</p> <p>3.5 Prepare material by shearing of strips, or by individual blank, or by coil strip as required.</p> <p>3.6 Perform the pre-start checks of the press.</p> <p>3.7 Start the press safely.</p> <p>3.8 Load the material and trip the switch.</p> <p>3.9 Examine the product and check against the drawing.</p> <p>3.10 Make the necessary rectification.</p> <p>3.12. Observe necessary safety precautions in operating the press.</p>	<ul style="list-style-type: none"> • Lecture/ discussion • Self-paced instructions • Workshop project • On-the-job training 	<ul style="list-style-type: none"> • Observation over time • Written or oral • Demonstration
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3.2 TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum.

Delivery should be guided by the 10 basic principles of Competency-Based TVET.

The training is based on curriculum developed from the competency standards;

- Learning is modular in its structure;
- Training delivery is individualized and self-paced;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off-the –job component;
- Allows for the recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit ; and
- Approved training programs are nationally accredited.

The competency-based TVET system recognizes various types of delivery modes, both on and off-the–job as long as the learning is driven by the competency standards specified by the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in school and in-industry training of fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations
- Modular / self-paced learning is a competency- based training modality wherein the trainee is allowed to progress at his own pace. The trainer facilitates the training delivery
- Peer teaching / mentoring is training modality wherein fast learners are given the opportunity to assist the slow learners.
- Supervised industry training or on-the-hob training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific competencies prescribed in the training regulations.
- Distance learning is formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, or audio, video or computer technologies.

3.3 TRAINEE ENTRY REQUIREMENTS

This section specifies the qualifications of trainees and educational experience. Other requirements like health and physical requirements are also stated. Passing entry written examinations may also be indicated if necessary.

- Must be a holder of Machining NC I or COC in BW, Turning, and Milling
- With good moral character
- Ability to communicate
- Physically and mentally fit

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

TOOL AND DIE MAKING NC II

Recommended list of tools, equipment and materials for the training of 25 trainees for Tool and Die Making NC II

TOOLS					
QTY		QTY		QTY	
Drawing Equipment					
4	• Working Bench	12	• Protractor	12	• Compass
12	• T-squares	12	• Ruler	12	• Drawing pencil
12	• Triangles	12	• Scale Ruler 12 "	12	• Triangular scale
Measuring Tools:					
12	• Vernier caliper, 150	6 .	• Vernier caliper 200mm	6	• Micrometer 25-50 mm
12 .	• Protractor	6.	• Outside caliper	6 .	• Micrometer 50-75 mm
6	• Inside caliper		• Dial indicator, plunger type		• Micrometer, 0-25 mm
6	• Dial indicator, lever type	3	• Bevel vernier protractor	1	• Gage block & accessories, workshop grade
1	• Vernier Height gage	1	• Cylindrical square	1	• Surface plate
2	• Angle plate	6	• Steel rule		• Dial indicator, plunger type

EQUIPMENT					
QTY		QTY			
2	Lathe	1	Mechanical Press		
2	Horizontal Milling machine w/ DRO	1	Drill press		
2	Vertical Milling machine w/ DRO	1	Power hacksaw		
1	Surface Grinder				
1	Bandsaw				
1	Power Hacksaw				
TOOLS					
1	Set of files	1	Assorted shims	1	Set drill bits
1	Set Allen wrench	2	Angle plate	1	Set hand taps
1	Scribers	2	Vernier height gage	1	Set counter bore
1	Vise with soft jaws	8	Center punch	2	Portable electric drill
8	Spotting screws	6	parallel clamps	4	Set of parallel set
1	Set of counterbores	1	Set of reamers	2	Set reamers
6	Mallets	3	Anvil	6	Rose bits
6	Machinist hammer	6	Set of screwdrivers, flat	6	Set of open wrench
3	Angle vise			6	Set of box wrench
Training Materials:					
	▪ Reference books		▪ Catalogs		▪ CD s / Video tape
	▪ Manuals		▪ Brochures /		
Housekeeping materials:					
20 pcs	▪ Brooms	10 pcs	▪ Mops	2 pcs.	▪ Trash can
10 pcs	▪ Scrapers	2 bars	▪ Soap		▪
10 k	▪ Clean rags	5 pcs	▪ Dustpan		

3.5 TRAINING FACILITIES TOOL AND DIE MAKING NC II

The die making workshop must be of concrete structure. Based on class size of 12 students/trainees the space requirements for the teaching/learning and circulation areas are as follows:

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
• Building (permanent)	10 M X 30 M		300 Sq. M
▪ Trainee working space	2 M X 2 M	4 Sq.M / trainee	100 sq. M.
▪ Lecture Room	8 M X 10 M	80 Sq. M.	80 Sq. M
▪ Learning Resource Center	4 M X 8 M.	32 Sq. M	32 Sq. M
▪ Facilities/ Equipment/ Circulation Area			88 Sq. M.

3.6 TRAINER'S QUALIFICATIONS FOR METALS AND ENGINEERING SECTOR

TRAINER QUALIFICATION (TQ II)

- Must be a holder of Tool and Die Making NC II
- Must have undergone training on Training Methodology II (TM II)
- Must be computer literate
- Must be physically and mentally fit
- *Must have at least 2 years job/industry experience
- Must be a civil service eligible (for government position or appropriate professional license issued by the Professional Regulatory Commission)

* **Optional. Only when required by the hiring institution.**

Reference: TESDA Board Resolution No. 2004 03

3.7 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

- 4.1 To attain the National Qualification of Tool and Die Making NC II, the candidate must demonstrate competence in all the units of competency listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.
- 4.2 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.
- 4.3 The following are qualified to apply for assessment and certification:
 - 4.3.1 Graduates of formal, non-formal and informal including enterprise-based training programs.
 - 4.3.2 Holders of Machining NC I or COC in Benchwork, Turning, and Milling.
 - 4.3.3 Experienced workers (wage employed or self employed)
- 4.3 The guidelines on assessment and certification are discussed in detail in the "Procedures Manual on Assessment and Certification" and "Guidelines on the Implementation of the Philippine TVET Qualification and Certification System (PTOQS)".

**Supermarket of
Metalworking Engineering
Sector**

BASIC COMPETENCIES	Machine die components	Fit and assemble die	Test and try die			
	Perform bench work (Basic)	Turn workpiece (Basic)	Mill workpiece (Basic)	Grind workpiece (Basic)		
	Apply safety devices	Measure workpiece (Basic)	Select and workshop materials	Perform preventive maintenance	Measure workpiece using gages and comparators	
	Interpret drawings and sketches	Perform computations (Basic)	Perform housekeeping	Perform computations	Measure angles	Perform computations (Advanced)
	Receive and communicate on workplace	Participate in workplace communication	Lead in workplace communication	Solve problems and workplace activities	Utilize specialization skills	Collect, analyze and organize information
	Work with others	Work in team environment	Lead small teams	Use mathematical and technical concepts and techniques	Develop team and individual	Plan and organize work
	Demonstrate work values	Practice professionalism	Develop and practice negotiation skills	Use technical resources	Apply problem-solving techniques in the workplace	Promote environmental protection
	Practice housekeeping procedures	Practice occupational health and safety procedures				

Legen
 **Tool and Die Making NC III**

Definition of Terms

1. Press A machine by which pressure is applied to a workpiece to cut, pierce, bend or shape it
2. Die A tool used to cut shaped blanks or holes; and bend and form metals into desired shape
3. Blanking A press operation wherein shaped blanks are cut from metal by striking it with a punch against a die by a press.
4. Bending A press operation that involves forming a metal part into a curved or angular shape, or the stretching or flanging of it along a curved path
5. Drawing A press operation that forces plastic deformation of metal in a die to form recessed parts or cuplike shapes
6. Drawing die A die that forms sheet metal into cuplike, wrinkle-free shapes
7. Feed stock The raw material furnished to a press machine to form or shape the metal
8. Trimming Removing excess materials from drawn or blanked part
9. Punching A piece (or a blank) is removed from a sheet metal or other material by a punch press
10. Piercing Pressworking where holes on metal is the desired output
11. Ram A plunger, weight or other guided structure for exerting pressure by impact
12. Tolerance A permissible deviation from a specified value, expressed in actual values or more often as a percentage of the nominal value
13. Limits The maximum and minimum values prescribed for a specific dimension; the limits may be of size if dimension concerned is size dimension, or may be of location if the dimension concerned is a location dimension
14. Fit The dimensional relationship between mating parts, such as press, shrink or sliding fit

- | | | |
|-----|-------------------|---|
| 15. | Die set | A set of lower and upper plate where the die assembly is set. The upper plate called the punch holder has bushings pressed into it that slides on guide posts pressed into the lower plate called the die holder to maintain proper alignment of the members of the die |
| 16. | Blanking punch | Is the part of the die that cuts or remove the blank from the strip. |
| 17. | Piercing punch | Also called perforator, pierces holes through the blank. They are usually round and usually provided with a shoulder to retain them on a punch plate. |
| 18. | Punch plate | Plate which retains punches with their heads against the punch holder of the die set. |
| 19. | Pilots | The part with acorn-shaped heads which enter previously pierced holes to shift the work before blanking occurs. |
| 20. | Back gage | A thin member against which the material strip is held against by the operator (or pusher) in its travel through the die. |
| 21. | Front plate | Similar to the back gage but shorter and placed opposite it . This is optional as other has none depending upon the construction of the fixed stripper. |
| 22. | Finger stop | Locates the lead end of the material strip at the first station of a progressive die. |
| 23. | Nesting | Pins or plate that locates a single blank in the die. |
| 24. | Automatic stop | Locates the strip automatically while it is fed through the die. |
| 25. | Stripper | Plate that removes the material strip from around the blanking and piercing punches during the upward movement of the die. |
| 26. | Progressive die | A die in which the stock strip is advanced through a series of operations which work toward completion of a piece part. |
| 27. | Advance Distance | The amount advanced by a strip for each stroke of the press. It is equal to the blank width plus the width of the scrap web (bridge) between blanks. |
| 28. | Stations | Basic divisions of a progressive die into which the stock strip is registered. |
| 29. | Blank-through die | A die that produces a plain blank in one stroke of a press. |

ACKNOWLEDGMENT

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