TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY

LABOR MARKET INTELLIGENCE REPORT

Metals and Engineering Sector

Supply and Demand in Computer Numerical Control (CNC) Machine Operation and Other Related TVET Qualifications

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I. THE INDUSTRY

Metals Industry

Metals industry in the Republic Act 4724 otherwise known as the Metals Industry Act of the Philippines refers to the manufacture from ore materials of products of all precious, base and rare metals and their alloys, including all processes from smelting in direct or indirect reduction furnaces to the final finished product state, either separately or part of an integrated process, namely: the production of bullion, pig ingots, billets, pellets, blooms, skelps, slabs or bars, and rolling and/or processing into basic forms such as sheets, plates, strips, tubes, conduits, pipes, rails, rods, tin-plates and the like, and the rough castings, forgings, and extrusions, and the final processing, manufacture, fabrication, and/or assembly into finished metal products such as power generating machinery, agricultural machinery and implements, office machinery, metal working machinery, mining, construction, and all other industrial machinery, and machine parts and accessories; electric machinery, apparatus and appliances such as generators, transformers, motors and the like, and their metal parts and accessories; transport equipment such as railway locomotives and cars, passenger road motor vehicles, motorcycles, trucks, bicycles and other cycles, aircraft, ships and boats and their metal parts and accessories; and various metal manufactures such as railway construction accessories, wires, tubes and fittings, firearms, wires netting and the like, nails, bolts, and similar articles, needles and pins, safes, hand tools and implements, tools, dies and molds, household utensils, forks and spoons and cutlery, hardwares and metals, metal containers for transport and storage, and other miscellaneous manufactured articles of base, precious and rare metals and their alloys.

Economic Contribution

Table 1 below provides data on the economic contribution of the metals and engineering sector to the Philippine economy based on the 2010 Philippine Statistical Yearbook. The average gross value added (GVA) in the sector from 2004 to 2009 was estimated at 50 million pesos.

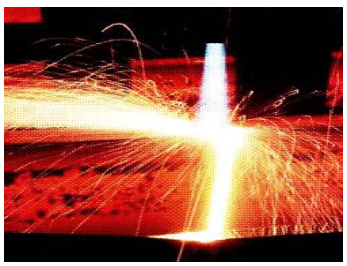


Table 1. Gross Value Added in Metals and Engineering Sector: 1995 – 2009
(In Million Pesos at Current Prices)

Industry	2004	2005	2006	2007	2008	2009
Basic Metals Industries	31,740	32,299	41,245	46,403	55,453	43,819
Metals Industries	19,864	21,682	24,430	26,176	29,410	25,751
GVA	**51,604**	**53,981**	**65,675**	**72,579**	**84,863**	**69,570**

Note: Data are as of May 2010
Source: National Statistical Coordination Board

Investments

From 1995 to 2010, investments in enterprises located inside PEZA-registered economic zones came mostly from the electronics/semiconductor industry. A total share of 42.88% of total investments were made by locators in the ecozones into electronic/semiconductor sector. This is followed by the **basic metal/mineral industry (9.29%)**; the information technology services sector (7.69%); the transport (shipbuilding, car part, equipment) sector (6.78%) and; the electrical machinery and apparatus (5.46%). These comprise the Top 5 sectors which garnered the most number of investments for over past 15 years of PEZA's existence. *(Philippine Development Plan 2011-2016)*

II. DEMAND FOR CNC MACHINISTS

Employment Prospects (2010 and Beyond)

The global labor market will continue to offer employment opportunities for Filipino workers, particularly skilled workers and professionals in various industries in the next 5-10 years. The key employment generators (KEGs) for OFWs are the following sectors/industries: healthcare, building and construction, petroleum / oil and gas / energy, tourism/hotel and restaurant and gaming industry, IT/ Cyber services, manufacturing, electronics, **metals**, transport, household services, education, seafaring, communications, and water and environment. *(Philippine Development Plan 2011-2016)*

In-demand Skills

The Project Jobsfit: DOLE 2020 Vision was a DOLE-wide project that touched base with key stakeholders through a series of consultations in generating valuable indicators that could facilitate the flow of information and requirements of both the supply and demand sides of the labor market.

The machine operators and machinists were among the occupations that were included in the list of hard-to-fill and in-demand occupations identified during the series of consultations and focus group discussions (FGDs) in the DOLE Project Jobsfit. This was cross validated using the 2008 BLES Occupational Shortages and Surpluses Survey.

Table 2. In-demand and Hard-to-fill Occupations in Production and Related Workers

In-Demand	Hard-to Fill	Equivalent TVET Qualifications
Machine Operators	Machinist	- Machining NC I, NC II, NC III - Press Machine Operations NC I - Tool and Die Making NC II - CAD CAM Operations NC III - CNC Lathe Machining Operations NC II, NC III - CNC Milling Machine Operations NC II, NC III

Source: Project JobsFit Regional Consultation

Among the skills in-demand in the production and related workers from 2010-2020 are as follows:

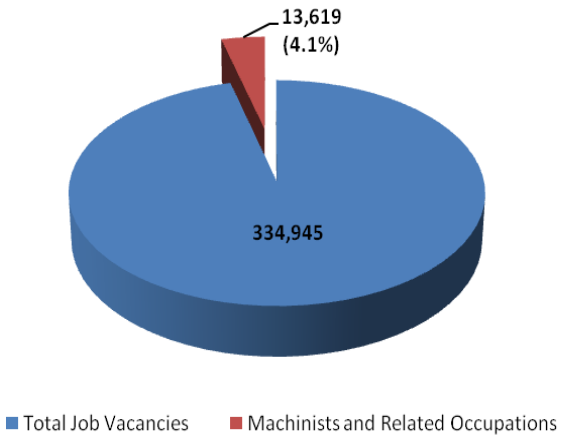
Table 3. Skills In-demand in Production and Related Workers: 2010-2020

Major Occupational Category	Industry / Sector / Skill
Production and related workers	• Construction workers, **aluminum installers**, carpenters, concrete finishers, draftsmen, drillers, electric/ **mechanical assistants**, electricians, erectors, **fabricators**, foremen, heavy equipment operators, helpers/ watchmen, mason, pipefitters, plaster painters, plasterers, plumbers, riggers, safety officers, **welders**, **mechanics** • Oil and Gas: oil and gas workers: instrumentation workers, engineers, **welders**, pipe fitters, and telecommunication technicians • Production/ Manufacturing: electronic workers, **metal workers**, quality control inspectors

Source: POEA / Project JobsFit: DOLE 2020 Vision

Data from POEA show that from January 1 to May 31, 2012, a total of 334,945 job orders were posted across countries with OFW deployment. Of the total, 13,619 job orders representing 4.1% are machinists and related occupations (see Figure 1).

Figure 1. Job Vacancies/Orders: January 1 to May 31, 2012



Occupations that post high demand are: Machine Fitters, Machine Assemblers and Precision Installation Makers (4,984), Structural and Metal Preparers and Erectors (3,804), Machine Tool Operators (937). It will be noted that only 3,545 (5.3%) had been processed, leaving a total of 10,074 (4.3%) unfilled. (Table 4)

Table 4. Skills In-Demand (Job Orders) on Machinists and Related Occupations: January 1 to May 31, 2012

Occupations	Demand (Job Orders)		Filled-up (Processed)	Not Yet Filled-up
	No.	% Distri-bution		
Total	**13,619**	**100.0**	**3,545**	**10,074**
Blacksmiths, Hammersmiths & Forging Press Operators	402	3.0	159	243
Blacksmiths, Toolmakers & Machine Tool Operators (N E C)	600	4.4	156	444
Machine Fitters, Assemblers & Precision Instn. Makers	4,984	36.6	1,209	3,775
Machine Operators Woodworking	21	0.2	1	20
Machinery Fitters & Machine Assemblers	933	6.9	179	754
Machinery Operators Power-Generating	197	1.4	33	164
Machine Tool Operators	937	6.9	323	614
Metal Casters	47	0.3	11	36
Metal Grinders, Polishers & Tool Sharpeners	6	0.0	5	1
Metal Rolling-Mill Workers	5	0.0	-	5
Metal Moulders & Coremakers	9	0.1	10	9
Metal Processors	1	0.0	1	-
Sheet Metal Workers	794	5.8	192	602
Structural and Metal Preparers and Erectors	3,804	27.9	1,138	2,666
Metal Toolmakers, Pattern Makers and Metal Markers	869	6.4	128	741
Metal Processors Not Elsewhere Classified	168	1.2	48	120

Source: POEA, Job Order January to May 31, 2012

Note: Processed by PRED-PO

The criticality of the need for machine operators and other related TVET qualifications were identified by the DOLE's Technical Working Group on Mission Critical Skills (MCS) on Computer Numerical Control (CNC).

For those unfamiliar with CNC, a CNC machine tool is the combination of a machine tool that carries out a particular processing method, e. g. turning, milling, eroding, grinding, tool sharpening, punching, cutting (by laser, plasma, water) etc., and of an electronic control, the so-called computerized numeric control (or "CNC"). Such computerized numerical controls were introduced at the end of the 1970s as part of the continuous development of NC (numeric control) technology, which had been established 15 years previously (mainly in the US aviation industry). The world's leading CNC system manufacturers are Bosch (Germany), Fanuc (Japan), Fanuc GE (USA), Fagor (Spain), Heidenhain (Germany), Mitsubishi (Japan), Num (France/Sweden), Okuma (Japan), and Siemens (Germany).

During the series of consultation meetings with MOOG Controls Corporation, a total of 136 in-demand skilled workers were reported in 2012 (Table 5). The MOOG Controls Corporation is located in Baguio City Economic Zone.

Table 5. Critical Skills Demand of Moog Controls Corporation by Occupation Title and Qualification: 2012

Occupation Title	Qualification	No.
1. Machine Operator/Machinist	Machining NC I, NC II NC III	75
1.1 Computer Numeric Control (CNC)	CNC Lathe Machine Operation NC II, NC III; CNC Milling Machine Operation NC II, NC III	
1.2 Grinds	Machining NC I, NC II, NC III	
1.3 Electrical Discharge Machining (Sr. level)		
2. Manufacturing Engineer		12
3. CNC Programmer	CNC Lathe Machine Operation NC II, NC III; CNC Milling Machine Operation NC II, NC III	4
4. Maintenance Technician/Engineer	Plant Maintenance NC I	10
5. Assembly Technician (Sr. level)	Instrumentation & Control Servicing NC II	20
5.1 Servo Valve		
5.2 Servo Acuator		
6. Test Technician (Sr. Level)	Instrumentation & Control Servicing NC II	10
6.1 Servo Valve		
6.2 Servo Acuator		
7. Product Engineer		5
Total		**136**

Source: MOOG Controls Corporation

In addition, the MOOG Controls Corporation indicates the following qualifications as Mission Critical Skills (MCS):

- CNC Machine Operator/Machinist
- Grinds Machine Operator Machinist (Conventional)
- EDM Machine Operator/Machinist
- CNC Machine Programmer
- Manufacturing Engineer
- Machine Maintenance Technician/Engineer
- Servo Valve Assembly Technician
- Servo Actuator Assembly Technician
- Servo Valve Test Technician
- Servo Actuator Test Technician
- Servo Controls Product Engineer

High demands are put on machinists who have training and theoretical knowledge on CNC. A machinist is a person who uses machine tools to make or modify parts, primarily metal parts, a process known as machining. This is accomplished by using machine tools to cut away excess material much as a woodcarver cuts away excess wood to produce his work. In addition to metal, the parts may be made of many other kinds of materials, such as plastic or wood products. The goal of these cutting operations is to produce a part that conforms to a set of specifications, or tolerances, usually in the form of engineering drawings commonly known as blueprints.

Table 6 is the competency map developed by industry. This illustrates the specific skills or competencies needed for occupations such as lathe and milling machinists (CNC Machine Lathe Operation NC II), industrial mechanics, toolmakers, mechatronics, and skilled precision mechanics.

Table 6

Competency Map

Metals and Engineering Sector

CORE COMPETENCIES	Turn workpiece (Basic)	Turn workpiece (Intermediate)	Turn workpiece (Advanced)	Grind workpiece (Basic)	Grind workpiece (Complex)	Apply CAD/CAM program
	Mill workpiece (Basic)	Mill workpiece (Intermediate)	Mill workpiece (Advanced)	Perform bench work (Basic)	Perform bench work (Complex)	Create drawing using CAD software
	Write basic CNC lathe machine program	Set-up CNC lathe machine, work- piece and cutting tools	Perform basic CNC lathe machine operations	Write advanced CNC Lathe Machine program	Set-up multiple-axis CNC lathe machine, workpiece and cutting tools	Perform advanced CNC Lathe Machine operations
	Write basic CNC milling machine program	Set-up CNC milling machine, work- piece and cutting tools	Perform basic CNC milling machine operations	Write advanced CNC Milling machine program	Set-up multiple-axis CNC milling machine, work-piece and cutting tools	Perform advanced CNC Milling Machine operation
COMMON COMPETENCIES	Select and cut workshop materials	Measure workpiece (Basic)	Perform preventive and corrective maintenance	Perform routine housekeeping	Measure workpiece using gages and comparators	Prepare cost estimates
	Interpret working drawings and sketches	Perform shop computations (Basic)	Perform shop computations (Intermediate)	Measure workpiece using angular measuring instruments	Apply safety practices	Perform shop computations (Advanced)
BASIC COMPETENCIES	Receive and respond to workplace communication	Participate in workplace communication	Lead in workplace communication	Solve problems related to workplace activities	Utilize specialist communication skills	Collect, analyze and organize information
	Work with others	Work in team environment	Lead small teams	Use mathematical concepts and techniques	Develop team and individual	Plan and organize work
	Demonstrate work values	Practice career professionalism	Develop and practice negotiation skills	Use relevant technologies	Apply problem-solving techniques in the workplace	Promote environmental protection
	Practice housekeeping procedures	Practice occupational health and safety procedures				

CNC Lathe Machine Operation NC II

III. SUPPLY

TVET Initiatives for Computer Numerical Control (CNC) and Related Qualifications

Centers of Excellence in Modern Manufacturing Technology (CEMMT) Project

In the past, TESDA had been recipient of various foreign assisted projects that provided assistance to TESD private institutions and industry partners. One of which was the Center of Excellence in Modern Manufacturing Technology (CEMMT) Project funded by the Government of Austria through a soft loan on the amount of US$21M to address the demand for skilled workers able to operate Computer Numerically Controlled (CNC) machines, which are widely used in many countries. The TESDA regional training centers become the Centers of Excellence in Modern Manufacturing Technologies. Seven (7) training centers in NCR, CAR, IV-A, VI, VII, X, and XI benefited from the project. The project commenced in 2002 and was completed in 2006. The seven training centers identified as the Centers of Excellence (Centexes), were as follows: TESDA Training Center Taguig Campus Enterprise (TTCTCE), RTC-Baguio City, RTC– Batangas, New Lucena Polytechnic College, RTC–Talisay, RTC-Cebu, and RTC-Korea Philippines Vocational Training Center, Davao City. They were able to produce a total of 1,987 graduates. The output per training center by qualification is reflected in Table 7.

Table 7. Training Outputs of CEMMT Project by Region: 2006 - 2012

Reg.	Training Center/Course	2006	2007	2007-2011	2008	2009	2010	2011	2012	Grand Total
	Grand Total	**89**	**303**	**543**	**243**	**290**	**65**	**368**	**86**	**1,987**
NCR	**TESDA Training Center Taguig Campus Enterprise (TTCTCE)**							81		81
	CNC Milling Machine Operation							42		42
	CNC Lathe Machine							32		32
	Benchworking							7		7
CAR	**RTC- Baguio City**			543						543
	Core Manufacturing Competency Development Course (CMCDC)			275						275
	General Machinist			268						268
IV-A	RTC – Batangas	39	228		144	239	49	42	28	769

Reg.	Training Center/Course	2006	2007	2007-2011	2008	2009	2010	2011	2012	Grand Total
IV-A	Trainers Training on Basic CNC Lathe Programming and Operation	24	31		34	21	4			114
	Trainers Training on Basic CNC Milling Programming and Operation	8	12		11	23	4			58
	Trainers Training on CAD CAM Programming & Operation with Production Machine	7	6		23					36
	Seminar/Orienta-tion on CNC Lathe/Mill Operation		179		76	139	8			402
	CNC Machining					56	33	42	13	144
	CNC Milling Machine Operation								7	7
	CNC Lathe Machine Operation								8	8
VI	**New Lucena Polytechnic College**					**35**	**16**	**46**	**47**	**144**
	Basic CNC Machining Programming & Operation					35				35
	Basic CNC Lathe Machine Operation NC II						16	46	35	97
	Basic CNC Milling Machine Operation NC II								20	20
VII	**RTC - Talisay**							**158**		**158**
	Creating Drawings using CAD Software leading to CAD CAM Operation NC III							143		143
	Turn Workpiece Leading to Machining NC I							4		4
	Service Emission Control							5		5

Reg.	Training Center/Course	2006	2007	2007-2011	2008	2009	2010	2011	2012	Grand Total
VII	Skills Enhancement SMAW and GMAW							6		6
	RTC-Cebu	**50**	**75**		**96**	**16**		**12**	**11**	**260**
	Basic CNC Lathe Machine	47	28		33					108
	CNC Lathe Machine Operator	3								3
	Basic CNC Milling Machine		47		25			12	11	95
	CNC Sinumeric				5					5
	CNC Machining					16				16
	Basic CNC Milling & Lathe Training				15					15
	CNC Lathe Machine leading to Machining NC III				18					18
XI	**RTC-Korea Phils. Vocational Training Center, Davao City**				**3**			**29**		**32**
	SMAW NC II							17		17
	Mechatronics Servicing NC II							12		12
	CNC Maintenance				3					3

Source of data: TTCTCE and CEMMT Training Centers in CAR, IV-A, VI, VII and XI

Based on the 2011 Registry of Workers Assessed and Certified (RWAC), Table 8 shows that the overall certification rate in Metals and Engineering sector was registered at 84.1%. The following are TVET qualifications with 100% certification rate: CAD/CAM Operation NC III, CNC Lathe Machine Operation NC II, CNC Lathe Machine Operation NC III, CNC Lathe Milling Machine Operation NC II, CNC Milling Machine Operation NC III, Gas Welding NC II, and Shielded Metal Arc Welding (SMAW) NC IV.

Table 8. Number of Graduates Assessed and Certified in Metals and Engineering Sector: 2011

TVET Qualifications	Assessed	Certified	Certification Rate
Total	**40,405**	**33,990**	**84.1**
CAD/CAM Operation NC III	3	3	100
CNC Lathe Machine Operation NC II	27	27	100
CNC Lathe Machine Operation NC III	2	2	100
CNC Lathe Milling Machine Operation NC II	18	18	100
CNC Milling Machine Operation NC III	2	2	100

TVET Qualifications	Assessed	Certified	Certification Rate
Flux Cored Arc Welding (FCAW) NC I	109	99	91
Flux Cored Arc Welding (FCAW) NC II	77	63	82
Gas Metal Arc Welding (GMAW) NC I	185	154	83
Gas Metal Arc Welding (GMAW) NC II	1,092	988	90
Gas Metal Arc Welding (GMAW) NC III	99	83	84
Gas Tungsten Arc Welding (GTAW) NC II	975	821	84
Gas Tungsten Arc Welding (GTAW) NC IV	125	110	88
Gas Welding NC II	5	5	100
Machining NC I	672	534	79
Machining NC II	1,760	1,400	80
Machining NC III	51	41	80
Shielded Metal Arc Welding (SMAW) NC I	9,873	8,164	83
Shielded Metal Arc Welding (SMAW) NC II	23,339	19,849	85
Shielded Metal Arc Welding (SMAW) NC III	1,964	1,602	82
Shielded Metal Arc Welding (SMAW) NC IV	20	20	100
Submerged Arc Welding (SAW) NC II	7	5	71

Source: Registry of Workers Assessed and Certified / CACO

As of December 2010, a total of 876 programs in Metals and Engineering sector have been registered. Eight hundred forty-eight (848) programs or 97% are with training regulations (WTR) while programs with no training regulations (NTR) were recorded at 28 or 3%.

Aside from the seven (7) Centexes, there are sixty-one (61) TVET providers offering Machining NC I, II and III. The training duration ranges from 337 hours to one-and-half years of training (Annex A).

The training fee of CNC and related TVET qualifications varies depending on the duration and the specific skill competencies that need to be taught to the trainees/workers. Annex B provides program descriptions and the corresponding training fees from selected training providers of CNC and related TVET qualifications.

IV. PROGRAM RESPONSE/S TO SKILLS SHORTAGE

A. DOST-TESDA Proposed Training Program

The DOST, through MIRDC, proposed a program for the replenishment of job-ready CNC machinists. The proposed training program was titled “Training on CNC

Programming and Operation Project", a two-year project with an estimated funding requirement of around P65 M.

Participating partners include industry associations and academe. The target output for 2012 is 100 CNC machinists. Initial first 2 batches (20 trainees each) shall be conducted in MIRDC and CAR, RTC Baguio.

As to the partnership arrangement with TESDA, TESDA shall provide the venue and the trainers. DOST shall donate 1 CNC milling machine to RTC Baguio for this particular project and another 1 for their next project. The training program shall be conducted in other TESDA Regional Training Centers in the following regions: IV-A; VI; VII; X; XI; and CAR.

B. Recommended Actions

1. To focus on higher technology areas and meet/align with the current skills requirements of industry, TESDA shall review and update the following training regulations:
    - Machining NC I
    - Machining NC II
    - Machining NC III
    - CNC Lathe Machine Operation NC II
    - CNC Lathe Machine Operation NC III
    - CNC Milling Machine Operation NC II
    - CNC Milling Machine Operation NC III

2. Evaluation of Centers of Excellence in Modern Manufacturing Technology (CEMMT) Project funded training programs that benefited seven (7) training centers and the manufacturing sector in NCR, CAR, IV-A, VI, VII, X, and XI shall be pursued, to determine the status of products and services and analyze the impact of effectiveness of the project.

3. Capability building, especially TVET trainers to upgrade levels of their competencies.

4. Continuous engagement of the metalworking group in standards development, assessment and certification and in the design of curriculum and delivery of programs.

Annex A

List of TVET Providers Offering Machining Course by Region: 2012

Region	Name of TVET Providers	Course	No. of Hrs.
NCR	Dual Tech Training Center Foundation, Inc.	Machining NC II	438
	MFI Foundation, Inc.	Machining NC I	374
		Machining NC II	337
		Machining NC III	342
	Don Bosco Technical College	Machining NC II	337
	Don Bosco Youth Center -Tondo, Inc.	Machining NC II	2,906
	Don Bosco Technical Institute of Makati, Inc.	Machining NC II	337
	Marikina Polytechnic College	Machine Shop Technician Course	NA
	National TVET Trainors Academy	Machining NC II	NA
	New Era University	Machining NC II	337
		Machining NC I	374
CAR	RTC Baguio	Machining NC II	337
		Machining NC III	342
I	Datuin Machine Works and Heavy Equiment Training Center, Inc.	Machining NC II	337
	Pangasinan School of Arts & Trades	Machining NC II	1,440
	Philgerma Manufacturing, Inc.	Machining NC II	337
	Luzon College of Science and Technology (Urdaneta) Inc.	Machining NC II	1,460
	RTC La Union	Machining NC I	372
II	RTC - Tuguegarao	Machining NC I	374
		Machining NC II	337
	Isabela School of Arts & Trades	Machining NC II	307
III	RTC-Mariveles	Machining NC II	464
	RTC - Guiguinto	Machining NC II	360
		Machining NC I	360
IV-A	Jacobo Gonzales Memorial School of Arts & Trades	Machining NC I (e-TESDA)	374
		Machining NC II	1,132
	University of Perpetual Help System Laguna	Machining NC II	464
	Don Bosco College- Canlubang	Machining NC II	1,134
	Dual Tech Training Foundation, Inc.	Machining NC I	375
	Emilio Aguinaldo Educational Corporation	Machining NC I	372
	Phil-Nippon Training Center - Calamba City	Machining NC I	374
	Rogationist College - Silang Cavite	Machining NC II	1,265
		Machining (BOL)	NA
	Sisters of Mary Technical, Inc.	Machining NC I	NA
		Machining NC II	NA

Region	Name of TVET Providers	Course	No. of Hrs.
IV-A	University of Rizal System - Morong	Machining NC II	NA
	RTC - Batangas	Machining NC II	1,064
		Machining NC I	374
	Lyceum of the Philippines University - Batangas, Inc.	Machining NC I	NA
IV-B	Buyabod School of Arts and Trades	Machining NC II	337
	Puerto Princesa School of Arts & Trades	Machining NC II	337
	Western Philippine University	Machining NC II	337
V	Aquinas University of Legazpi	Machining NC II	344
	Don Bosco Training Center of Naga, Inc.	Machining NC II	1 1/2 yr.
	Mariners' Polytechnic Colleges Foundation of Canaman (Cam. Sur), Inc.	Machining NC I	450
	RTC- Pili	Machining NC II	307
	Aemilianum College, Inc.	Machining NC II	1 yr.
VI	Semirara Training Center, Inc.	Machining NC II	2,112
	Don Bosco Technical Institute of Victorias, Inc.	Machining NC I	374
		Machining NC II	337
	RTC - Talisay, Negros Occidental	Machining NC I	374
		Machining NC II	337
VII	Negros Oriental State University Main Campus	Machining NC II	337
	Provincial Integrated Skills Training Center- Negros Oriental	Machining NC I	374
	Cebu State College of Science and Technology	Machining NC I	374
		Machining NC II	464
		Machining NC III	342
	Center for Industrial Technology and Enterprise (CITE)	Machining NC I	1,800
		Machining NC I	374
		Machining NC II	3,332
		Machining NC II	337
	Don Bosco Boys Home, Inc.	Machining NC I	2,112
	Don Bosco Technology Center, Inc.	Machining NC I	1 yr
		Machining NC I	374
		Machining NC II	464
	Don Bosco (Pasil) Youth Training Center, Inc.	Machining NC I	1,760
	Sisters of Mary Technical Education Institute Cebu, Inc.	Machining NC I	374
		Machining NC II	464
	RTC - Cebu	Machining NC I	374
		Machining NC II	337
		Machining NC III	342
VIII	RTC - Abucay	Machining NC II	337
IX	RTC San Roque, Zamboanga City	Machining NC II	337

Region	Name of TVET Providers	Course	No. of Hrs.
IX	Ben Villarino Vocational School	Machining NC II	337
	Jose Rizal Memorial State College	Machining NC II	337
	Kabasalan Institute of Technology	Machining NC II	337
X	RTC - Iligan	Machining NC I	374
		Machining NC II	464
	Cagayan de Oro College	Machining NC I	648
		Machining NC II	647
		Machining NC III	451
	RTC - Tagoloan	Machining NC II	338
	Xavier University-Center for Integrated Technology (XU-CIT)	Machining NC I	374
		Machining NC II	307
	Misamis University	Machining NC II	337
XI	Don Bosco Training Center	Machining NC II	152
	Regional Training Center-Davao/Korea Philippines Vocational Training Center	Machining NC I	374
		Machining NC II	464
	University of Southeastern Philippines College of Technology	Machining NC II	360
	Cor Jesu College, Inc.	Machining NC II	1,520
XII	University of Southern Mindanao	Machining NC II	320
	Green Valley College Foundation, Inc.	Machining NC II	414
	Notre Dame University	Machining NC II	NA
CARAGA	Father Saturnino Urios Unversity	Machining NC II	337
	Surigao Education Center	Machining NC II	337
	Dela Salle John Bosco	Machining NC II	464
	Surigao State College of Technology - Main Campus	Machining NC II	337
ARMM	Regional Manpower Development Center	Machining NC II	307

Source of data: Compendium of TVET Registered Programs as of March 2012, TSDO

Annex B

List of Programs Offered by Don Bosco Technical Institute, MFI and MIRDC: CY 2012

Training Institution	Title of Program	Duration	Course Description	Schedule	Training Fee (PhP)
Don Bosco Technical Institute	*Fitter Machinist Course* **Shielded Metal Arc Welding (SMAW) NCII** **Machining NC II**	15 mos	Students are trained to fabricate machine parts and components through the efficient operation of lathe, milling, shaper machines, bench fitting and basic arc welding. They are also trained in the proper utilization of measuring tools.	June 4, 2012 (start of classes)	40,450
	Electro-Mechanical Technician Course	15 mos	Trainees develop skill in the basics of planning, installing and maintaining of electrical wiring, motor control, pneumatic and hydraulic control systems and industrial sensors. They also perform installation, basic programming and testing of control system involving programmable logic controllers.		
	Mechatronics NC II **Electrical Installation and Maintenance NC II**				
Metals Industry Research and Development Center (MIRDC)	*Metalcasting Technology* **Foundry Practices**	30 hrs	Covers conventional and investment casting process, pattern making, molding and melting.	March 19-23, 2012	8,000
	Metalworking Technology **Turning Operation**	24 hrs	Covers the principle of turning, parts & function of lathe machine, cutting tools, cutting condition and operation.	October 24-26, 2012	4,800
Molding Future Innovators (MFI) Technological Institute	**Shielded Metal Arc Welding**	32 hrs		May 5 – Dec. 21, 2012	8,500

Training Institution	Title of Program	Duration	Course Description	Schedule	Training Fee (PhP)
	Gas Metal Arc Welding	40 hrs		May 7 – Dec. 4, 2012	7,500
	Gas Welding, Cutting and Brazing	40 hrs	This module deals with the trade theory and practices of gas welding, brazing and cutting. Topics include the principles of	May 7 - Dec. 21, 2012	6,000
			operation, safety, welding defects, flame set-up, and filler wire selection. Practical exercises are designed for fusion welding, brazing and cutting operation.		
Molding Future Innovators (MFI) Technological Institute	**Milling Machine Operation**	**40 hrs**	This module deals with the safety measures in the shop, use of measuring instruments like vernier caliper & micrometer caliper and basic milling machine operations.	**May 7 – Dec. 4, 2012**	**7,500**
	Lathe Machine Operation	**40 hrs**		**May 7 – Dec. 4, 2012**	**7,500**
	CNC Milling Programming	40 hrs	This course provides the participant with the fundamentals of CNC Milling programming including the coding and encoding of programs to answer the demand of metal industry.	May 14 – June 17, 2012	4,000
	Basic CAD/CAM	40 hrs	This module is designed to develop the necessary knowledge in Basic CAD-CAM system.	May 26 – Dec. 9, 2012	5,000

Sources of data: www.mirdc.dost.gov.ph
www.donboscomakati.edu.ph
www.mfi.org.ph