

TRAINING REGULATIONS



MOLDMAKING NC II

AUTOMOTIVE MANUFACTURING SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Superhighway, Taguig City, Metro Manila

TABLE OF CONTENTS
AUTOMOTIVE SECTOR
(AUTOMOTIVE MANUFACTURING SUB SECTOR)

MOLDMAKING NC II

	Page No.
SECTION 1	
MOLDMAKING NC II QUALIFICATION	1
SECTION 2	
COMPETENCY STANDARDS	
• Basic Competencies	2-14
• Common Competencies	15-26
• Core Competencies	27-35
- MOLDMAKING NC II	
SECTION 3	
TRAINING STANDARDS	
3.1 Curriculum Design	36-38
3.2 Training Delivery	39
3.3 Trainee Entry Requirements	40
3.4 List of Tools, Equipment and Materials	40-42
3.5 Training Facilities	42
3.6 Trainers' Qualifications	43
3.7 Institutional Assessment	43
SECTION 4	
NATIONAL ASSESSMENT AND	44
CERTIFICATION ARRANGEMENTS	
ANNEX A: COMPETENCY MAP	45
DEFINITION OF TERMS	46
ACKNOWLEDGEMENTS	47

TRAINING REGULATIONS FOR MOLDMAKING NC II

SECTION 1 MOLDMAKING NC II QUALIFICATION

The MOLDMAKING NC II Qualification consists of competencies that a person must achieve to be able to machine parts using a variety of machining equipment and tools on plain carbon steel, heat resistant steel and other metals and alloy using different machining processes; perform precision assembly and testing complex engineering components and mechanical assemblies in a production, manufacturing environment. It also includes minor maintenance of equipment being used.

This Qualification is packaged from the competency map of the Automotive Industry (Manufacturing sub-sector) as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

CODE NO.	BASIC COMPETENCIES
500311105	Participate in Workplace Communication
500311106	Work in Team Environment
500311107	Practice Career Professionalism
500311108	Practice Occupational Health and Safety Procedures

CODE NO.	COMMON COMPETENCIES
ALT742201	Read, Interpret and Apply Engineering Drawings
ALT311202	Perform Mensuration and Calculation
ALT723203	Read, Interpret and Apply Specifications and Manuals
ALT723205	Perform Shop Maintenance

CODE NO.	CORE COMPETENCIES
ALT722307	Machine Parts
ALT722308	Perform Precision Assembly

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

- Mold Maker**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in MOLDMAKING 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. Protocols	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 and attitudes</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. Method of assessment</p>	<ul style="list-style-type: none"> 5.1 Direct Observation 5.2 Oral interview and written test
<p>6. Context of 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 judgment 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. Method 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 of 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
2. 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
3. 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 & attitudes	<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. Method 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 of 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
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: 2.1 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 2.4 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
3. Contingency measures	May include but are not limited to: 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel
4. 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

VARIABLE	RANGE
5. 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
6. 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. Underpinning knowledge and Attitudes</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>3. 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>4. 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>5. Method of assessment</p>	<p>Competency MUST be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation
<p>6. Context of assessment</p>	<p>6.1 Competency may be assessed in the work place or in a simulated work place setting</p>

COMMON COMPETENCIES
AUTOMOTIVE MANUFACTURING

UNIT TITLE: READ, INTERPRET AND APPLY ENGINEERING DRAWINGS.

UNIT CODE: ALT742201

UNIT DESCRIPTOR: This unit deals with identifying, interpreting and applying specification from engineering blue prints or drawings that provides the measurements of the product and pattern that is to be produced.

ELEMENT	PERFORMANCE CRITERIA
	<i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify and access engineering drawings/ specification	1.1 Appropriate engineering drawings are identified and accessed as per job requirements. 1.2 Version and date of drawing is checked to ensure correct specification and procedure are identified.
2. Interpret drawings	2.1 Relevant dimensions and sections of the drawings/ specifications are located in relation to the work to be conducted 2.2 Information in the manual are interpreted in accordance to industry practices
3. Apply information in the drawings & specifications	3.1 Engineering drawing is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with the specifications in the drawings. 3.3 Dimensional data and shape are applied according to the given task
4. Store drawings	4.1 The drawings and specification are stored properly to ensure prevention of damage, ready access and updating of information when required in accordance with company requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Engineering drawings	Kinds of drawings: 1.1 Casting drawing 1.2 Machining drawing 1.3 Project plan 1.4 Technical drawing
2. Data	Data includes but not limited to 2.1 Material specifications 2.2 Process specifications 2.3 Special instructions 2.4 Machining locating points 2.5 Clamping points 2.6 Amount of draft 2.7 Surface finish

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 Identified and accessed drawings/specification 1.2 Interpreted drawings 1.3 Applied information in drawings 1.4 Stored drawings
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> 2.1 Types of drawings used in automotive manufacturing industry 2.2 Identification of symbols used in the drawings 2.3 Identification of units of measurements 2.4 Unit conversion 2.5 Attention to details, Perseverance, Honesty
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Reading and comprehension skills required to identify and interpret engineering drawings and specifications 3.2 Accessing information and data
<p>4. Resource implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 All drawings/engineering specifications relative to automotive manufacturing 4.2 Job order, requisitions 4.3 Product sample
<p>5 Method of assessment</p>	<p>Competency MUST be assessed through:</p> <ul style="list-style-type: none"> 5.1 Observation with questioning 5.2 Interview
<p>6 Context of assessment</p>	<ul style="list-style-type: none"> 6.1 Assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 6.2 Assessment may be conducted in the workplace or a simulated environment.

UNIT OF COMPETENCY: PERFORM MENSURATION AND CALCULATION

UNIT CODE: ALT311202

UNIT DESCRIPTOR: This unit includes identifying, caring for, handling, using and maintaining measuring instruments.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Select measuring instruments	1.1 Object or component to be measured is identified 1.2 Correct specifications are obtained from relevant source 1.3 Appropriate <i>measuring instrument</i> is selected according to job requirements
2. Carry out measurements and calculation	2.1 Measuring tools are selected in line with job requirements 2.2 Accurate measurements are obtained to job 2.3 <i>Calculation</i> needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x) and division (/). 2.4 Calculations involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.5 Numerical computation is self-checked and corrected for accuracy 2.6 Instruments are read to the limit of accuracy of the tool.
3. Maintain measuring instruments	3.1 Measuring instruments are kept free from corrosion 3.2 Measuring instruments are not dropped to avoid damage 3.3 Measuring instruments are cleaned before and after using.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring instruments	Measuring instruments includes: 1.1 Multitester 1.2 Micrometer (In-out, depth) 1.3 Vernier caliper (Out, inside) 1.4 Dial Gauge with Mag. Std. 1.5 Straight Edge 1.6 Thickness gauge 1.7 Try square 1.8 Protractor 1.9 Height gauge 1.10 Steel rule 1.11 Shrink rule
2. Calculation	Kinds of part mensuration include: 2.1 Volume 2.2 Area 2.3 Displacement 2.4 Inside diameter 2.5 Circumference 2.6 Length 2.7 Thickness 2.8 Outside diameter 2.9 Taper 2.10 Out of roundness 2.11 Shrinkage allowance

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1 Selected measuring instruments 1.2 Carried-out measurements and calculations. 1.3 Maintained measuring instruments
2. Underpinning knowledge and attitudes	2.1 Types of Measuring instruments and its uses 2.2 Safe handling procedures in using measuring instruments 2.3 Four fundamental operation of mathematics 2.4 Formula for Volume, Area, Perimeter and other geometric figures
3. Underpinning skills	3.1 Caring and Handling measuring instruments 3.2 Calibrating and using measuring instruments 3.3 Performing calculation by Addition, Subtraction, Multiplication and Division 3.4 Visualizing objects and shapes 3.5 Interpreting formula for volume, area, perimeter and other geometric figures
4. Resource implications	The following resources MUST be provided: 4.1 Workplace location 4.2 Measuring instrument appropriate to servicing processes 4.3 Instructional materials relevant to the propose activity
5. Method of assessment	Competency MUST be assessed through: 5.1 Observation with questioning 5.2 Written or oral examination 5.3 Interview 5.4 Demonstration with questioning
6. Context of assessment	6.1 Competency elements must be assessed in a safe working environment 6.2 Assessment may be conducted in a workplace or simulated environment

UNIT TITLE: READ, INTERPRET AND APPLY SPECIFICATION AND MANUALS.

UNIT CODE: ALT723203

UNIT DESCRIPTOR: This unit deals with identifying, interpreting and applying service specification manuals, maintenance procedure manuals and periodic maintenance manual.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify and access manual/ specification	1.1 Appropriate manuals are identified and accessed as per job requirements. 1.2 Version and date of manual is checked to ensure correct specification and procedure are identified.
2. Interpret manuals	2.1 Relevant sections, chapters of manuals/specifications are located in relations to the work to be conducted 2.2 Information and procedure in the manual are interpreted in accordance to industry practices
3 Apply information in manual	3.1 Manual is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with manufacturer specification 3.3 Manual data is applied according to the given task 3.4 All correct sequencing and adjustments are interpreted in accordance with information contained on the manual or specifications
4. Store manuals	4.1 Manual or specification are stored appropriately to ensure prevention of damage, ready access and updating of information when required in accordance with company requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Manuals	Kinds of manuals: 2.1 Manufacturer's specification manual 2.2 Repair manual 2.3 Maintenance Procedure Manual 2.4 Periodic Maintenance Manual

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 Identified and accessed manual/specification 1.2 Interpreted manuals 1.3 Applied information in manuals 1.4 Stored manuals
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> 2.1 Types of manuals used in automotive industry 2.2 Identification of symbols used in the manuals 2.3 Identification of units of measurements 2.4 Unit conversion
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1. Reading and comprehension skills required to identify and interpret automotive manuals and specifications 3.2. Accessing information and data
<p>4 Resource Implications</p>	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 4.1 All manuals/catalogues relative to Automotive 4.2 Job order, requisitions 4.3 Actual vehicle or simulator
<p>5 Method of assessment</p>	<p>Competency must be assessed through:</p> <ul style="list-style-type: none"> 5.1 Observation with questioning 5.2 Interview
<p>6 Context of assessment</p>	<ul style="list-style-type: none"> 6.1 Assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 6.2 Assessment may be conducted in the workplace or a simulated environment.

UNIT OF COMPETENCY : **PERFORM SHOP MAINTENANCE**

UNIT CODE : **ALT723205**

UNIT DESCRIPTOR : This unit deals with inspecting and cleaning of work area including tools, equipment and facilities. Storage and checking of tools/ equipment and disposal of used supplies/materials are also incorporated in this competency.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Inspect/clean tools and work area	1.1 Cleaning solvent used as per workshop/tools <i>cleaning requirement</i> 1.2 <i>Work area</i> is checked and cleaned 1.3 Wet surface/spot in work area is wiped and dried
2. Store/arrange tools and shop equipment	2.1 Tools/equipment are checked and stored in their respective shelves/location 2.2 Corresponding labels are posted and visible 2.3 Tools are safely secured and logged in the records
3. Dispose wastes/used lubricants	3.1 Containers for used lubricants are visibly labeled 3.2 Wastes/used lubricants are disposed as per workshop SOP
4. Report damaged tools/equipment	4.1 Complete inventory of tools/equipment is maintained 4.2 Damaged tools/equipment/facilities are identified and repair recommendation is given 4.3 Reports prepared has no error/discrepancy

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work area	Work areas include: 1.1 Workshop areas for servicing/repairing light and/or heavy vehicle and/or plant transmissions and/or outdoor power equipment 1.2 Open workshop/garage and enclosed, ventilated office area 1.3 Other variables may include workshop with: <ul style="list-style-type: none"> • Mess hall • Wash room • Comfort room
2. Cleaning requirement	2.1 Cleaning solvent 2.2 Inventory of supplies, tools, equipment, facilities 2.3 List of mechanics/technicians 2.4 Rags 2.5 Broom 2.6 Mop 2.7 Pail 2.8 Used oil container 2.9 Oiler 2.10 Dust/waste bin
3. Manuals	3.1 Vehicle/plant manufacturer specifications 3.2 Company operating procedures 3.3 Industry/Workplace Codes of Practice 3.4 Product manufacturer specifications 3.5 Customer requirements 3.6 Industry Occupational Health and Safety
4. Company standard operating procedure	Wearing of Personal protective equipment include: 4.1 Gloves 4.2 Apron 4.3 Goggles 4.4 Safety shoes

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Cleaned workshop tools/facilities 1.2 Maintained equipment, tools and facilities 1.3 Disposed wastes and used lubricants/fluid as per required procedure
2. Underpinning knowledge and attitudes	2.1 5 S or TQM 2.2 Service procedures 2.3 Relevant technical information 2.4 Safe handling of equipment and tools 2.5 Vehicle safety requirements 2.6 Workshop policies 2.7 Personal safety procedures 2.8 Fire extinguishers and prevention 2.9 Storage/disposal of hazardous/flammable materials 2.10 Positive Work Values (Perseverance, Honesty, Patience, Attention to Details)
3. Underpinning skills	3.1 Handling/Storing of tools/equipment/supplies and material 3.2 Cleaning grease/lubricants 3.3 Disposing of wastes and fluid 3.4 Preparing inventory of s/m and tools and equipment 3.5 Monitoring of s/m and tools/equipment
4. Resource implications	The following resources MUST be provided: 4.1 Workplace: Real or simulated work area 4.2 Appropriate Tools & equipment 4.3 Materials relevant to the activity
5. Method of assessment	Competency MUST be assessed through: 5.1 Written/Oral Questioning 5.2 Demonstration
6. Context of assessment	6.1 Competency must be assessed on the job or in a simulated environment. 6.2 The assessment of practical skills must take place after a period of supervised practice and repetitive experience.

CORE COMPETENCIES

UNIT OF COMPETENCY : **MACHINE PARTS**
UNIT CODE : **ALT722307**
UNIT DESCRIPTOR : This unit covers the competency required to use a range of equipment to machine parts

ELEMENT	PERFORMANCE CRITERIA
1 Determine job requirements	<p>1.1 Drawings, job sheets or equivalent instructions are interpreted and understood</p> <p>1.2 Workpiece materials are identified and prepared based on the specification listed.</p> <p>1.3 Tools and equipment are selected and prepared in accordance with the requirements of the job.</p> <p>1.4 Measuring equipment is calibrated to ensure accurate measurement within the tolerances specified.</p>
2 Prepare machine for operation	<p>2.1 Workpiece is set in accordance with standard operating procedures or manufacturer's instruction</p> <p>2.2 Cutting tools are selected and set based on the job specification</p> <p>2.3 Machine controls are preset or adjusted to job specification.</p> <p>2.4 Minor maintenance is carried out in accordance with company policy.</p> <p>2.5 Measuring equipment is calibrated to ensure accurate measurement within the tolerances specified.</p> <p>2.6 Machine speed and feed controls are adjusted in accordance with the specifications to suit the type of metal/alloy being machined</p> <p>2.7 Machine is set in accordance with company or manufacturer procedures.</p>
3 Machine Parts	<p>3.1 Parts are machined and finished to specification using the appropriate machining process.</p> <p>3.2 Parts are checked for tolerances specified in the standard operating procedures and to minimize waste.</p> <p>3.3 Identified faults and defects are rectified in accordance with enterprise quality control standards to minimize wastage.</p> <p>3.4 Machined parts are washed, inspected and dried to ensure they are cleaned and contain no waste in cavities or chambers.</p> <p>3.5 Production schedule is maintained and recorded in accordance with company procedures</p> <p>3.6 Safe working procedures are implemented in accordance with company procedures</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Workpiece materials	1.1 Plain carbon steel 1.2 Heat / corrosion resistance steel 1.3 Aluminum alloy 1.4 Copper alloy for electrode 1.5 Graphite for electrode
2. Tools	2.1 Reamers 2.2 Tool holders 2.3 Taps and dies 2.4 Machinist files 2.5 Hammers 2.6 Letter / number punch 2.7 Sand papers 2.8 Rotary table
3. Measuring equipment	Measuring equipment include but not limited to: 3.1 Micrometers 3.2 Vernier calipers 3.3 Height gages 3.4 Gages (feeler, snap, bore, ring, thread, air) 3.5 Dial indicators 3.6 Dial test indicators. 3.7 Surface plate 3.8 Square block 3.9 Centering machine 3.10 Surface comparator
4. Machine	Machine include but not limited to machine tools such as: 4.1 Drills 4.2 Lathes 4.3 Milling machines 4.4 Precision grinders 4.5 EDM 4.6 Slotting machine 4.7 Tool grinders 4.8 Power tools 4.9 Die grinders 4.10 Jig borer 4.11 CNC machines.
5. Minor maintenance	5.1 Machine slide 5.2 Lead screw 5.3 Gear round 5.4 Necks / dents 5.5 Gear backlash 5.6 Lubrication 5.7 Topping-off of coolant

6. Machining process	6.1 Drilling 6.2 Turning 6.3 Milling 6.4 Reaming 6.5 Honing 6.6 Threading 6.7 Grinding 6.8 Lapping 6.9 Polishing
7. Faults and defects	7.1 Fault that is outright scrapped 7.2 Fault that can be rectified
8. Washed, inspected and dried	8.1 Washing chemicals, method, draining 8.2 Drying, storage method, handling fixtures

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 Interpreted and understood drawing and instruction 1.2 Prepared materials and tools 1.3 Set up workpiece 1.4 Prepared machine for operation 1.5 Machined parts to specification
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> 2.1 Shrinkage values of different plastic resin 2.2 Blow-mold parts and functions 2.3 Blow-molding machine parts and functions 2.4 Mold materials and their properties 2.5 Different machine process such as milling, turning, drilling, tapping, grinding, lapping, etc. 2.6 Machine shop tools and equipment 2.7 Set-up and use of machining equipment 2.8 Types and uses of precision measuring instruments 2.9 Blue print reading and mensuration 2.10 Safe work practice and regulations 2.11 House-keeping and 5-S principle 2.12 Machining defects / cause 2.13 Company procedure for dealing with faulty parts 2.14 Company OH&S policy and procedures 2.15 Company production schedules ad work-flow record 2.16 Company quality standard of acceptance 2.17 Manual handling process 2.18 Basic machine maintenance 2.19 Attention to details, Perseverance and Honesty
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Planning skill 3.2 Listening / following verbal orders 3.3 Counting and recording parts 3.4 Checking and counting quantities 3.5 Using PPE, safe handling products and materials, reading relevant safety information and applying safety precautions appropriate to the task. 3.6 Reading / interpreting company form e.g. job sheets, process sheets, work order, company standard documentation 3.7 Setting up and operating machine tools 3.8 Using tools, measuring instruments and hoisting/lifting equipment
<p>4. Resource implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Tools, equipment and workplace relevant with the requirements for the job. 4.2 Supplies and consumable materials 4.3 Personal protective devices 4.4 Drawings

	4.5 Relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials
5. Method of assessment	Competency MUST be assessed through: 5.1 Observation with questioning 5.2 Portfolio 5.3 Third party report
6. Context of assessment	Competency may be assessed individually in the actual workplace or a simulated workplace environment.

UNIT OF COMPETENCY: PERFORM PRECISION ASSEMBLY

UNIT CODE : ALT722308

UNIT DESCRIPTOR : This unit covers assembling and testing complex engineering components and mechanical assemblies in a production, manufacturing environment.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Read and understand drawings, job sheets and specifications	1.1 Drawings, job instructions and specifications are interpreted and task requirements understood including settings in accordance with workplace procedures 1.2 Components/sub-assemblies are checked against specifications in the drawing, job sheet, assembly list or equivalent instructions. 1.3 Tools, equipment and components/sub-assemblies are selected to meet job requirements 1.4 Fitting requirements and sequential assembly planning are carried out where applicable.
2. Assemble components	2.1 Defective or faulty components/sub-assemblies are identified and processed according to standard operating procedure. 2.2 Components/sub-assemblies is correctly prepared for assembly. 2.3 Techniques and principles appropriate to the job requirements are applied in assembly activity. 2.4 Records/inputs are accurately maintained or processed. 2.5 Components of mold are fitted to ensure correct positioning and conformance with specifications. 2.6 Mold is tested to ensure that components interface/ interact according to operational specifications. 2.7 First-off sample products are evaluated and compared with standard of acceptance
3. Perform final adjustments	3.1 Final adjustments are performed on assembly to ensure alignment with operational specifications. 3.2 Faults are identified for rework or, where the fault is outside the scope of the workstation, processed according to standard operating procedure. 3.3 The assembly is correctly marked/tagged according to standard operating procedure. 3.4 Components and/or mold assembly are handled and stored according to standard operating procedures and in a manner least likely to cause damage. 3.5 Procedures are undertaken in response to emergency in accordance with workplace procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sample product	Sample product made of: 1.1 Polyethylene, poly vinyl chloride, polypropylene, polycarbonate, etc 1.2 Additives to improve 1.2.1 Impact resistance 1.2.2 Anti-static property 1.2.3 Colorant 1.2.4 Ultra-violet property 1.3 Product requirement 1.3.1 Volume of content 1.3.2 Section thickness 1.3.3 Product weight 1.3.4 Product color range 1.3.5 Cap design 1.3.6 With printing or decoration
2. Standard of acceptance	2.1 Weight of the product 2.2 Alignment of mold halves (fixed / movable) parting line 2.3 Uniform thickness of the product 2.4 Volume of product content 2.5 Bottom rocking 2.6 Misaligned neck cap thread product
3. Final adjustment	Adjustments based on predetermined standards of quality and safety: 3.1 Clearances 3.2 Mesh 3.3 Tension 3.4 Level 3.5 Alignment etc.

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 Interpreted and understood drawings, job sheets and specifications 1.2 Checked components against specifications 1.3 Assembled and tested assembly 1.4 Evaluated first-off sample products and made final adjustments
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> 2.1 Fitting requirements 2.2 Uses of relevant tools and equipment 2.3 Sequence in which the tasks are to be performed 2.4 Sources of the component / sub-assemblies 2.5 Required action for tests and checks 2.6 Required action for non-conformance 2.7 Damage to components and/or assemblies through the use of inappropriate handling and/or unsafe storage procedures 2.8 Relevant record keeping requirements 2.9 Use and application of personal protective equipment 2.10 Safe work practices and procedures 2.11 Hazards and control measures associated with precision assembly. 2.12 Fire hazards 2.13 Torque requirements of sub-assembly and main assembly 2.14 Type oil seal use 2.15 Safe work practice 2.16 Attention to details, Perseverance and Honesty
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Planning skills 3.2 Reading and interpreting drawings, routine information on written job instructions, specifications and standard operating procedures 3.3 Preparing a sequential assembly plan 3.4 Selecting and sourcing appropriate tools, components and sub-assemblies 3.5 Following job instructions 3.6 Identifying faulty components 3.7 Entering routine and familiar information onto proformas and standard workplace forms 3.8 Using hand tools and manual power tools 3.9 Dimensional measurement skills 3.10 Cleaning and lubricating parts/ sub-components 3.11 Application of safe work practices 3.12 Use of personal protective equipment 3.13 Use of fire fighting equipment
<p>4. Resource implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Operating plant or equipment that allows for realistic

	<p>simulation.</p> <p>4.2 Tools, equipment and workplace relevant with the requirements for the job.</p> <p>4.3 Supplies and consumable materials</p> <p>4.4 Relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials</p>
5. Method of assessment	<p>Competency MUST be assessed through:</p> <p>5.1 Observation with questioning</p> <p>5.2 Written assessment</p> <p>5.3 Portfolio</p>
6. Context of assessment	<p>Competency may be assessed individually in the actual workplace or a simulated workplace environment.</p>

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 MOLDMAKING NC II.

3.1 CURRICULUM DESIGN

Course Title: **MOLDMAKING**

NC Level: **NC II**

Nominal Training Duration: **18 Hours** (Basic Competencies)
 20 Hours (Common Competencies)
 68 Hours (Core Competencies)

Course Description:

This course is designed to enhance the knowledge, skills and attitudes of an individual to be able to machine parts using a variety of machining equipment and tools on plain carbon steel, heat resistant steel and other metals and alloy using different machining processes; perform precision assembly and testing complex engineering components and mechanical assemblies in a production, manufacturing environment. It also includes minor maintenance of equipment being used.

This course is also designed to enhance the basic and common knowledge, skills and attitudes of an individual in the field of foundry-pattern making.

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

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Participate in workplace communication	1.1 Obtain and convey workplace information. 1.2 Complete relevant work related documents. 1.3 Participate in workplace meeting and discussion.	<ul style="list-style-type: none"> • Group discussion • Interaction • Lecture • Reportorial 	<ul style="list-style-type: none"> • Written test • Practical/ performance test • Interview
2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team. 2.2 Describe work as a team member.	<ul style="list-style-type: none"> • Group discussion • Interaction • Lecture • Case studies • Simulation 	<ul style="list-style-type: none"> • Written test • Observation • Simulation • Role playing • Case studies

3. Practice career professionalism	<p>3.1 Integrate personal objectives with organizational goals.</p> <p>3.2 Set and meet work priorities.</p> <p>3.3 Maintain professional growth and development.</p>	<ul style="list-style-type: none"> • Group Discussion • Interaction • Simulation • Demonstration • Self-paced instruction • Structured activity • Film viewing 	<ul style="list-style-type: none"> • Role play • Interview • Written examination • Portfolio assessment
4. Practice occupational health and safety	<p>4.1 Identify hazardous risks</p> <p>4.2 Evaluate hazard and risks</p> <p>4.3 Control hazards and risks</p> <p>4.4 Maintain occupational health and safety awareness</p>	<ul style="list-style-type: none"> • Interactive-lecture • Simulation • Symposium • Group dynamics • Film viewing • Situation analysis • Self-paced instruction 	<ul style="list-style-type: none"> • Situational analysis • Interview • Practical examination • Written exam • Portfolio assessment

COMMON COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Read, Interpret and Apply Engineering Drawings	<p>1.1 Identify and access engineering drawings/ specification</p> <p>1.2 Interpret drawings</p> <p>1.3 Apply information in the drawings & specifications</p> <p>1.4 Store drawings</p>	<ul style="list-style-type: none"> • Lecture/ Demonstration • Dual training • Practical exercises 	<ul style="list-style-type: none"> • Direct observation • Written examination • Oral examination
2. Perform Mensuration and Calculation	<p>2.1 Select measuring instrument and</p> <p>2.2 Carry out measurement and calculations.</p> <p>2.3. Maintain measuring instruments</p>	<ul style="list-style-type: none"> • Demonstration • Practical exercises 	<ul style="list-style-type: none"> • Written test • Oral questioning • Direct observation
3. Read, Interpret and Apply Specifications and Manual	<p>3.1 Identify/accessed manuals and interpret data and specification</p> <p>3.2 Apply information accessed in manual</p> <p>3.3 Store manual</p>	<ul style="list-style-type: none"> • Lecture/ Demonstration • Dual training • Distance Learning 	<ul style="list-style-type: none"> • Written test • Direct observation • Project method • Interview

4. Perform Shop Maintenance	4.1 Inspect/clean tools and work area 4.2 Store/arrange tools and shop equipment 4.3 Dispose wastes/used lubricants 4.4 Report damaged tools/equipment	<ul style="list-style-type: none"> • Lecture/ Demonstration • Dual training • Self paced (modular) • Simulation • Interactive lecture 	<ul style="list-style-type: none"> • Written test • Direct observation • Demonstration • Interview
-----------------------------	---	--	--

CORE COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Machine Parts	1.1 Prepare machines for operation 1.2 Machine parts	<ul style="list-style-type: none"> • Demonstration • Lecture • Discussion • Dual training 	<ul style="list-style-type: none"> • Observation and questioning • Portfolio • Third party
2. Perform Precision Assembly	2.1 Read and understand job sheets 2.2 Assemble engineering components 2.3 Perform final adjustments	<ul style="list-style-type: none"> • Demonstration • Lecture • Distance learning • Dual training 	<ul style="list-style-type: none"> • Observation and questioning • Portfolio • Third party

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 learner-centered and should accommodate individualized and self-paced learning strategies;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based on and off-the-job components;
- Allows for 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 or 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 a training modality wherein fast learners are given the opportunity to assist the slow learners.
- Supervised industry training or on-the-job 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 a 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.
- Project-Based Instruction is an authentic instructional model or strategy in which students plan, implement and evaluate projects that have real world applications.

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.

- With experience in basic machining
- Ability to communicate both orally and in writing; and
- Physically and mentally fit

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS MOLDMAKING NC II

Recommended list of tools, equipment and materials for the training of 12 trainees for MOLDMAKING NC II

Machine Parts

TOOLS		EQUIPMENT		MATERIALS	
QTY		QTY		QTY	
1 unit	Vernier caliper	1 unit	Horizontal lathe (4 jaw)		Coolant
2 units	Bore gage	1 unit	Horizontal milling machine		Coolant dispense (1 liter)
3 units	Go-no-go gage	1 unit	Vertical milling machine		Machining stock
2 units	Plug gage (as required)	1 unit	Carbide tool grinder	8 pcs	CRS – 50° x 150m
1 unit	Depth gage	1 unit	Band saw	8 pcs	CRS – 20° x 150m
1 unit	Dial indicator	1 unit	Surface grinder	4 pcs	MS – plate 4" wide x 6" x 2" thick
1 unit	Thread gage	1 unit	Drill bench	4 pcs	MS – plate 6" wide x 6" x 2" thick
2 unit	Reamer-4-flute	1 unit	Rotary table		Face mill 4-point
1 unit	Die grinders	4 unit	Mechanical vise		Face mill 6-point
1 unit	Hammer (metal)	1 unit	Radial drill	2 sets	Grinding wheel dresser
1 unit	Hammer (plastic)	1 unit	Vertical lathe		Drill holder or chuck – assorted
2 set	Tap / dies	1 unit	Surface plate	4 sets	C-clamp
1 set	Feeler gage	1 unit	Shaper	4 sets	Machinist clamp (step block)
1 set	Snap gage	1 unit	Working bench		Step drill assorted size
1 set	Lubricator			2 sets	Chantering tool
2 set	Steel brush			2 sets	Machinist file
2 set	Paint brush			10 pcs	De-burring tool (1/4" stem)

1 set	Ball pen				
1 pad	Writing paper				
1 set	Calculator				
1 set	Assorted drills (tapered shank)				
1 set	Assorted drills (straight shank)				
1 set	Carbide insert assorted				
6 pcs	Tool holder				
1 set	HSS tools assorted				
1 set	Holder assorted				
2 pairs	Face shield				
1 set	End mill cutters assorted				

Perform Precision Assembly

TOOLS		EQUIPMENT		MATERIALS	
QTY		QTY		QTY	
2 pcs	Plastic mallet	2 set	Over-head crane (1 ton capacity)	10 Kgs 2 bars	Detergent soap
2 pcs	Wooden / rubber mallet	1 set	Washing equipment	5 gals	Thinner
2 pcs	Bearing driver	1 unit	Paint mixer	5 gals	Kerosene
2 pcs	Bushing driver	2 units	Hydraulic press (20Kg / mm ² up to 50Kg / mm ²)	10 Kgs	Wiping rugs
2 sets	Torque wrench	3 units	Test bench	5 li	Lubricating oil
2 sets	Impact wrench	1 set	Illustration board for sequential assembly	20 li	Gasoline
4 pcs	Screw driver	1 set	Illustration board for parts nomenclature	5 sheets	Sand paper #240
1 set	Feeler gage	2 set	Tote boxes	5 shts	Sand paper #180
2 set	Box wrench	10 set	Pallets	5 shts	Sand paper #32
2 sets	Open wrench	2 set	Push cart (500Kgs capacity)	1 li	Grease
		3 units	Fire extinguisher (10Kgs)		
2 set	Bronze brush	1 set	Fire hose with cabinet and		

			water source		
2 set	Air gun	1 set	Air line with filter, regulator and lubricator		
2 set	Lubricator				
50 meters	Air line hose				
2 sets	Paint spray gun				
2 unit	Sealant dispenser				
2 pcs	File fine				
2 pcs	Spanner				
2 sets	Special tools				
4 sets	Safety gadgets				
4 sets	Housekeeping tools				
5 sets	Tote boxes				
2 set	Waste can				
2 sets	Lifter				
2 pcs	Scissor				
1 set	Letter punch				
1 set	Number punch				
1 pc	Ball pein hammer				
	Personal protective equipment				
1 pair	Respirator				
1 pair	Rubber gloves				
1 pair	Safety shoes				
1 pair	Eye goggles				

3.5 TRAINING FACILITIES MOLDMAKING NC II

Based on a class size of 12 students/trainees

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
• Building (permanent)	26.00 x 28.00	728.00	728.00
• Trainee Working Space	3.50 x 3.50 per student / trainee	12.25 per student	147
• Lecture room	9.00 x 10.00	90.00	90.00
• Learning resource center	5.00 x 8.00	40.00	40.00
• Facilities / Equipment / Circulation area**	-	-	302.00

** Area requirement is equivalent to 30% of the total teaching/learning areas

3.6 TRAINER'S QUALIFICATIONS

AUTOMOTIVE MANUFACTURING SUB SECTOR

MOLDMAKING NC II

TRAINER QUALIFICATION (TQ II)

- Must be a holder of MOLDMAKING NC II
- Must have undergone training on Training Methodology II (TM II) ¹
- Must be computer literate
- Must be physically and mentally fit
- Must have at least 2 years job/industry experience²
- Must be a civil-service eligible or holder of appropriate professional license issued by the Professional Regulatory Commission (for government positions)

¹ This shall be changed to “:Must be a holder of Trainer Qualification Level II (TQII) or equivalent” upon promulgation by the TESDA Board of the TQ/AQ training regulations

² 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 MOLDMAKING NC II, the candidate must demonstrate competence in all the units listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.

4.2 Individual aspiring to be awarded the qualification of MOLDMAKING NC II must acquire Certificates of Competency (COC) in all the following core units of the Qualification. Candidates may apply for assessment in any accredited assessment center.

4.2.1 Machine Parts

4.2.2 Perform Precision Assembly

4.3 Upon accumulation and submission of all COCs acquired for the relevant units of competency comprising a qualification, an individual shall be issued the corresponding National Certificate.

4.4 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units

4.5 The following are qualified to apply for assessment and certification:

4.5.1 Graduates of formal, non-formal and informal including enterprise-based training programs.

4.5.2 Experienced workers (wage employed or self-employed)

4.6 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 (PTQCS)*.

COMPETENCY MAP AUTOMOTIVE PARTS MANUFACTURING

ANNEX A

CORE COMPETENCIES	Develop and Manufacture Wood Pattern	Develop and Manufacture Polymer Pattern	Develop and Manufacture Assembled Plated Pattern	Develop and Manufacture Production Pattern	Perform General Woodworking Machine Operations	Use and Maintain Measuring Instrument	Machine Parts	Perform Precision Assembly					
	Prepare & Mix Sand for Metal Molding	Produce Molds by Hand	Produce Cores by Hand	Operate Molding Machine	Operate Core-Making Machine	Pour Molten Metal to Molds	Prepare Sand Mixture for Heavy Casting	Produce Blow Molded Products	Change Equipment Dies				
	Operate Melting Furnaces (non-electric)	Operate Cupola Melting Furnace	Operate Electric Induction Melting Furnace	Fettle & Trim Metal Castings/Forgings	Perform Refractory Installation & Repair	Perform Hand Molding to Produce Heavy Casting	Pour Molten Metal to Heavy Castings	Produce Injection Molded Products	Prepare and Start Equipment for Production				
	Melt Aluminum-Silicon Alloys for Safety Tested Castings	Melt Metals Using Coreless Induction Furnace	Melt Automotive Gray Iron Castings in Cupola	Manufacture and develop corebox for Shell Core Box	Develop and Manufacture Gear, Conveyor Screw and	Develop Gravity Die Casting Mold	Perform Press Machine Setting	Perform Mechanical Shearing Operation					
	Use Comparison and Basic Measuring Devices	Measure Components Using Coordinate Measuring Machines	Use Graphical Techniques and Perform Simple Statistical Computations	Apply Quality Systems	Conduct Product and/or Process Capability Studies	Maintain/Supervise the Application of Quality Procedures	Perform Mechanical Press Forming Operation						
	Perform Hand Forging	Perform Hammer Forging	Perform Basic Incidental Heat/Quenching, Tempering and Annealing	Hand Forge Complex Shapes	Hammer Forge Complex Shapes	Perform Drop and Upset Forging	Select Heat Treatment Process	Perform Heat Treatment Process					
	Perform Engineering Measurement	Perform Precision Mechanical Measurement	Calibrate Measuring Equipment	Select and Control Inspection Processes and Procedures	Perform Inspection	Perform Basic Statistical Quality Control	Use Improvement Processes in Team Activities						
	Prepare Molds for Composites Production	Prepare Materials for Formulae	Assemble Materials and Equipment for Production	Operate injection Molding Equipment	Operate Blow Molding Equipment	Monitor Process Operations	Finish Products and Components						
COMMON COMPETENCIES	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Read & Interpret Engineering Drawings</td> <td>Perform Mensuration and Calculation</td> <td>Read, Interpret and Apply Specifications and Manuals</td> <td>Perform Shop Maintenance</td> </tr> </table>				Read & Interpret Engineering Drawings	Perform Mensuration and Calculation	Read, Interpret and Apply Specifications and Manuals	Perform Shop Maintenance					
	Read & Interpret Engineering Drawings	Perform Mensuration and Calculation	Read, Interpret and Apply Specifications and Manuals	Perform Shop Maintenance									
BASIC COMPETENCIES	Receive and respond workplace communication	Work with Other	Demonstrate work values	Practice basic housekeeping procedures	Lead in workplace communication	Develop and practice negotiation skills	Use relevant technologies	Solve workplace problems related to work activities					
	Participate in workplace communication	Work in team environment	Practice career professionalism	Practice occupational health and safety procedures	Lead small Team	Use mathematical concepts and techniques	Develop team and individual	Apply problem solving techniques in the workplace					
	Plan and organize work	Utilize specialist communication skills											

Legend:
 MOLDMAKING NC II

DEFINITION OF TERMS

- 1. Machining** mechanical method used to precisely shape a work-piece by removing some of the work-piece material with tools having sharp and geometrically precise cutting edge
- 2. Drilling** Making holes using rotary end cutting tool
- 3. Milling** Removing metal using a milling cutter
- 4. Turning** Removing material by facing a cutting tool against the surface of a rotating work piece. The tool may or may not be moved toward or along the axis of rotation while it cuts away material.
- 5. Tapping** cutting internal thread with a tap
- 6. Reaming** Enlarging a hole to desired size. The tool used is called a reamer
- 7. Spot Facing** Machining a flat seat for a bolt head
- 8. Counter bore** Drilling or boring a flat bottom hole often concentric with other holes
- 9. Boring** A machining method using single point or multiple point tools to make holes other than drilling or enlarging a hole
- 10. Planing** Producing flat surface on a metal by linear reciprocal motion of work and the table to which it is attached relative to a stationary cutting tool
- 11. Shaping** Producing flat surface using simple point tool. The work piece is held in a vise or fixture
- 12. Carbide tools** Cutting or forming tools usually made from Tungsten, titanium, niobium or a combination of them in a matrix of cobalt nickel or other metals
- 13. Clearance** The gap or space between two mating parts.
- 14. Interference** The difference in lateral dimension at room temperature between two mating components before assembly

ACKNOWLEDGEMENT

The Technical Education and Skills Development Authority (TESDA) wishes to extend thanks and appreciation to the many representatives of business, industry, academe and government agencies who rendered their time and expertise to the development and validation of this Training Regulation.

THE TECHNICAL AND INDUSTRY EXPERT PANEL

MOLDMAKING

Antonio A. Gimenez

Philippine Automotive
Federation, Inc. (PAFI)

Cesar R. Leal

Philippine Automotive
Federation, Inc. (PAFI)

Elmo N. Serbito

PAFI (Samahan ng mga
Manggagawang Supercast)

Carina J. Bondad

(Administrative Staff)

The PARTICIPANTS in the National Validation of this Training Regulation

- (Supercast Foundry & Machinery Corp. SFMC)
- Philippine Aluminum Wheels Inc. (PAWI)
- Toyota Auto Parts Phils. Inc.

Members of the TESDA Board

The MANAGEMENT and STAFF of the TESDA Secretariat
TESDA EXCOM

Qualification and Standards Office

Florante P. Inoturan

Agnes P. Panem

Abel B. Elpedes