

K to 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL-LIVELIHOOD TRACK
INDUSTRIAL ARTS – MACHINING (NC I)
(640 hours)

These are the specializations and their pre-requisites. These lists should be used as reference for curriculum maps.

AGRI-FISHERY ARTS

	Specialization	Number of Hours	Pre-requisite
1.	Agricultural Crops Production (NC I)	320 hours	
2.	Agricultural Crops Production (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	640 hours	
3.	Agricultural Crops Production (NC III)	640 hours	Agricultural Crops Production (NC II)
4.	Animal Health Care Management (NC III)	320 hours	Animal Production (Poultry-Chicken) (NC II) or Animal Production (Ruminants) (NC II) or Animal Production (Swine) (NC II)
5.	Animal Production (Poultry-Chicken) (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
6.	Animal Production (Large Ruminants) (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
7.	Animal Production (Swine) (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
8.	Aquaculture (NC II)	640 hours	
9.	Artificial Insemination (Large Ruminants) (NC II)	160 hours	Animal Production (Large Ruminants) (NC II)
10.	Artificial Insemination (Swine) (NC II)	160 hours	Animal Production (Swine) (NC II)
11.	Fish Capture (NC II)	640 hours	
12.	Fishing Gear Repair and Maintenance (NC III)	320 hours	
13.	Fish-Products Packaging (NC II)	320 hours	
14.	Fish Wharf Operation (NC I)	160 hours	
15.	Food Processing (NC II)	640 hours	
16.	Horticulture (NC III)	640 hours	Agricultural Crops Production (NC II)
17.	Landscape Installation and Maintenance (NC II)	320 hours	
18.	Organic Agriculture (NC II)	320 hours	
19.	Pest Management (NC II)	320 hours	
20.	Rice Machinery Operations (NC II)	320 hours	
21.	Rubber Processing (NC II)	320 hours	
22.	Rubber Production (NC II)	320 hours	
23.	Slaughtering Operations (Hog/Swine/Pig) (NC II)	160 hours	

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HOME ECONOMICS

	Specialization	Number of Hours	Pre-requisite
1.	Attractions and Theme Parks Operations with Ecotourism (NC II)	160 hours	
2.	Barbering (NC II)	320 hours	
3.	Bartending (NC II)	320 hours	
4.	Beauty/Nail Care (NC II)	160 hours	
5.	Bread and Pastry Production (NC II)	160 hours	
6.	Caregiving (NC II)	640 hours	
7.	Commercial Cooking (NC III)	320 hours	Cookery (NC II)
8.	Cookery (NC II)	320 hours	
9.	Dressmaking (NC II)	320 hours	
10.	Events Management Services (NC III)	320 hours	
11.	Fashion Design (Apparel) (NC III)	640 hours	Dressmaking (NC II) or Tailoring (NC II)
12.	Food and Beverage Services (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	160 hours	
13.	Front Office Services (NC II)	160 hours	
14.	Hairdressing (NC II)	320 hours	
15.	Hairdressing (NC III)	640 hours	Hairdressing (NC II)
16.	Handicraft (Basketry, Macrame) (Non-NC)	160 hours	
17.	Handicraft (Fashion Accessories, Paper Craft) (Non-NC)	160 hours	
18.	Handicraft (Needlecraft) (Non-NC)	160 hours	
19.	Handicraft (Woodcraft, Leathercraft) (Non-NC)	160 hours	
20.	Housekeeping (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	160 hours	
21.	Local Guiding Services (NC II)	160 hours	
22.	Tailoring (NC II)	320 hours	
23.	Tourism Promotion Services (NC II)	160 hours	
24.	Travel Services (NC II)	160 hours	
25.	Wellness Massage (NC II)	160 hours	

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INDUSTRIAL ARTS

	Specialization	Number of Hours	Pre-requisite
1.	Automotive Servicing (NC I) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	640 hours	
2.	Automotive Servicing (NC II)	640 hours	Automotive Servicing (NC I)
3.	Carpentry (NC II)	640 hours	
4.	Carpentry (NC III)	320 hours	Carpentry (NC II)
5.	Construction Painting (NC II)	160 hours	
6.	Domestic Refrigeration and Air-conditioning (DOMRAC) Servicing (NC II)	640 hours	
7.	Driving (NC II)	160 hours	
8.	Electrical Installation and Maintenance (NC II)	640 hours	
9.	Electric Power Distribution Line Construction (NC II)	320 hours	Electrical Installation and Maintenance (NC II)
10.	Electronic Products Assembly and Servicing (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	640 hours	
11.	Furniture Making (Finishing) (NC II)	640 hours	
12.	Instrumentation and Control Servicing (NC II)	320 hours	Electronic Products Assembly and Servicing (EPAS) (NC II)
13.	Gas Metal Arc Welding (GMAW) (NC II)	320 hours	Shielded Metal Arc Welding (SMAW) (NC II)
14.	Gas Tungsten Arc Welding (GTAW) (NC II)	320 hours	Shielded Metal Arc Welding (GMAW) (NC II)
15.	Machining (NC I)	640 hours	
16.	Machining (NC II)	640 hours	Machining (NC I)
17.	Masonry (NC II)	320 hours	
18.	Mechatronics Servicing (NC II)	320 hours	Electronic Products Assembly and Servicing (EPAS) (NC II)
19.	Motorcycle/Small Engine Servicing (NC II)	320 hours	
20.	Plumbing (NC I)	320 hours	
21.	Plumbing (NC II)	320 hours	Plumbing (NC I)
22.	Refrigeration and Air-Conditioning (Packaged Air-Conditioning Unit [PACU]/Commercial Refrigeration Equipment [CRE]) Servicing (NC III)	640 hours	Domestic Refrigeration and Air-conditioning (DOMRAC) Servicing (NC II)
23.	Shielded Metal Arc Welding (NC I)	320 hours	
24.	Shielded Metal Arc Welding (NC II)	320 hours	Shielded Metal Arc Welding (NC I)
25.	Tile Setting (NC II)	320 hours	
26.	Transmission Line Installation and Maintenance (NC II)	640 hours	Electrical Installation and Maintenance (NC II)

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INFORMATION, COMMUNICATIONS AND TECHNOLOGY (ICT)

	Specialization	Number of Hours	Pre-requisite
1.	Animation (NC II)	320 hours	
2.	Broadband Installation (Fixed Wireless Systems) (NC II)	160 hours	Computer Systems Servicing (NC II)
3.	Computer Programming (.Net Technology) (NC III) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
4.	Computer Programming (Java) (NC III) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
5.	Computer Programming (Oracle Database) (NC III) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
6.	Computer Systems Servicing (NC II) <i>updated based on TESDA Training Regulations published December 28, 2007</i>	640 hours	
7.	Contact Center Services (NC II)	320 hours	
8.	Illustration (NC II)	320 hours	
9.	Medical Transcription (NC II)	320 hours	
10.	Technical Drafting (NC II)	320 hours	
11.	Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II)	320 hours	Computer Systems Servicing (NC II)
12.	Telecom OSP Installation (Fiber Optic Cable) (NC II)	160 hours	Computer Systems Servicing (NC II)

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Course Description

This course is designed to develop knowledge, skills, and desirable attitudes of an individual in the field of machining. The student is expected to demonstrate **common competencies** in 1) applying safety practices, 2) interpreting technical drawing, 3) performing shop computations, 4) measuring workpiece, 5) selecting and cutting materials, 6) performing preventive and corrective maintenance, and 7) performing routine housekeeping. It also includes the development of **core competencies** such as 1) performing bench work operations, and 2) turning, milling, and grinding workpiece.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
Introduction 1. Basic concepts in machining 2. Relevance of the course 3. Career opportunities	The learners demonstrate an understanding of the basic concepts and underlying theories in machining	The learners shall be able to demonstrate common and core competencies in machining as prescribed by TESDA Training regulations	The learners... 1. Explain basic concepts in machining 2. Discuss the relevance of the course 3. Explore career opportunities in machining	
PERSONAL ENTREPRENEURIAL COMPETENCIES (PECs)				
1. Assessment of Personal Competencies and Skills (PECs) vis-à-vis PECs of a practicing entrepreneur/ employee 1.1 Characteristics 1.2 Attributes 1.3 Lifestyle 1.4 Skills 1.5 Traits 2. Analysis of PECs compared to those of a practitioner 3. Align one's PECs based on the results of the assessment	The learners demonstrate an understanding of one's PECs in machining	The learners shall be able to prepare an activity plan that aligns with the PECS of a practitioner/ entrepreneur in machining	LO 1. Recognize Personal Entrepreneurial Competencies and Skills (PECs) needed in machining 1.1 Compare one's PECs with those of a practitioner/ entrepreneur 1.2 Align one's PECs with those of a practitioner/ entrepreneur 1.3 Assess one's PECs 1.4 Assess practitioner's PECs	TLE_PECs7-12-00-1
1. Strengthening and developing further one's PECs	The learners demonstrate an understanding of one's PECs in machining	The learners shall be able to create a plan of action that strengthens/develops one's PECs in machining	LO 2. Develop and strengthen personal competencies and skills (PECs) needed in machining 2.1 Identify areas for improvement, development and growth 2.2 Align one's PECs according to his/her business/career choice 2.3 Create a plan of action that ensures success of his/her business/career choice	TLE_PECs7-12-00-2

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
ENVIRONMENT AND MARKET (EM)				
Market (Town) 1. Key concepts of market 2. Players in the market (competitors) 3. Products & services available in the market	The learners demonstrate an understanding of the concepts of environment and market and how they relate to the field of machining, particularly in one's town/ municipality	The learners shall be able to create a business vicinity map reflective of the potential machining market in the locality/town	LO 1. Recognize and understand the market in machining 1.1 Identify the players/ competitors within the town 1.2 Identify the different products/services available in the market	TLE_EM7-12-00-1
Market (customer) 1. Key concepts in identifying and understanding the consumer 2. Consumer analysis through: 2.1 Observation 2.2 Interviews 2.3 Focus group discussion (FGD) 2.4 Survey			LO 2. Recognize the potential customer/ market in machining 2.1 Profile potential customers 2.2 Identify the customer's needs and wants through consumer analysis 2.3 Conduct consumer/market analysis	TLE_EM7-12-00-2
1. Generating business ideas 1.1 Key concepts in generating business ideas 1.2 Knowledge, skills, passions, and interests 1.3 New applications 1.4 Irritants 1.5 Striking ideas (new concepts) 1.6 Serendipity Walk			LO 3. Create new business ideas in machining by using various techniques 3.1 Explore ways of generating business ideas from ones' own characteristics/attributes 3.2 Generate business ideas using product innovation from irritants, trends, and emerging needs 3.3 Generate business ideas using Serendipity Walk	TLE_EM7-12-00-3

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ol style="list-style-type: none"> 1. Product development 2. Key concepts in developing a product 3. Finding Value 4. Innovation <ol style="list-style-type: none"> 4.1 Unique Selling Proposition (USP) 	The learners demonstrate an understanding of concepts of environment and market and how they relate to machining, particularly in one's town/municipality	The learners shall be able to create a business vicinity map reflective of the potential machining market within the locality/town	LO 4. Develop a product/service in machining 4.1 Identify what is of "value" to the customer 4.2 Identify the customer 4.3 Explain what makes a product unique and competitive 4.4 Apply creativity and innovative techniques to develop marketable product 4.5 Employ a USP to the product/service	TLE_EM7-12-00-4
<ol style="list-style-type: none"> 1. Selecting business idea 2. Key concepts in selecting a business idea <ol style="list-style-type: none"> 2.1 Criteria Techniques			LO 5. Select a business idea based on the criteria and techniques set 5.1 Enumerate various criteria and steps in selecting a business idea 5.2 Apply the criteria/steps in selecting a viable business idea 5.3 Determine a business idea based on the criteria/techniques set	TLE_EM7-12-00-5
Branding			LO 6. Develop a brand for the product 6.1 Identify the benefits of having a good brand 6.2 Enumerate recognizable brands in the town/province 6.3 Enumerate criteria for developing a brand 6.4 Generate a clear appeal	TLE_EM7-12-00-6
COMMON COMPETENCIES				
LESSON 1: APPLYING SAFETY PRACTICES (ASP)				
<ul style="list-style-type: none"> • Hazard and Risk Identification and Control • Shop safety signs, symbols, and alarms • Occupational Health and Safety (OHS) 	The learners demonstrate an understanding of concepts and underlying principles in applying safety practices.	The learners shall be able to perform applying safety practices based on OHS standards	LO.1 Identify hazards 1.1 Identify hazards in accordance with OHS standards 1.2 Identify safety signs and symbols according to OHS standards	TLE_IAMAC9-12ASP-Ia-1

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<ul style="list-style-type: none"> Types of protective clothing and devices Proper usage of protective clothing and devices 			<p>LO 2. Use protective clothing and devices</p> <p>2.1 Select appropriate protective clothing and devices in accordance with OHS requirements</p> <p>2.2 Use protective clothing and devices according to OHS standards</p>	<p>TLE_IAMAC9-12ASP-Ib-2</p>
<ul style="list-style-type: none"> Safety procedures for handling of tools and equipments operation Safe handling practices of tools, equipment, and materials 			<p>LO 3. Perform safe handling of tools, equipment, and materials</p> <p>3.1 Follow safety procedures for pre-use check and operation of tools and equipment in accordance with workplace procedures</p> <p>3.2 Handle tools, equipment, and materials safely in accordance with OHS requirements</p>	<p>TLE_IAMAC9-12ASP-Ic-3</p>
<ul style="list-style-type: none"> Kinds of injuries and accidents First Aid treatment of injuries 			<p>LO 4. Perform First Aid treatment</p> <p>4.1 Identify accidents and injuries common in the workplace</p> <p>4.2 Carry out First Aid treatment according to recommended procedures</p>	<p>TLE_IAMAC9-12ASP-Id-e-4</p>
LESSON 2: PERFORMING ROUTINE HOUSEKEEPING (PRH)				
<ul style="list-style-type: none"> Proper housekeeping Shop policies and regulations Storing consumable materials 	<p>The learners demonstrate an understanding of concepts and underlying principles in performing routine housekeeping</p>	<p>The learners shall be able to perform routine housekeeping based on housekeeping policies</p>	<p>LO 1. Maintain upkeep and order in work area</p> <p>1.1 Maintain cleanliness in work area according to housekeeping policies</p> <p>1.2 Arrange work benches, fixtures, and other working surfaces according to housekeeping policies</p> <p>1.3 Maintain and store consumable materials according to housekeeping policies</p>	<p>TLE_IAMAC9-12PRH-If-5</p>
<ul style="list-style-type: none"> Waste management and proper disposal 5'S (sorting, systematizing, sweeping, sanitizing, self-discipline) 			<p>LO 2. Clean work area</p> <p>2.1 Remove and dispose of wastes according to environmental regulations</p> <p>2.2 Clean walkways and aisles according to housekeeping policies</p> <p>2.3 Clean work area regularly</p>	<p>TLE_IAMAC9-12PRH-Ig-6</p>

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LESSON 3: PERFORMING PREVENTIVE AND CORRECTIVE MEASURE FOR MAINTENANCE (PCMM)				
<ul style="list-style-type: none"> • Inspection of machine • Report preparation 	<p>The learners demonstrate understanding of concepts and underlying principles in performing preventive and corrective measures for maintenance</p>	<p>The learner shall be able to perform preventive and corrective measures for maintenance based on standards</p>	<p>LO 1. Perform Machine Inspection 1.1 Inspect machine according to worksite procedures 1.2 Update status report according to worksite procedures</p>	<p>TLE_IAMAC9-12PCMM-Ih-7</p>
<ul style="list-style-type: none"> • Cleaning and lubricating machine • Types of lubricants • Types of cleaning materials 			<p>LO 2. Clean and lubricate machine 2.1 Lubricate machines as per manufacturer’s recommendation and specification. 2.2 Replace or top up fluids and lubricants according to prescribed schedule</p>	<p>TLE_IAMAC9-12PCMM-Ii-8</p>
<ul style="list-style-type: none"> • Parts and function of machine tools ▪ Procedures in minor repair 			<p>LO 3. Perform minor machine repairs and adjustments 3.1 Perform minor machine repairs according to manufacturer’s manual or worksite procedures 3.2 Adjust machine moving parts based on manufacturer’s specifications</p>	<p>TLE_IAMAC9-12PCMM-Ij-9</p>
LESSON 4: PERFORMING SHOP COMPUTATION-BASIC (PSCB)				
<ul style="list-style-type: none"> • Four fundamental mathematical operations • Computations of fractions and mixed numbers • Shop operations needing mathematical computations 	<p>The learners demonstrate an understanding of concepts and underlying principles in performing shop computations</p>	<p>The learners shall be able to perform shop computation based on computation standards</p>	<p>LO 1. Perform four fundamental operations 1.1 Perform simple calculations involve in shop operation using basic mathematical rules 1.2 Perform simple calculations involving fractions and mixed numbers according to basic mathematical rules</p>	<p>TLE_IAMAC9-12PSCB-IIa-10</p>
<ul style="list-style-type: none"> • Fraction and decimal numbers • Conversion of decimals numbers into fractions (and vice versa) 			<p>LO 2. Perform basic calculations involving fractions and decimals 2.1 Perform simple calculations involving fractions and decimal numbers 2.2 Convert decimal numbers into fraction (and vice versa) using specific mathematical rules</p>	<p>TLE_IAMAC9-12PSCB-IIb-11</p>

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<ul style="list-style-type: none"> Percentage computation Conversion of decimals to percentages 			<p>LO 3. Perform basic calculation involving percentages</p> <p>3.1 Perform simple calculations to obtain percentage</p> <p>3.2 Perform conversion of decimals to percentages and vice versa</p>	<p>TLE_IAMAC9-12PSCB-IIc-12</p>
<ul style="list-style-type: none"> Ratio and proportion 			<p>LO 4. Perform basic calculation involving ratio and proportion</p> <p>4.1 Perform simple calculation involving ratio and proportion using mathematical concepts</p>	<p>TLE_IAMAC9-12PSCB-IIId-13</p>
<ul style="list-style-type: none"> Algebraic expressions Four fundamentals operations on algebraic expressions Problem solving involving some formulas used in machine shop computations Problem solving involving trigonometric functions (sine, cosine, tangent, cotangent) 			<p>LO 5. Perform calculation on algebraic expressions</p> <p>5.1 Perform simple calculations involving algebraic expressions using the four fundamental operations</p> <p>5.2 Carry out simple transposition of formula involving the four fundamental operations to isolate the variables required</p> <p>5.3 Perform simple calculations involving trigonometric functions (sine, cosine, tangent, cotangent)</p>	<p>TLE_IAMAC9-12PSCB-IIe-14</p>
LESSON 5: INTERPRETING WORKING DRAWING AND SKETCHES (IWDS)				
<ul style="list-style-type: none"> Alphabet of lines Drawing tools and supplies Drawing symbols Dimensioning techniques Tolerance, limits, fits, and surface finishes 	<p>The learners demonstrate an understanding of concepts and underlying principles in interpreting working drawing and sketches</p>	<p>The learners shall be able to perform interpreting of working drawings and sketches based on drawing specifications</p>	<p>LO 1. Interpret technical drawings</p> <p>1.1 Identify alphabet of lines according to drawing specifications</p> <p>1.2 Identify drawing tools and supplies according to job requirements</p> <p>1.3 Interpret symbols according to standards</p> <p>1.4 Identify dimensioning techniques required according to specifications</p> <p>1.5 Identify tolerance, limits, fits, and surface finishes according to specifications</p>	<p>TLE_IAMAC9-12IWDS-IIIf-g-15</p>

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<ul style="list-style-type: none"> Techniques in freehand sketching of machine parts Application of drawing projection 			<p>LO 2. Prepare freehand sketches of machine parts 2.1 Draw sketch according to requirements 2.2 Apply projection of drawings according to job requirements</p>	<p>TLE_IAMAC9-12IWDS-IIh-j-16</p>
LESSON 6: MEASURING WORKPIECES-BASIC (MWPB)				
<ul style="list-style-type: none"> Semi-precision and precision measuring tools Proper handling of measuring tools 	<p>The learners demonstrate an understanding of concepts and underlying principles in measuring workpiece</p>	<p>The learners shall be able to measure workpiece using precision tools</p>	<p>LO 1. Select and use semi-precision and precision measuring tools 1.1 Use measuring tools according to the required accuracy level 1.2 Proper handling and care of measuring tools</p>	<p>TLE_IAMAC9-12MEWB-IIIa-b-17</p>
<ul style="list-style-type: none"> Measuring procedure and techniques English and metric systems of measurement 			<p>LO 2. Measure given workpiece 2.1 Take measurement according to required measuring tools and specified levels of accuracy 2.2 Use measuring technique according to English/metric standards</p>	<p>TLE_IAMAC9-12MEWB-IIIc-d-18</p>
<ul style="list-style-type: none"> Proper handling of measuring tools Care and Safekeeping techniques 			<p>LO 3. Clean and store measuring tools 3.1 Perform care of measuring tools according to manufacturer’s specifications 3.2 Clean measuring tools are stored according to manufacturer’s specifications</p>	<p>TLE_IAMAC9-12MEWB-III-e-19</p>
LESSON 7: SELECTING AND CUTTING WORKSHOP MATERIALS (SCWM)				
<ul style="list-style-type: none"> Reading plans/drawing Planning work activities 	<p>The learners demonstrate an understanding of concepts and underlying principles in selecting and cutting workshop materials</p>	<p>The learners shall be able to perform selecting and cutting workshop materials based on specifications and standards</p>	<p>LO 1. Determine job requirements 1.1 Interpret plans and drawings according to component specification 1.2 Determine sequence of operation in accordance with job requirements</p>	<p>TLE_IAMAC9-12SCWM-III-f-g-20</p>
<ul style="list-style-type: none"> Shop safety practices Measuring and cutting different kinds of material Metal specification Cutting tools and equipment 			<p>LO 2. Select, measure, and cut materials 2.1 Select materials according to prescribed specifications and requirements 2.2 Measure materials to required level of accuracy according to specification 2.3 Cut materials according to required specifications and standard</p>	<p>TLE_IAMAC9-12SCWM-III-g-j-21</p>

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CORE COMPETENCIES				
LESSON 8: PERFORMING BENCH WORK-BASIC (PBWB)				
<ul style="list-style-type: none"> • Kinds of materials and specification • Types of laying-out tools • Safety precautionary measures in layout • Process of laying and marking out dimension 	The learners demonstrate an understanding of concepts and underlying principles in performing bench work	The learners shall be able to perform bench work operations based on standards	LO 1. Lay out and mark dimensions and features on workpieces 1.1 Select materials according to the specification. 1.2 Lay out dimensions/features in accordance with drawing specification 1.3 Lay out and mark dimensions and features applying safety practices according to OHS standards	TLE_IAMAC9-12PBWB-IVa-c-22
<ul style="list-style-type: none"> • Work holding devices • Metal cutting procedures using <ul style="list-style-type: none"> - hacksaw - cold chisel - files 			LO 2. Cut, chip, and file flat, rectangular, or round blocks 2.1 Clamp workpiece in work-holding devices according to safe working practices 2.2 Cut, chip, and file workpiece within tolerance specified in the working drawing 2.3 Use hacksaw according to specified procedures 2.4 Use cold chisel according to safe chipping practices 2.5 Use file according to job requirements	TLE_IAMAC9-12PBWB-IVd-g-23
<ul style="list-style-type: none"> • Drill press machine, parts, and functions • Center drilling and drilling • Proper drilling and reaming procedures • Using drill bits, center drills, counter sinks, and reamers 			LO 3. Drill and Ream Holes 3.1 Perform center drilling, drilling, counter sinking, and reaming holes according to proper procedures	TLE_IAMAC9-12PBWB-IVh-j-24
LESSON 9: TURNING WORKPIECE-BASIC (TWPB)				
<ul style="list-style-type: none"> • Factors in determining job requirements • Drawing interpretation • Standard drawing scales, symbols, and abbreviations • Orthographic and isometric drawings • Assembly and detail drawings • Interpreting tolerances, limits, fits, and surface finishes 	The learners demonstrate an understanding of concepts and underlying principles in turning workpieces	The learners shall be able to turn workpieces based on job requirements	LO 1. Determine job requirements 1.1 Identify factors in determining job requirements based on job specifications 1.2 Interpret drawings according to job specifications 1.3 Determine sequence of operation according to work plan 1.4 Select cutting tools according to job requirements	TLE_IAMAC9-12TWPB-Ia-j-25

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<ul style="list-style-type: none"> Sequence of operations of work plan Types of cutting tools and function 				
<ul style="list-style-type: none"> Lathe machine nomenclature Work holding device and accessories Methods of mounting and centering workpiece on lathe Selection of cutting tools Centering tools OHS regulations 			LO 2. Set up workpiece 2.1 Mount workpiece in accordance with job requirements 2.2 Use cutting tool according to job requirements 2.3 Perform setup operation according to OHS regulations	TLE_IAMAC9-12TWPB-IIa-j-26
<ul style="list-style-type: none"> Lathe machine operations procedures Setting cutting speed, revolutions per minute (RPM) and feed rate <ul style="list-style-type: none"> according to size of workpiece according to classification of materials Lathe accessories, fixtures, and attachment Tooling setup in turning operation Safety practices in turning operations 			LO 3. Perform turning operations 3.1 Calculate speed and feed according to job specifications 3.2 Use lathe accessories according to job requirements 3.3 Perform lathe operation according to job requirements 3.4 Perform lathe operation according to safety precautions	TLE_IAMAC9-12TWPB-IIIa-j-IVa-j-Ia-j-27
<ul style="list-style-type: none"> Classification and mechanical properties of engineering materials Types of measuring tools 			LO 4. Check and measure workpiece 4.1 Check and measure workpiece according to job requirement 4.2 Use measuring tools and equipment according to job specifications	TLE_IAMAC9-12TWPB-IIa-j-28
LESSON 10: MILLING WORKPIECE-BASIC (MWPB)				
<ul style="list-style-type: none"> Factors in determining job requirements for milling operations Interpreting tolerances, 	The learners demonstrate an understanding of concepts and underlying principles in milling	The learners shall be able to mill workpieces based on job requirements	LO 1. Determine job requirements 1.1 Identify factors in determining job requirement based on job specifications 1.2 Interpret drawing to produce component according to	TLE_IAMAC9-12MIWB-IIIa-

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<ul style="list-style-type: none"> limits, fits, and surface finishes • Blueprint reading • Milling cutters 	workpieces		specifications 1.3 Determine sequence of operation according to job requirements 1.4 Select cutting tool according to job requirements	c-29
<ul style="list-style-type: none"> • Setting up procedures of work piece • Nomenclature of milling machine 			LO 2. Set up workpiece 2.1 Set up workpiece according to job requirement 2.2 Perform set up operation according to OHS regulations	TLE_IAMAC9-12MIWB-IIIc-e-30
<ul style="list-style-type: none"> • Milling machine operation procedure • Setting cutting speed, revolutions per minute (RPM) and feed rate • Milling accessories, fixture, and attachment • Tooling setup in milling operations • Safety practices in milling operations 			LO 3. Perform milling operations 3.1 Calculate speed and feed according to job requirements 3.2 Use milling accessories according to job requirements 3.3 Perform milling operation according to job requirements 3.4 Perform milling operation according to safety practices	TLE_IAMAC9-12MIWB-III f-j-IVa-j-Ia-e-31
<ul style="list-style-type: none"> • Types of measuring tools • Classification of working materials 			LO 4. Check and measure workpiece 4.1 Check workpiece according to job requirements 4.2 Measure workpiece using appropriate tools	TLE_IAMAC9-12MIWB-If-j-32
LESSON 11: GRINDING WORKPIECE-BASIC (GWPB)				
<ul style="list-style-type: none"> • Factors in determining job requirements for grinding • Blueprint reading • Grinding operations • Specify: <ul style="list-style-type: none"> - tolerances - limits - fits - surface finishes 	The learners demonstrate an understanding of concepts and underlying principles in grinding work pieces	The learners shall be able to perform grinding workpieces based on job requirements	LO 1. Determine job requirements 1.1 Identify factors in determining job requirement based on job specifications 1.2 Interpret drawing according to job specifications 1.3 Determine sequence of operation according to work plan	TLE_IAMAC9-12GWPB-IIa-c-33

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<ul style="list-style-type: none"> • Types of grinding wheel and functions • Types of lubricants and coolants • Types of work-holding devices for surface grinder • Grinding machine accessories • Components and properties of grinding materials 			<p>LO 2. Select wheels and accessories</p> <p>2.1 Select grinding wheel according to job specifications.</p> <p>2.2 Select accessories and holding device according to job requirements.</p> <p>2.3 Check machine guards, coolant, and dust extraction device according to job requirements.</p>	<p>TLE_IAMAC9-12GWPB-IIIc-e-34</p>
<ul style="list-style-type: none"> • Grinding machine setup and adjustments • Surface grinder cutting procedure • Safe working practices 			<p>LO 3. Perform grinding operations</p> <p>3.1 Set up and adjust grinding machine in accordance with manufacturer’s manual</p> <p>3.2 Perform surface grinding operations according to safe working practices</p> <p>3.3 Ensure that grinding operations are performed according to job specification</p>	<p>TLE_IAMAC9-12GWPB-IIIIf-j-35</p>
<ul style="list-style-type: none"> • Types of measuring tools • Classification of materials 			<p>LO 4. Check and measure component</p> <p>4.1 Measure workpiece in accordance with job requirements</p> <p>Use measuring tool in accordance with job specifications</p>	<p>TLE_IAMAC9-12GWPB-IVa-j-36</p>

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RESOURCES			ASSESSMENT METHODS
TOOLS AND EQUIPMENT	SUPPLIES AND MATERIALS	LEARNING MATERIALS	
<ul style="list-style-type: none"> • Hand hacksaw • Power hacksaw • Metal band saw • Lathe machine • Lathe accessories <ul style="list-style-type: none"> - 3-jaw chuck - 4-jaw chuck - Collect chuck - Face plate - Drill chuck - Lathe center - Steady rest - Follower rest - Tool holder • Cutting tools <ul style="list-style-type: none"> - Boring tool - Knurling tool - Right hand tool - Left hand tool - Reading tool - Grooving tool • Drill press <ul style="list-style-type: none"> - Drill chuck - Center drill - Counter sink - Drill bits • Electric hand drill • Milling machineMilling cutters <ul style="list-style-type: none"> - Slab mills - End mills - Shell mills - Side and face cutters - Slitter - T-slot cutter - Concave cutters - Convex cutters - Gear cutters 	<ul style="list-style-type: none"> • Paper • Pencil • Triangles • Protractor • Compass • Steel brush • Paint brush • Light oil • Oil can • Dust pan • Clean rags • Calculator • Paint brush • Grinding coolant • Brass shim • Apron • Gloves • Safety goggles • Face mask • Safety shoes • Tool blank • Carbide inserts • Layout dye • Mild steel plate • CRS shafting 	<ul style="list-style-type: none"> • References (books) • Manuals • Mathematics books • Chart (Formulas of speed and feed) • Table for speed and feed • Maintenance chart • Working drawing (blue prints) • Audiovisual materials 	<ul style="list-style-type: none"> • Interview • Direct observation • Written test • Demonstration • Practical exercises

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RESOURCES			ASSESSMENT METHODS
TOOLS AND EQUIPMENT	SUPPLIES AND MATERIALS	LEARNING MATERIALS	
<ul style="list-style-type: none"> - Collet chuck - Shaper machine - Surface grinder - Grinding wheels - Grinding disc - Bench grinder - Angle disc grinder - Measuring tools - Dial indicator - Universal bevel protractor - Bevel protractor - Steel rule - Micrometer - Protractor - Vernier caliper - Steel rule - Height gauge • Holding devices <ul style="list-style-type: none"> - C-clamps- F-clamps - Grip Pliers - Machine vise - Bench vise - Angle plates - T-bolt and nut - Jack screw - Step block - V-block with clamp - Parallel bars • Layout tools <ul style="list-style-type: none"> - Hermaphrodite - Prick punch - Scriber - Divider - Combination square - Try square - Surface plate 			

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RESOURCES			ASSESSMENT METHODS
TOOLS AND EQUIPMENT	SUPPLIES AND MATERIALS	LEARNING MATERIALS	
<ul style="list-style-type: none"> • Hammer • Formed tools • T-wrench • Tool holder • Surface finish comparator • Grease gun • Drawing table • Tool bit gauge 			

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GLOSSARY

- | | |
|----------------|--|
| Bench work | - Operations involving the process of laying out, fitting, or assembling, and when the work is placed on the bench or in a bench vise |
| Boring | - Enlarging a hole by means of an adjustable cutting tool with only one cutting edge |
| Chipping | - Removing/cutting metal using hammer and chisel |
| Counter boring | - Enlarging the end of a hole cylindrically |
| Drilling | - Producing a circular hole by removing solid metal |
| Facing | - The lathe operation of finishing the ends of the work, to make the piece the right length; also known as squaring |
| Grinding | - The removal of material from a workpiece with a grinding wheel |
| Laying out | - Term used to include the marking or scribing of center points, circles, arcs, or straight lines upon metal surfaces, either curved or flat, for the guidance of the worker |
| Milling | - Removing metal by feeding a workpiece through the periphery of rotating circular cutter |
| Reaming | - An operation of sizing and finishing a hole by means of a cutting tool having several cutting edges; reaming serves to make the hole smoother, straighter, and more accurate |
| Spot-facing | - Smoothing and squaring the surface around a hole |
| Tapping | - Forming internal threads by means of a tool called tap |
| Turning | - Shaping a workpiece by gripping it in a work holding device and rotating it under power against a suitable cutting tool |

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CODE BOOK LEGEND
Sample: **TLE_IAMAC9-12ASP-Ia-1**

LEGEND		SAMPLE		DOMAIN / COMPONENT	CODE
First Entry	Learning Area and Strand Subject or Specialization	Technology and Livelihood Education	TLE	Common Competencies	
		Industrial Arts	IA	Applying Safety Practices	ASP
		Machining NC I	MAC	Performing Routine Housekeeping	PRH
	Grade Level	9 to 12	9-12	Performing Preventive and Corrective Measure For Maintenance	PCMM
Uppercase Letter/s	Domain/Content/ Component/ Topic	Applying Safety Practices	ASP	Performing Shop Computation-Basic	PSCB
				Interpreting Working Drawing and Sketches	IWDS
				Measuring Workpieces-Basic	MEWB
				Selecting and Cutting Workshop Materials	SCWM
Roman Numeral *Zero if no specific Quarter	Quarter	First Quarter	I	Core Competencies	
Lower case letter/s *put a an en dash (-) between letters to indicate more than a specific week	Week	Week one to three	a-c	Performing Bench Work-Basic	PBWB
				Turning Workpiece-Basic	TWPB
				Milling Workpiece-Basic	MIWB
				Grinding Workpiece-Basic	GWPB
Arabic Number	Learning Competency	Identify hazards	1		

Technology-Livelihood Education and Technical-Vocational Track specializations may be taken between Grades 9 to 12.

Schools may offer specializations from the four strands as long as the minimum number of hours for each specialization is met.

Please refer to the sample Curriculum Map on the next page for the number of semesters per Industrial Arts specialization and those that have pre-requisites. Curriculum Maps may be modified according to specializations offered by a school.

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SAMPLE INDUSTRIAL ARTS CURRICULUM MAP** (as of May 2016)

GRADE 7/8 (EXPLORATORY)		GRADES 9-12				
EXPLORATORY				Automotive Servicing (NC I)* <small>updated based on TESDA Training Regulations published December</small>	8 sems	
				*Automotive Servicing (NC II)	8 sems	
			Motorcycle/Small Engine Servicing (NC II)	4 sems	Driving (NC II)	2 sems
				Electronic Products Assembly and Servicing (NC II)* <small>updated based on TESDA Training Regulations published December 28, 2013</small>	8 sems	
					*Mechatronics Servicing (NC II)	4 sems
					*Instrumentation Control and Servicing (NC II)	4 sems
				Electrical Installation and Maintenance (NC II)	8 sems	
					*Electrical Power Line Distribution Line Construction (NC II)	4 sems
				*Transmission Line Installation and Maintenance (NC II)	8 sems	
				Machining (NC I)	8 sems	
				*Machining (NC II)	8 sems	
			Plumbing (NC I)	4 sems	*Plumbing (NC II)	4 sems
				Domestic Refrigeration and Air-conditioning Servicing (NC II)	8 sems	
				*Refrigeration and Air-conditioning Servicing (PACU/CRE) (NC III)	8 sems	
			Shielded Metal Arc Welding (NC I)	4 sems	*Shielded Metal Arc Welding (NC II)	4 sems
					*Gas Metal Arc Welding (GMAW) (NC II)	4 sems
					*Gas Tungsten Arc Welding (GTAW) (NC II)	4 sems
				Carpentry (NC II)	8 sems	
			*Carpentry (NC III)	4 sems	Construction Painting (NC II)	2 sems
				Furniture Making (Finishing) (NC II)	8 sems	
	4 sems	Masonry (NC II)	4 sems	Tile Setting (NC II)	4 sems	

* Please note that these subjects have pre-requisites mentioned in the CG.

+ CG updated based on new Training Regulations of TESDA.

Other specializations with no prerequisites may be taken up during these semesters.

Pre-requisites of the subjects to the right should be taken up during these semesters.

****This is just a sample. Schools make their own curriculum maps considering the specializations to be offered. Subjects may be taken up at any point during Grades 9-12.**

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Reference:

Technical Education and Skills Development Authority-Qualification Standards Office. *Training Regulations for Machining NC I*. Taguig City, Philippines: TESDA, 2006.