



CEVEST



**SKILL-UPGRADING TRAINING
COURSE GUIDE
1996/1997**

MACHINING FIELD

**THE CENTER FOR VOCATIONAL
&
EXTENSION SERVICE TRAINING
(CEVEST)**

Jl.Guntur Raya No.1 Bekasi 17144

**Tel.: 885-2415, 884-1147
Fax.: 885-2415, 884-1146**

COURSE LIST
(MACHINING TRADE)

CODE	COURSE	HOURS	FEE
MS-01	Basic Skill on Lathe Machine (1)	40	182,000
MS-02	Basic Skill on Lathe Machine (2)	40	186,000
MS-03	Precision and Assembling	24	165,000
MS-04	Cutting Tools and Cutting Condition	24	151,000
MS-05	Basic Skill of Milling Machine (1)	40	179,000
MS-06	Basic Skill of Milling Machine (2)	40	187,000
MS-07	Assembling Work	24	154,000
MS-08	Grinding End Mill	24	194,000
MS-09	Basic Grinding Machine	40	191,000
MS-10	NC Lathe Machine (1)	40	221,000
MS-11	Cycle Program and Automatic Program	40	200,000
MS-12	NC Lathe Machine (2) - FAPT Turn and Symbolic Programming	40	210,000
MS-13	Vertical Machining Center (1)	40	246,000
MS-14	Vertical Machining Center (2)	40	258,000
MS-15	FANUC Automatic Programming Tool	40	260,000
MS-16	FANUC Automatic Program Tool/ Milling	40	269,000
MS-17	Cutting Programs 3 Dimension (FAPT die)	80	433,000

COURSE LIST
(MACHINING TRADE)

MACRO PROGRAM	CUTTING PROGRAM 3 DIMENSION (FAPT DIE III) MS-17
NC LATHE MACHINE (2) FAPT TURN AND SYMBOLIC PROGRAMMING MS-12	FANUC AUTOMATIC PROGRAM TOOL/MILLING MS-15
NC LATHE MACHINE (1) MS-10	FANUC AUTOMATIC PROGRAM TOOL/MILLING MS-16
PRECISION AND ASSEMBLING MS-03	VERTICAL MACHINING CENTER (1) MS-13
CYCLE PROGRAM AND AUTOMATIC PROGRAM MS-11	VERTICAL MACHINING CENTER (2) MS-14
CUTTING TOOLS AND CUTTING CONDITION MS-04	ASSEMBLING WORK MS-07
BASIC SKILL OF MACHINE (1) MS-01	BASIC SKILL OF MILLING MACHINE (1) MS-05
BASIC SKILL OF LATHE MACHINE (2) MS-02	BASIC SKILL OF MILLING MACHINE (2) MS-06
	GRINDING AND MILL MS-08
	BASIC GRINDING MACHINE MS-09

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	HS - 01	TIME = 40 H
TRAINING COURSE	BASIC SKILL OF MACHINE 1			
TRAINING TARGETS : Senior Technical High School (STH) major of Production. Machine as operator of Lathe Machine				
<p>TRAINING OBJECTIVE :</p> <p>The purpose of this training to give basic knowledge and skill for lathe Machine nominate of operator of latha machine, how to operate lathe machine, how to use various of cutting tools and many kind of measurement.</p> <p>The end of this course trainee will be :</p> <ul style="list-style-type: none"> - To operate late machine - To use kind of cutting tools and how to grinding it - To use kinds of measurement and maintenance - Straight cutting, taper cutting, outside inside cutting, tolerance 0.05 - 0.02 mm - Outside/inside threading, sharp threading 				
DAY'S PROGRAM	1st Day	Knowledge of lathe machine, measurement and cutting tools		
	2nd Day	Measuring, grinding of cutting tools		
	3th Day	Straight cutting and taper cutting		
	4th Day	Straight cutting and inside taper cutting		
	5th Day	Threading outside and inside sharp cutting		
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Basic knowledge of : <ul style="list-style-type: none"> - Various of lathe machine, part/handle function - Calculation of Cutting speed, RPM, Feeding and taper cutting - Theory cutting tools and measurement - To looks the drawing 2. - Measuring by shuifmat and micrometer <ul style="list-style-type: none"> - Grinding of cutting tools 3. - Straight and step cutting <ul style="list-style-type: none"> - Outside taper cutting use cross slide movement and tail stock 4. - Inside straight cutting and step inside cutting <ul style="list-style-type: none"> - Inside taper cutting use cross slide movement and tail stock 5. - Outside sharp thread cutting - metric <ul style="list-style-type: none"> - Inside sharp thread cutting - metric 			
INSTRUCTOR	E.KOSASIH	COURSE FEE	182.000	Rp.
MAIN EQUIPMENT : lathe Machine, HSS Cutting tools, Measurement and Safety				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 02	TIME = 40 H
TRAINING COURSE	BASIC SKILL OF LATHE MACHINE 2			
TRAINING TARGETS : Experience in operator of lathe Machine				
TRAINING OBJECTIVE :				
<p>This training module include knowledge and skill of use HSS cutting tools and cemented carbide cutting tools, special tolerance and complete shape with training objective :</p> <ol style="list-style-type: none"> a. Understood to determination fine step of job b. Grinding and use cutting tools according to the function of cutting c. Understood do the job with tolerance 0.02 mm according to the job sheet or drawing sheet 				
DAY'S PROGRAM	1st Day	Prepare of cutting tools, step cutting and calculation Preparation of cutting with 4-jaw chuck		
	2nd Day	Rough cutting for all places preparation diameter 0.4 and 0.1 mm long left size for finishing		
	3th Day	Finishing cutting for all faces according the tolerance need		
	4th Day	Review cutting the place who do not included tolerance		
	5th Day	Review cutting and repair		
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. a. How to grinding cutting tools, install of roughgt material and determine/calculate RPM, Cutting speed, feeding, and good cutting condition b. Install of roughgt material and install of cutting tools 2. a. Rought cutting for all places, and cutting diameter 0.4 mm left. 0.1 mm long left b. Good cutting condition 3. a. Finishing cutting for all places check the size and flatness who want to get 4. Rought cutting and finishing cutting 5. Check the size and repair the job 			
INSTRUCTOR	ARHIN	COURSE FEE	186.000	Rp.
MAIN EQUIPMENT : Lathe Machine, Cutting tools and Measurement				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 03	TIME = 24 H
TRAINING COURSE	PRECISION AND ASSEMBLING			
TRAINING TARGETS : Operator of lathe machine 1 year experience in that field				
TRAINING OBJECTIVE : This module give knowledge and skill about : Precision of lathe machine, each other assembling, straight cutting, step cutting, taper and outside / inside thread cutting				
DAY'S PROGRAM	1st Day	- To arrange step of job and do the job - Determined equipment to be use according the purpose of job - Operation of lathe machine		
	2nd Day	- Rought cutting job sheet No.1 and job sheet No.2		
	3rd Day	- Finishing cutting and assembling		
	TRAINING CONTENTS 1. Arrange how to do the job and step the job according the job sheet determine equipment to be use, cutting tools, measurement and other equipment. Operate of lathe machine, introduce of handle use, arrange RPM feeding, and automatically feeding. 2. Rought cutting job sheet No.1 and job sheet No.2 Finishing and assembling cutting between job No.1 and job No.2 with 0.02 mm tolerance.			
INSTRUCTOR	E.KOSASIH		COURSE FEE	165.000 Rp.
MAIN EQUIPMENT : Lathe machine conventional, various of cutting tools, measurement, various of measurement, balancing equipment				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	HS - 04	TIME = 24 H
TRAINING COURSE	CUTTING TOOLS AND CUTTING CONDITION			
TRAINING TARGETS :	Operator of Lathe Machine and Milling Machine ~ months experience in field			
TRAINING OBJECTIVE :	This module give knowledge and skill about : a. Cutting tools condition, cutting edge need for cutting tools and cutting condition b. Power cutting and load movement motor c. Fineness cutting			
DAY'S PROGRAM	1st Day	a. Cutting condition and material of cutting tools		
		b. Edged tools need		
	2nd Day	a. Cutting power and cutting resistance		
		b. Tools life		
	3rd Day	a. Cutting condition		
		b. Application		
TRAINING CONTENTS	<ul style="list-style-type: none"> - Material of cutting tools - Cutting condition - Edged tools - Power cutting and cutting resistance - Life cutting - Trial / application 			
INSTRUCTOR	ARMIN	COURSE FEE	151.000	Rp.
MAIN EQUIPMENT :	Various of cutting tools			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 05	TIME = 40 H
TRAINING COURSE	BASIC SKILL OF MILLING MACHINE 1			
TRAINING TARGETS :	Graduated Senior Technical High School for operator milling Machine			
TRAINING OBJECTIVE :	<p>This training module give knowledge and basic skill about milling machine, for candidate operator of operation milling machine, use various cutting tools and various of measurement.</p> <p>At the end of training, the participants are expected to have :</p> <ol style="list-style-type: none"> a. To operate milling machine, use cutting tools, and measurement well known b. Make cube, groove and step tolerance 0.05 - 0.02 mm 			
DAY'S PROGRAM	1st Day	Knowledge of milling machine, cutting tool and measurement		
	2nd Day	Measuring, adjust of cutting tools, adjust of vise to the bench milling machine		
	3rd Day	Rought cutting for cube type		
	4th Day	Rought cutting for groove and step		
	5th Day	Finishing cube shape, step and groove		
TRAINING CONTENTS	<ul style="list-style-type: none"> - Kind of milling machine and function to determined : RPM = round per minute CS = cutting speed F = Feeding (moving table every cutting tool point) Kind of cutting tools, measurement, function and how to used - Measuring tolerance 0.01 mm Adjust of face milling cutter Adjust vise in table of milling machine - Rought cutting for groove, step and the size 1 mm left for finishing - Finishing cutting cube, groove, step and tolerance 0.05 - 0.02 mm 			
INSTRUCTOR	MULYONO	COURSE FEE	179.000	Rp.
MAIN EQUIPMENT :	Vertical Milling Machine Universal Milling Machine, Face milling cutter, End Mill, Vernier callipers, Micrometer			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 06	TIME = 40 H
TRAINING COURSE	BASIC SKILL OF MILLING MACHINE 2			
TRAINING TARGETS :	Minimum 6 months experience in Milling Machine in field			
TRAINING OBJECTIVE :	<p>This training module give knowledge and skill about process to made the job use milling machine. At the end of the training the participants are expected to have :</p> <ul style="list-style-type: none"> - Determined of machine, cutting tools, measurement, and other equipment to be use - Determined step of job exactly - Machining of the job assembly tolerance 0.05 - 0.02 mm 			
DAY'S PROGRAM	1st Day	- Introduce of milling machine, preparation equipment, cutting tools, measurement and other equipment to be use		
		- Determine step of job according the purpose of the job, and shape the job the same as job sheet		
	2nd Day	Rought cutting for the job No. 1		
	3rd Day	Finishing cutting job No. 1		
	4th Day	Rought cutting for the job No. 2		
	5th Day	Finishing cutting job No. 2		
	TRAINING CONTENTS	<p>1.- Introduce of milling machine, how to operate, check the equipment prepare of equipment</p> <ul style="list-style-type: none"> - Arrange step of job No.1 according the job sheet No.1 - Rought cutting for the job No. 1 - Finishing cutting the job No.1 and tolerance 0.05 - 0.02 mm <p>2.- Arrange step of job No.2 look job sheet No.2</p> <ul style="list-style-type: none"> - Rought cutting job No.2 - Finishing cutting job No.2 and tolerance 0.05 - 0.02 mm 		
INSTRUCTOR	L. CHAHBALI	COURSE FEE	187.000	Rp.
MAIN EQUIPMENT :	Vertical milling machine/universal milling machine, milling cutter, Face milling cutter, End mill, Vernier, Calipers, Micrometer			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 07	TIME = 24 H
TRAINING COURSE	ASSEMBLING WORK			
TRAINING TARGETS :	Operator of milling machine and experience 6 months in the field			
TRAINING OBJECTIVE : This module training give knowledge and skill about : - Machining all shape of the milling, specially for assembling work				
DAY'S PROGRAM	1st Day	- To arrange step of work at step of job		
		- Determine of equipment as : Cutting tools, measurement.		
		- Operation of milling machine : RPM, Cutting speed, install of cutting tools		
	2nd Day	- Machining of cube shape through the end or finishing		
	3rd Day	- Machining of grooving and step		
		- Finishing cutting for assembling		
TRAINING CONTENTS	1. To arrange step of work and determine step of cutting as in the job sheet, determine equipment to be use, trial and learn how to operate the machine, install of milling cutter, install the vice 2. - Machining shape of cube from rought cutting to the end of cutting or finishing cutting tolerance 0.05 - 0.02 mm - Drawing at work like drawing sheet 3. - Grooving cutting and step cutting tolerance 0.03 mm, check the size - Check assembling job No. 1 and job No.2 size tolerance and fineness.			
INSTRUCTOR	RAMAYULIS	COURSE FEE	154.000	Rp.
MAIN EQUIPMENT : Vertical milling machine, Cutting tools, Measurement, and other equipment				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 08	TIME = 24 h
TRAINING COURSE	GRINDING END MILL			
TRAINING TARGETS : Operator of milling machine or maintenance cutting tools				
TRAINING OBJECTIVE : This module training give knowledge and skill about : Grind of end mill, and edge tool as : cutting edge, pointer, margin, radius				
DAY'S PROGRAM	1st Day	Knowledge of the kind of cutting tool, cutting edge for end mill		
	2nd Day	Grinding point edge end mill, 2 flute, 3 flute and 4 flute		
	3rd Day	Grinding of margin end mill and radius end mill		
	TRAINING CONTENTS 1. Knowledge of various milling cutter, end mill and use, cutting edge how to grind cutting edge, margin grind, and radius 2. Grinding of end mill 2 flute, 3 flute, 4 flute 3. Grinding of margin end mill, and radius end mill			
INSTRUCTOR	MULYONO	COURSE FEE	194.000	Rp.
MAIN EQUIPMENT : Cutting tools grinding machining, end mill, measurement				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 09	TIME = 40 H
TRAINING COURSE	BASIC GRINDING MACHINE			
TRAINING TARGETS :	Graduated Senior Technical High School (STH production) or candidate of operator grinding machine			
TRAINING OBJECTIVE :	<p>This training module give knowledge and skill and at the end of the training participant are expected to have :</p> <ul style="list-style-type: none"> - Kind of grinding machine and function - Profile, roughness, hardness, color of grind stone match to the function - Balancing of grind stone before installation - Grinding the works at cylindrical grinding machine and surface grinding machine 			
DAY'S PROGRAM	1st Day	Knowledge of grinding machine, grind stone and measuring use micrometer tolerance 0.01 mm		
	2nd Day	Measuring, balancing of grind stone, operation of cylindrical grinding machine and surface grinding machine		
	3rd Day	Grinding for surface grinding machine		
	4th Day	Grinding for cylindrical grinding machine		
	5th Day	Grinding for cylindrical grinding machine		
	TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Knowledge of : <ul style="list-style-type: none"> - Kind of grinding machine and function - Kind of grind stone and function - Kind of measurement tolerance 0.01 mm 2. Measuring the work to use measurement exactly, balancing of grind stone, operation of cylindrical grinding machine and surface grinding machine 3. Grinding for surface and step grind on surface grinding machine tolerance 0.02 - 0.01 mm 4. Grinding the work for straight and taper on cylindrical grinding machine tolerance 0.02 - 0.01 mm 5. Grinding the work for straight and taper on cylindrical grinding machine tolerance 0.02 - 0.01 mm 		
INSTRUCTOR	ARMIN	COURSE FEE	191.000	Rp.
MAIN EQUIPMENT :	Surface grinding machine, cylindrical grinding machine, kind of measurement, and balancing equipment			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 10	TIME = 40 H
TRAINING COURSE	NC LATHE MACHINE 1			
TRAINING TARGETS :	OPERATOR LATHE MACHINE 1 YEAR EXPERIENCE IN FIELD			
TRAINING OBJECTIVE :	<p>This training module give knowledge and skill are :</p> <ul style="list-style-type: none"> a. Code command coordinate movement b. Made NC program c. Procedure operation of machine d. Input and output data program e. Operation program on machine 			
DAY'S PROGRAM	1st Day	How to make program		
	2nd Day	Programing		
	3th Day	Programing		
	4th Day	Programing		
	5th Day	Programing		
TRAINING CONTENTS	<ul style="list-style-type: none"> 1. a. Use G, M, S, and T function b. Make format program c. Make a cycle program d. Make a thread program, groove and various of job 2. a. Make data program and check the program b. Operation program on Machine 			
INSTRUCTOR	MULYONO	COURSE FEE	221.000	Rp.
MAIN EQUIPMENT :	NC Lathe, cutting tools, computer			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 11	TIME = 40 H
TRAINING COURSE	CYCLE PROGRAM AND AUTOMATIC PROGRAM			
TRAINING TARGETS :	Programmer of CNC lathe machine 6 months experience in field			
TRAINING OBJECTIVE :	<p>This training module give knowledgs and skill, at the end of the training the participants are expected to have :</p> <p>To make program CNC lathe machine, Main program, Sub program, cycle program</p>			
DAY'S PROGRAM	1st Day	Make main program, data tools and data cutting		
	2nd Day	Make main program sub program and cycle program		
	3th Day	Make automatic program		
	4th Day	Transfer program from Part program to NC program		
	5th Day	Make program and operation on the machine		
TRAINING CONTENTS	<ul style="list-style-type: none"> - Make main program - Make data tools and data cutting - Make main program, sub program and cycle program - Make automatic program - Operation of CNC Lathe and make various of work shape 			
INSTRUCTOR	L. CHAMBALI	COURSE FEE	200.000	Rp.
MAIN EQUIPMENT :	CNC Lathe Machine, PG-Mark II, Cutting tools			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 12	TIME = 40 H
TRAINING COURSE	NC LATHE II (FAPT TURN AND SYMBOLIC PROGRAMMING)			
TRAINING TARGETS :	1 year experience operator of NC turning machine			
TRAINING OBJECTIVE :	<p>This training module give knowledge and skill and at the end of the training the participant are expected to have :</p> <p>a. Make program NC use automatic program b. Change part program to NC program</p>			
DAY'S PROGRAM	1st Day	Definition of geometric		
	2nd Day	Definition of movement and cutting tools		
	3th Day	Area and curve		
	4th Day	Practice make program		
	5th Day	Make program		
	6th Day	Make program use symbolic		
	7th Day	Make program use symbolic		
	8th Day	Test program in operation of machine		
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Fapt Turn <ol style="list-style-type: none"> a. Definition of geometry, definition movement and tooling b. Definition area and curve 2. a. How to programming use symbolic turn b. Cutting area and process cutting and cutting tools 3. a. Input and output data use Fapt Turn b. Process data use symbolic Fapt turn c. Operation program 			
INSTRUCTOR	MULYONO	COURSE FEE	210.000	Rp.
MAIN EQUIPMENT :	PG-Mark II, NC Turning, cutting tools			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 13	TIME = 40 H
TRAINING COURSE	VERTICAL MACHINING CENTER I			
TRAINING TARGETS : Candidate programmer of machining center				
TRAINING OBJECTIVE : Module of VMC give knowledge and skill for NC program include : a. System coordinate and code G, M, S, F and T b. System work coordinate and offset c. Main program and sub program d. Check program and procedure to operate the machine and program				
DAY'S PROGRAM	1st Day	a. Use of cutting tools and cutting condition		
		b. Coordinate system, movement code and system program		
	2nd Day	a. Use code G, M, S, F and T		
		b. Local coordinate system and work coordinate system		
		c. Offset, H, D and used		
		d. Make sub program		
	3rd Day	a. Make a program		
		b. Cycle program		
	4th Day	a. Type a program and check a program in computer		
		b. Input and output data program		
		c. Procedure operation of the machine		
		d. Preparation of cutting tools		
	5th Day	a. Preparation of machining the work		
		b. Operation of cutting the work		
		c. Check the program and to correct the program		
TRAINING CONTENTS	1. a. Cutting tools and cutting condition b. Coordinate system and movement code 2. a. Use code of G, M, S, F and T b. Coordinate work, offset and setting c. Make program, main program and sub program 3. a. Procedure to operation the program and operation the machine b. Preparation cutting tools and the machine c. Cutting, check a size and corrected			
INSTRUCTOR	ARMIN	COURSE FEE	246.000	Rp.
MAIN EQUIPMENT : Machining Center, Computer, PG-Mark II, Cutting tools				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 14	TIME = 40 H
TRAINING COURSE	VERTICAL MACHINING CENTER II			
TRAINING TARGETS : Programming				
<p>TRAINING OBJECTIVE :</p> <p>This training module give knowledge and skill and at the end of the training the participant are expected to have :</p> <p>Planning the program and process make the program</p>				
DAY'S PROGRAM	1st Day	Make data of cutting tools, offset data, cutting data make main program and sub program		
	2nd Day	Make cycle program, input output data program in computer and operation the program		
	3rd Day	Make program various of work		
	4th Day	Make program various of work		
	5th Day	Cutting process and check the size		
	TRAINING CONTENTS	<ol style="list-style-type: none"> 1. a. Make data of cutting tools, data offset, cutting data b. Make main program and sub program 2. a. Make a drilling program b. Make boring program and reamer program c. Make tap program 3. a. Make program according to the job sheet who determined 4. a. Make program according to the job selection 5. a. Operation the machine and program at process cutting b. Check the size and correct the program 		
INSTRUCTOR	ARMIN	COURSE FEE	250.000	Rp.
<p>MAIN EQUIPMENT :</p> <p>VMC, Computer, PG-Mark II and Cutting tools</p>				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 15	TIME = 40 H
TRAINING COURSE	FANUC AUTOMATIC PROGRAM TOOL			
TRAINING TARGETS : Programmer (supervisor) 6 months experience in field				
TRAINING OBJECTIVE :				
To give basic knowledge for automatic program tools milling (FAPT HILL II)				
DAY'S PROGRAM	1st Day	Differences between automatic program and usual program		
	2nd Day	Geometric definition and systematic program, scheme and soft ware		
	3rd Day	Definition of movement and to practicing		
	4th Day	Make program		
	5th Day	Practice on machine		
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. <ol style="list-style-type: none"> a. Make manual program b. Differences between manual program and automatic program c. Systematic of automatic program tools (APT) 2. <ol style="list-style-type: none"> a. Various of scheme APT and soft ware b. Geometric definition c. Movement definition 3. <ol style="list-style-type: none"> a. Practice to make program b. Practice to operate the program in machine 			
INSTRUCTOR	ARMIN	COURSE FEE	260.000	Rp.
MAIN EQUIPMENT : VMC, Computer, Tools				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	HS - 16	TIME = 40 H
TRAINING COURSE	FAHUC AUTOMATIC PROGRAM TOOLS MILLING II			
TRAINING TARGETS : Programmer (supervisor) 1 year experience in field				
TRAINING OBJECTIVE : This training module give knowledge and skill and at the end of the training the participant are expected to have : Automatic program tools milling Machine				
DAY'S PROGRAM	1st Day	a. Pattern definition and tooling data		
		b. Copy program		
	2nd Day	Area program and pocket program		
	3rd Day	Island program and variable		
	4th Day	Practice make a program		
	5th Day	Practice to operate the machine and programing		
TRAINING CONTENTS	<ul style="list-style-type: none"> - Pattern definition - Copy program - Area program - Pocket program - Island program - Variable program - Practice to the machine 			
INSTRUCTOR	MULYONO	COURSE FEE	269.000	Rp.
MAIN EQUIPMENT : VMC, Computer, Tools				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	MACHINING	CODE NO.	MS - 17	TIME = 80 H
TRAINING COURSE	CUTTING PROGRAM 3 DIMENSION (FAPT DIE III)			
TRAINING TARGETS :	Programmer/Supervisor minimum 2 years experience make NC program			
TRAINING OBJECTIVE :	This training module give knowledge and training for NC program 3 dimension cutting (Die III)			
DAY'S PROGRAM	1st Day	Pattern definition, various schema of soft ware		
	2nd Day	Geometric definition, move definition		
	3th Day	Curve, basic curve and drive curve		
	4th Day	Sculpture surface cutting		
	5th Day	Area and processing condition		
	6th Day	Make program		
	7th Day	Make program		
	8th Day	Practice on the machine		
TRAINING CONTENTS	<ul style="list-style-type: none"> - Curve - Basic curve - Sculpture surface - Processing condition - Make program - Operation of NC program 			
INSTRUCTOR	MULYONO		COURSE FEE	433.000 Rp.
MAIN EQUIPMENT :	PG System H, VMC, Tools			



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CODE	COURSE	HOURS	FEE
EL-01	Basic Electricity	40	241,000
EL-02	Electronics Measuring and Equipment	40	230,000
EL-03	Electronics Devices	32	252,000
EL-04	Electronics Circuit	40	252,000
EL-05	Assembling Electronics Equipment	40	241,000
EL-06	Basic Digital Circuit	40	252,000
EL-07	Digital Control Circuit	40	275,000
EL-08	Power Supply and Regulator Divices	40	252,000
EL-09	Operational Amplifier	40	252,000
EL-10	Radio Technology	40	230,000
EL-11	Television Technology (Black/White)	40	252,000
EL-12	Television Technology (Colour)	40	275,000
EL-13	Audio Amplifier Technolgy	40	265,000
EL-14	Operating System (DOS)	40	219,000
EL-15	Quick BASIC	40	219,000
EL-16	Word Star (ver.7)	40	219,000
EL-17	LOTUS 123	40	219,000
EL-18	dBASE	40	219,000
EL-19	Microcomputer Hardware (Z80 CPU)	40	331,000
EL-20	Microcomputer Control (Programming)	40	331,000
EL-21	Sensor Application	40	331,000
EL-22	Personal Computer Operation for Biginners	40	219,000
EL-23	Electronics Wiring Technique	40	285,000
EL-24	Motor Speed Control by Inverter System	40	245,000

OUTLINE OF ELECTRONIC COURSE

Rev. 1986

COLOR
TELEVISION TECHNOLOGY
EL-12

280 MICRO
COMPUTER CONTROL
EL-20

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SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL- 1	TIME = 40 H
TRAINING COURSE	BASIC ELECTRICITY		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or production Machine operation			
TRAINING OBJECTIVE This course aims to train Basic Electricity, to a beginner working in enterprise, giving a through introduction to the principles and practices of basic electricity. No previous knowledge or experience of electric is assumed, although it would probably help if you have studied Basic rudimentary level physics and math. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to use fundamental measuring equipment such as AVO meter. (2) be able to get an outline of electrical engineering. (3) be able to take appropriate precaution for danger of electricity.			
DAY'S PROGRAMS	1st day	Current, EMF and voltage, resistance, ohm Law	
	2nd day	Kirchoff's Law, static electricity, capacitor	
	3rd day	Magnetism, Inductors, Alternating Current	
	4th day	Alternating Current circuit, three phase AC	
	5th day	Electrical machines, sequence control circuit	
CONTENTS	1. Direct Current Circuit Electric current, EMF, PD and voltage, resistance, Ohm's Law, Electric power, meter and measurement. 2. Static Electricity Capacitor, Charge & discharge, capacitor network, inductor, Electromagnetic induction. 3. Alternating current circuit Direct current, alternating current, frequency of AC, Root Mean Square, characteristic of AC, 3 phase AC 4. Electrical machine Transformer, DC motor and AC motor. 5. Sequence Control Introduction of control, ON circuit, OFF circuit, self holding, interlock circuit.		
INSTRUCTOR IN CHARGE KARTAINI & AGUS MUCHTAR		COURSE FEE 241,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Power supply, Electrical machine demonstrators.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-02	TIME = 40 H
TRAINING COURSE	ELECTRONIC MEASUREMENT & INSTRUMENTATION		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or Machine operation.			
TRAINING OBJECTIVE This course aim to train basic electric measuring, to a beginner working in enterprise, giving a through introduction to the instrumentation, measuring electric/electronics unit, and find out a fault in the electric/electronics circuit. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electricity. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get an outline of electrical instrumentation such as multimeter, oscilloscope. (2) be able to get methods electrical measuring (3) be able to get technics to find out a fault in the electrical & electronics circuit			
DAY'S PROGRAMS	1st day	Errors in measuring, meter, multimeter	
	2nd day	Methods of measuring voltage, current and resistance	
	3rd day	Checking & measure semiconductor parts	
	4th day	Measuring power, decibel, digital counter	
	5th day	Oscilloscope, frequency and waveforms.	
CONTENTS	1. Electronics Instrument Output analog, output digital, input impedance sensitivity. 2. Methods of Measurement Measuring DC/AC Current, DC/AC voltage, resistance, RMS and Effective value 3. Measuring Semiconductor parts GO and NO GO method, Checking parts by multimeter, Checking digital ICs. 4. Power and Counter Measure DC and AC power, High frequency power, digital counter, time base generator, universal counter 5. Oscilloscope Reading freq. & amplitude, dual trace mode, adding 2 signal, adjustment oscilloscope		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 230,000 Rp	
MAIN EQUIPMENT : Multimeter, Oscilloscope dual trace, Freq. counter, Signal Generator, power meter.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-03	TIME = 32 H
TRAINING COURSE	ELECTRONIC DEVICE		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or Machine operation			
TRAINING OBJECTIVE This course aim to train basic handling skills and knowledge of electronics devices working in enterprise, giving a through introduction to the electronics parts, circuits and find out a fault in electronic parts such as semiconductor parts. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electricity. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following <ol style="list-style-type: none"> (1) Be able to read an electronics device, code and it's performance. (2) Be able to know semiconductor devices, code and it's performance. (3) be able to get technics to find out a fault in semiconductor and another electronics devices. 			
DAY'S PROGRAMS	1st day	Reading code and checking the passive electronics parts.	
	2nd day	Reading code and checking the semiconductor parts such as transistor, diode and etc.	
	3rd day	Reading code and check the Three-layer semiconductor devices.	
	4th day	Study ICs code and their function.	
CONTENTS	<ol style="list-style-type: none"> 1. Reading code and check the devices Colour code resistor, capacitor, inductor and checking by multimeter. 2. Reading code and check semiconductor devices Diodes, zeners, varicaps and transistors, semiconductor coding. Performance data, substitution and checking by multimeter. 3. Reading code and check 3 layer semiconductor devices Such as FET, MOSFET, UJT, PUT, SCR, DIAC, TRIAC. 4. ICs Liner Op-amp ICs, Regulator ICs, TV ICs, and equivalent circuit of the devices. 		
INSTRUCTOR IN CHARGE SUBANDI		COURSE FEE 230,000 Rp	
MAIN EQUIPMENT : Multimeter, LCR meter			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. SL-04	TIME = 40 H
TRAINING COURSE	ELECTRONIC CIRCUIT		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or Machine operation			
TRAINING OBJECTIVE This course aims to train Basic Electronic Circuit to a beginner working in enterprise, giving a through introduction to the Electronics parts, circuits and find out a fault in electronic circuits. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied fundamental electric theories. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) Be able to know basic electronic circuit and it's function (2) Be able to solve problem in electronic circuit. (3) be able to repair the error which occur in the electronic circuit.			
DAY'S PROGRAMS	1st day	The circuit using diode and transistor	
	2nd day	The oscillator and multivibrator circuit.	
	3rd day	The circuit using SCR and TRIAC	
	4th day	Touch Switch circuit Application	
	5th day	Alarm circuit Application	
CONTENTS	<ol style="list-style-type: none"> 1. Diode and transistor circuit Rectifier, voltage doubler, voltage reference, signal amplifier, Power Amplifier. 2. Oscillator and multivibrator RC Oscillator, IC 555, timer circuit, 3. SCR and TRIAC circuit AC control by SCR, flash lamp circuit, Dimmer control by Triac. 4. Application Circuit Alarm Circuit, Op-Amp tester circuit 		
INSTRUCTOR IN CHARGE SUBANDI		COURSE FEE 252,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Regulator Power Supply			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-05	TIME = 40 H
TRAINING COURSE	ELECTRONIC ASSEMBLY		
TRAINING TARGET Supervisor or Workers who are worked in electronic production.			
<p>TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve the assembly skill. No previous knowledge and experience of electronic are assumed. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following</p> <ol style="list-style-type: none"> (1) be able to solder electronics parts. (2) be able to make good and neat wiring. (3) be able to assembly a electronic appliance. 			
DAY'S PROGRAMS	1st day	Techniques of soldering	
	2nd day	designing wiring on PCB pattern	
	3rd day	Etching, and insert parts.	
	4th day	Design wiring panel to PCB	
	5th day	Overall assembly	
CONTENTS	<ol style="list-style-type: none"> 1. Soldering Solder, tin, technique soldering, passive parts, semi-conductor parts, ICs. 2. Design PCB pattern Layout parts, making pattern on PCB, etching, drilling hole, finishing. 4. Wiring making pattern on board, wiring cable, tighten, presoldering. 4. Assembly Panel assembly, wiring PCB, wiring panel, wiring to chassis. 		
INSTRUCTOR IN CHARGE KARTAINI & SUBANDI		COURSE FEE 241,000 Rp	
MAIN EQUIPMENT : Soldering, soldering aids			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-06	TIME = 40 H
TRAINING COURSE	BASIC DIGITAL CIRCUIT		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or production Machine operation			
TRAINING OBJECTIVE This course aim to train Fundamental Digital technology, giving a through introduction to the principles and practices of digital. No previous knowledge or experience of electric is assumed, although it would probably help if you have studied Basic Electronics. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to know the principles of digital (2) be able to interpret problem statements in term of Boolean algebraic. (3) be able to design logic to control motor operation.			
DAY'S PROGRAMS	1st day	Introduction logic, binary number, octal number, hexadecimal number.	
	2nd day	Logic gates, logic level, truth table, Boolean Algebra.	
	3rd day	Application logic gate, Arithmetic circuit.	
	4th day	Multivibrator, flip flop.	
	5th day	Application flip-flop circuit	
CONTENTS	<ol style="list-style-type: none"> 1. Introduction & number Digital & analog system, Binary to decimal convert, Hex to decimal convert, binary arithmetic. 2. Logic Gate AND, OR, Inverter, XOR, TTL level, CMOS level, fan in and fan out IC digital. 3. Boolean Algebra De Morgan theorems, Law and theorems Boolean, equivalent gate, simplified gate circuit. 4. Arithmetic circuit XOR and XNOR gate, Half adder, full adder, Subtractor, Karnaugh map. 5. Multivibrator and flip-flop Astable & monostable multivibrator, RS flip-flop, latch, T flip-flop, JK flip-flop 		
INSTRUCTOR IN CHARGE SUBANDI & AGUS MUCHTAR		COURSE FEE 252,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Regulator PSA, logic checker, Digital trainer.			

SKILL.-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. RL-07	TIME = 40 H
TRAINING COURSE	CONTROL DIGITAL CIRCUIT		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or production Machine operation			
TRAINING OBJECTIVE This course aims to train Control by digital devices and giving a through the principles and practices of digital control. No previous knowledge or experience of electric is assumed, although it would probably help if you have studied Basic Digital Circuit. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to design digital control device (2) be able to find out a fault in the digital circuit (3) be able to solve in the digital device.			
DAY'S PROGRAMS	1st day	Outline digital control, ICs digital	
	2nd day	Counters and counter application	
	3rd day	Input/output device , encoder/decoder.	
	4th day	Shift register and its function	
	5th day	Arithmetic operation and it's application	
CONTENTS	1. ICs Digital TTL family, CMOS family, output totem pole, open collector, tristate buffer. 2. Counter Flip-flop, principle of counter, decade counter, preset counter, up/down counter, develop counter. 3. Input/output device Encoder, decoder, 7 segment driver, multiplex, de multiplex. 4. Shift Register Serial and parallel format input, serial and parallel format output, right and left register 5. Arithmetic operation EXOR, coincidence circuit, comparator circuit, Comparator ICs, Application on elevator control.		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 275,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Regulator PSA, logic checker, Digital trainer.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-08	TIME = 40 H
TRAINING COURSE	REGULATOR		
<p>TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or Machine operation</p>			
<p>TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills to solve problem which generally occurs on power supply block. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electronics. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) to know various kind of Power Supply. (2) to know regulator devices generally damage (3) to know how to repair regulator block.</p>			
DAY'S PROGRAMS	1st day	Different kind of power supply	
	2nd day	Regulator circuit and overload circuit	
	3rd day	Trouble Shooting techniques	
	4th day	Checking and testing the parts of regulator	
	5th day	Testing Power Supply	
CONTENTS	<ol style="list-style-type: none"> 1. Out line of Power Supply Different kind of power supply, Transformers, rectifier, filter, regulator. 2. Regulator circuit Voltage divider, error amplifier, seripass transistor Reference voltage, Overvoltage circuit 3. Comparator Voltage reference, elemen variable, comparator Design. 4. Testing parts Transformer, diode, Zener Diode, Transistor, Condensator, IC regulator. 5. Testing Power Supply Overload testing, short circuit testing, overvoltage input testing. 		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 252,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Power meter			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-09	TIME = 40 H
TRAINING COURSE	OPAMP APPLICATION		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or Machine operation			
TRAINING OBJECTIVE This course aim to train basic electronics to a beginner working in enterprise and giving a through introduction to the principles and practices of Operational Amplifier. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electronics . By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) to know different kind of Op-Amp and its characteristic (2) to know fundamental circuits of Op-Amp (3) to know the fault in circuit which use Op-Amp			
DAY'S PROGRAM	1st day	Op-Amp and its characteristic	
	2nd day	Fundamental circuit of Op-Amp	
	3rd day	Comparator	
	4th day	Filter by Op-Amp	
	5th day	Trouble shooting	
CONTENTS	1. Outline of Op-Amp Code & Symbol, Characteristic, Different kind of Opamp, equivalent of Op-Amp. 2. Fundamental circuit of Op-Amp Inverting & noninverting circuit, integrator & differentiator Circuit, Summing & difference circuit, Buffer. 3. Comparator Voltage reference, element variable, comparator Design. 4. Op-Amp Filter Inductor by Op-Amp, amplifier & attenuator bandwidth noise cancel, design a filter. 5. Trouble Shooting Checking the parts, checking circuit.		
INSTRUCTOR IN CHARGE KARTAINI & AGUS MUCHTAR		COURSE FEE 252,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-10	TIME = 40 H
TRAINING COURSE	RADIO TECHNOLOGY		
TRAINING TARGET Tradesman or technician who are engaged in the field of designing, assembling, setting (adjustment) and reability test.			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills to solve problem in radio circuit and concern technology. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electronics . By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) to get concept of wave propagation and performance circuit. (2) understand of the trouble shooting in a radio receiver (3) be able repairing the radio.			
DAY'S PROGRAMS	1st day	Wave propagation & Modulation.	
	2nd day	Diagram Block a radio and its circuit performance	
	3rd day	Checking parts for a radio set	
	4th day	Assembling for a radio set and setting (adjustment)	
	5th day	Trouble shooting a radio set.	
CONTENTS	1. Wave Propagation AM and FM modulation, Frequency Transmission, modulator and demodulator. 2. Diagram Block Circuit of tuner, oscillator, mixer, IF amp, detector Audio Amplifier. 3. Checking parts Resistor, Capacitor, diode, transistor, ICs speaker, check and test wiring 4. Assembling and Setting Insert part, soldering, cutting, overall assembly, testing each block 5. Trouble shooting Tuner Block, IF block, detector block, audio block		
INSTRUCTOR IN CHARGE KARTAINI & AGUS MUCHTAR		COURSE FEE 230,000	
MAIN EQUIPMENT : Multitester, Oscilloscope, AM Signal generator, Modulator trainer.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-11	TIME = 40 H
TRAINING COURSE	B/W TELEVISION TECHNOLOGY		
TRAINING TARGET Technician who are engaged the audio and video appliances or repairing in the TV production line.			
TRAINING OBJECTIVE This course aim to service B/W television giving trough experiment and simulation troubles. No previous knowledge or experience of electric is assumed, although it would probably help if you have studied Basic Electronics and digital. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to know the principles of each TV block (2) be able to decide location of trouble in B/W Television (3) be able to repair B/W television			
DAY'S PROGRAMS	1st day	Outline B/W TV, Modulation system TV, Block Diagram B/W TV	
	2nd day	Test/measure and simulation trouble shooting in Power Supply, IF Video and Detector	
	3rd day	Test/measure and simulation trouble shooting in AGC, Video Amp.	
	4th day	Test/measure and simulation trouble shooting in Horizontal and vertical block	
	5th day	Test/measure and High voltage, and panel control.	
CONTENTS	<ol style="list-style-type: none"> 1. Outline TV B/W Composition signal, TV modulation system, antenna, fundamental Block diagram. 2. Power Supply System Regulator, Switching regulator, low voltage supply high voltage supply, measuring EHT 3. Signal process Circuit Tuner, Video IF, Detector, Sound, Video amp Video Output. 4. Raster circuit Sync separator, horizontal block, vertical block, deflection circuit, High voltage transformer. 5. Trouble shooting Symptom fault in tuner block, Video Amp, Horizontal output, sync block, raster block, power supply 		
INSTRUCTOR IN CHARGE SUBANDI & AGUS MUCHTAR		COURSE FEE 252,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Rejuvenator, High tension meter, PAL pattern generator			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EI-12	TIME = 40 H
TRAINING COURSE	COLOUR TELEVISION TECHNOLOGY		
TRAINING TARGET Technician who are engaged in the Audio and Visual appliances or repairing in production line.			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills to solve problem in Colour Television Set. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electronics and B/W Television. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get concept of colour television system (2) be able to understand of the Colour TV circuit. (3) be able to solve the Colour TV problem.			
DAY'S PROGRAMS	1st day	Outline of Colour Television .	
	2nd day	Block Diagram of Colour Television	
	3rd day	Measuring waveform & voltage.	
	4th day	Simulation trouble shooting.	
	5th day	Simulation trouble shooting.	
CONTENTS	<ol style="list-style-type: none"> 1. Outline Colour TV Colour freq. processing, Suppress Carrier, colour burst, colour demodulator, Colour System PAL & NTSC 2. Diagram Block Difference of B/W television, tuning system, AC matic power supply, matrix circuit, RGB circuit. 3. Waveform & voltage Measuring waveform each block, voltage, high-voltage, rejuvenate. 4. Tube and its circuit Shadow mask type, aperture type, Anode, grids, puritas, RGB balance 5. Trouble shooting Symptom fault in tuner block, Video Amp, matrix, RGB block, colour process block, power supply 		
INSTRUCTOR IN CHARGE KARTAINI & AGUS MUCHTAR		COURSE FEE 275,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, Rejuvenator, Colour TV Trainer, PAL Pattern generator.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO.	EL- 13	TIME : 40 hours
TRAINING COURSE	AUDIO TECHNOLOGY			
TRAINING TARGETS Foreman, or lower level technician who are engaged in the work such as production line of audio equipment and consumer electronics equipment repairing.				
TRAINING OBJECTIVE This course aims to train general skills and knowledge concerning audio. Giving a through introduction to the principles and practices of audio technology. No previous experience of electronic work is assumed, although it would probably help if you have studied rudimentary level electronics. By the end of the training periode, the participants are expected to be able to get the knowledge and techniques of the following: (1) be able to understand an outline of audio amplifier engineering (2) be able to understand fundermental operation of the circuit (3) be able to do simple trouble shooting				
DAY'S PROGRAM	1st Day	Transistor ampifiers		
	2nd Day	Transistor amplifiers		
	3rd Day	Amplifiers feed back, Matching, Transistor oscillators		
	4th Day	Preampifiers, Power amplifiers: Single ended, Push-pull		
	5th Day	Audio amplifier ICs, Complete hi-fi system		
TRAINING CONTENTS	<p>1. Analogue electronics Transistor voltage amplifiers; load lines, stability, collectr-to-base bias fully-stabilized voltage amplifier</p> <p>FET voltage amplifiers; bias and stability, decoupling and coupling</p> <p>Others: amplifiers and feed back, amplifiers and matching, impedance matching circuits, transistor oscillators, operational amplifier</p> <p>2. Audio systems sound recording, pre amplifiers, power amplifiers: single ended power amplifiers: push-pull, audio amplifiers ICs, complete hi-fi systems.</p>			
INSTRUCTORS IN CHARGE AGUS, KARTAINI			COURSE FEE 265, 000 RP.	
MAIN EQUIPMENT Circuit tester, Oscilloscope, Power supply, Bread board, Audio amp. system				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-14	TIME = 40 H
TRAINING COURSE	OPERATING SYSTEM		
TRAINING TARGET Workshop or administrative personals who are operating Personal Computer.			
TRAINING OBJECTIVE The purpose of this course is to give the knowledge and techniques to improve skills in the field of advanced training on MS or PC DOS. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get an outline of Operating System. (2) be able to understand the MS or PC DOS System operation (3) be able to understand MS/PC-DOS Commands			
DAY'S PROGRAMS	1st day	Outline of the IBM PC and compatible, data record device, managing hard disk.	
	2nd day	Operating System in PC, PC-DOS and MS-DOS	
	3rd day	Essential commands, internal and external commands	
	4th day	Configuration System and ANSI Escape Sequence	
	5th day	Batch process and it's directive	
CONTENTS	1. Outline of PC Parts of PC, how PC works, diskette, track and sector file allocation table (FAT) 2. Disk Operating System (DOS) Working with operating system, DOS version, and managing Hard disk. 3. DOS Commands Format, dir, backup file, wild card, template Internal commands, external commands 4. Configuration and batch process Directive device, files, buffers, shell etc, file batched 5. ANSI Escape Sequence DOS prompt, CRT mode, function key		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 219,000 Rp	
MAIN EQUIPMENT : IBM PC and PC/MS DOS			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-15	TIME = 40 H
TRAINING COURSE	QUICK BASIC		
TRAINING TARGET Technician who are engaged in the work such as machine de - signing, production engineering.			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills in programming of Basic Language. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get concept of Quick Basic (2) be able to get programming techniques in basic language (3) be able to make program in basic language			
DAY'S PROGRAMS	1st day	Quick Basic Environment, Menu and Commands	
	2nd day	Variable type and Calculation,	
	3rd day	Logical statement and various loop.	
	4th day	Programming, make application	
	5th day	File and device I/O	
CONTENTS	<ol style="list-style-type: none"> 1. QBasic Environment Editing, syntax checking, file management, option 2. Calculation Integer variable, string variable, math function, logical relation, input statement. 3. Logical statement and Loop If..then..else, for..next loop, do loop, do while loop, do until loop. 4. Programming Decision structure, select case, looping structures 5. File and Device I/O Print, print using, input, line input, working with data file. 		
INSTRUCTOR IN CHARGE IMAN IRIANA & KARTAINI		COURSE FEE 219,000 Rp	
MAIN EQUIPMENT : IBM PC, Hard disk with QBasic software.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-16	TIME = 40 H
TRAINING COURSE	WORD STAR (ver.7)		
TRAINING TARGET For all who works in administration or financial field such as Secretary, typist and officer.			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills in the field of Wordstar ver.7 By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get concept of Wordstar ver.7 (2) be able to type a letter by word processor. (3) be able to make mail merge.			
DAY'S PROGRAMS	1st day	Outline Wordstar ver.7, Opening menu, pull down menu.	
	2nd day	Format text and Control block	
	3rd day	Making table and math operation	
	4th day	Sort database and column mode	
	5th day	Mail Merge and printing	
CONTENTS	1. Outline Wordstar Control file, Control edit, review text, Layout page, Style paragraph. 2. Format text and control block Fonts, select printer, over print, Shadow & colour copy block, delete block, move block. 3. Making table and math operation Extended character, summing, subtract, multiply, combine, calculator function. 4. Data base sorting database, selecting data base, word count 5. Mail merge file document, file data, print to disk, mailmerge with ask variable, math variable		
INSTRUCTOR IN CHARGE KARTAINI & IMAN IRIANA		COURSE FEE 219,000 Rp	
MAIN EQUIPMENT : IBM PC, Hard disk with WS7 software, mouse			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-17	TIME = 40 H
TRAINING COURSE	LOTUS 123		
TRAINING TARGET For all who works in administration or financial such as Secretary, typists and office businessman			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills in the field of Lotus 123. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get concept of Lotus 123 (2) be able to understand WYSIWIG and function commands (3) be able to make Graphic			
DAY'S PROGRAMS	1st day	Making table, copy range, making formula printing worksheet.	
	2nd day	Formatting worksheet, using function command	
	3rd day	Management data base and its formula	
	4th day	Making Graphic	
	5th day	Using WYSIWYG (What You See is What You Get)	
CONTENTS	1. Spread sheet of Lotus 123 Insert data, menu worksheet, menu range, menu file, formatting numeric. 2. Function in Lotus Mathematics function, statistic function, Special function, expression logic. 3. Management database Data format, data Query input, data query output, printing format. 4. Graph Main menu graph, bar graph, X-Y graph, line graph line graph, stackbar graph, pie graph. 5. WYSIWYG Menu system, graph command, print command, format command, worksheet command.		
INSTRUCTOR IN CHARGE KARTAINI & SUBANDI		COURSE FEE 219,000 Rp	
MAIN EQUIPMENT :: IBM PC, Hard disk with 123 software, mouse			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-18	TIME = 40 H
TRAINING COURSE	dBASE IV		
TRAINING TARGET For all who works in administration or financial field such as secretary, accounting, banker, sales clerk and marketing personnel.			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills in the field of dBase IV By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get concept of dBase IV (2) be able to manage database (3) be able to make application database			
DAY'S PROGRAMS	1st day	Outline of dBase IV and example dBase program, Installation.	
	2nd day	Control Center Menu, Formatting option, data Checking, making file	
	3rd day	Modify Structure, string function, printing	
	4th day	Sort database, erase and insert data	
	5th day	Application database	
CONTENTS	<ol style="list-style-type: none"> 1. Outline dBase IV Installation Software, create file, help facility 2. Control center menu Data, Queries, forms, reports, label, Application 3. Modify Structure Function string, use, close, erase 4. Sorting Ascending, Descending, sort record, insert record 5. Application Create/modify report, report form, label, label form Query/view, screen, create/modify application. 		
INSTRUCTOR IN CHARGE AGUS MUCHTAR & KARTAINI		COURSE FEE 219,000 Rp	
MAIN EQUIPMENT : IBM PC, Hard disk with dBASE IV, mouse			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-19	TIME = 40 H
TRAINING COURSE	MICROCOMPUTER HARDWARE		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing and production engineering.			
TRAINING OBJECTIVE This course aim to train basic Microcomputer to a beginner working in enterprise, giving a through introduction to the principles and practices of Microcomputer System. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Electronics and fundamental Digital Circuit. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following <ol style="list-style-type: none"> (1) be able to get an outline of Microcomputer system such as processor, memory, display and input/output Device (2) be able to get procedure to make program by Assembly language. (3) be able to get technics to find out a fault in the Micro computer system circuit. 			
DAY'S PROGRAMS	1st day	Outline of the Microcomputer and make up the microcomputer system.	
	2nd day	Principle of the keyboard & Read/write data control.	
	3rd day	Memory, RAM and ROM, Memory map	
	4th day	Central Processing Unit, I/O peripheral	
	5th day	Z80 Commands, Making program	
CONTENTS	<ol style="list-style-type: none"> 1. Outline of the Microcomputer Binary & Hex number, machine language, address bus, data bus, bit and byte. 2. Hex Keyboard and Read/Write Control Debounce Switch, Hex to binary conversion, latch, Binary to 7 segment, Shoot pulse generate, Preset, Counter, Semiconductor Switch. 3. Memory Read and Write data to memory, ICs RAM, ICs ROM, Memory map, display data and address. 4. Central Processing Unit Processor Z-80, Control bus, BUSAK and BUSRQ, Input/output Peripheral, Ports, Control Word. 5. Programing Z-80 Registers and Flag, Z-80 Commands, Procedure of programing, Simple programs. 		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 331,000 Rp	
MAIN EQUIPMENT : Multitester, Oscilloscope, PZ-80 Kits.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EJ.-20	TIME = 40 H
TRAINING COURSE	MICROCOMPUTER CONTROL		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering or facility maintenance.			
TRAINING OBJECTIVE This course aim to train Microcomputer Control, giving a through introduction principles of programing and design hardware to be controlled by Microcomputer System. It would probably help if you have studied Microcomputer previously. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get an outline of Microcomputer Control (2) understand of Microcomputer programing. (3) understand of interfacing microcomputer system			
DAY'S PROGRAMS	1st day	Development Microcomputer System	
	2nd day	Switch and LED programing	
	3rd day	Start & stop program Automatically	
	4th day	Application program of control display	
	5th day	Application program of control motor speed	
CONTENTS	1. Development The System Hardware design, software design, Initialize, set control word, set stack pointer 2. Switch and LED program Read input, send data to register, register to register, output data, looping, subroutine 3. Start and stop program Melody hardware design, check bit status, setting the timer, interrupt, decrement & increment 4. Program Control Display Display hardware design , displaying character, set address data to register, jump if zero. 5. Control motor speed Motor hardware design, photo interrupter sensor, design software RPM motor, Cycle subroutine.		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 331,000 Rp.	
MAIN EQUIPMENT : Multitester, Oscilloscope, PZ-80 Kits, Logic probe			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-21	TIME = 40 H
TRAINING COURSE	SENSOR APPLICATION		
TRAINING TARGET Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or Machine operation			
TRAINING OBJECTIVE This course aim to train Sensor Application, giving a through introduction principles of sensor as input device to PLC or control system. It would probably help if you have studied Basic Electronic. By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) be able to get a clear concept for the application of sensors (2) be able to understand principles and basic structures of sensors. (3) Be able to select appropriate sensors and fixing to the control system.			
DAY'S PROGRAMS	1st day	Outline of sensors, function, Classification, and specification of sensors	
	2nd day	Principles and specification of Proximity sensors	
	3rd day	Application of proximity sensors, ultrasonic sensors	
	4th day	Principles and specification of Mark photo sensors	
	5th day	Sensor Controller and Application	
CONTENTS	<ol style="list-style-type: none"> 1. Outline Sensor Principles of sensor, general function, Classification of sensor, General Application of sensor. 2. Proximity sensor metal proximity sensors, all metal type sensor, anti-steel sensor, Switch magnet proximity type, Capacitive proximity type. 3. Ultrasonic sensor Reflective type, unreflective type 4. Photo sensor Separate photo type, retroreflective photo type, diffuse reflective photo type, Mark photo sensors 5. Control sensor system & Application Function of sensor controllers, Programming and application of controllers, Sensor input system for PLC 		
INSTRUCTOR IN CHARGE KARTAINI & SUBANDI		COURSE FEE	
MAIN EQUIPMENT : Multitester, Sensor trainer			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO. EL-22	TIME = 40 H
TRAINING COURSE	PERSONAL COMPUTER OPERATION FOR BEGINNERS		
TRAINING TARGET For all who works in administration or financial such as Secretary, typists and office businessmen			
TRAINING OBJECTIVE The purpose this course is to provide the participants from private enterprise with the knowledge and techniques to improve their skills to solve simple PCs problem. No previous knowledge or experience of electronic is assumed, although it would probably help if you have studied Basic Digital By the end of the training period, the participants are expected to be able to get the knowledge/techniques the following (1) to get concept of Personal Computer. (2) to know PC parts and it's input/output device. (3) understand simple software & hardware fault.			
DAY'S PROGRAMS	1st day	Main parts of PC	
	2nd day	Software and operating system in IBM PC	
	3rd day	Assembly PC and set up BIOS.	
	4th day	Memory map and how to manage	
	5th day	Management disk and directory	
CONTENTS	1. PC Parts Processor, disk drive, hard disk, keyboard, memory chips, printer, monitor, adapter. 2. Operating System and software How to work a software, operating system, utility, program language, packed program, application program 3. Assembly PC Step by step assembly, Power Supply, disk drive, hard disk, chip memory, set up BIOS. 4. Memory map Conventional extended, expanded memory, upper memory, HIMEM configuration. 5. Management disk Format, back up, directory and subdirectory, check disk, repair disk.		
INSTRUCTOR IN CHARGE IMAN IRIANA & SUBANDI		COURSE FEE 219,000 Rp	
MAIN EQUIPMENT : IBM PC			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO.	EL- 23	TIME : 40 hours
TRAINING COURSE	Wiring Techniques for Electronics			
TRAINING TARGETS Worker, Foreman or lower level technician who are engaged in the work such as production and production engineering.				
TRAINING OBJECTIVE This course aims to train wiring techniques for electronics circuit and basic assembling work skills. No previous knowledge or experience of electronics is assumed, although it would probably help if you have studied rudimentary level physics. By the end of the training periode, the participants are expected to be able to get the knowledge and techniques of the following: (1) be able to use special tools and equipment for wiring . (2) be able to do the soldering, clamping, wire lapping connection. (3) be able to take appropriate procedures for wiring electronics circuit. (4) be able to acquire basic assembling skills.				
DAY'S PROGRAM	1st Day	Electronics wiring, Electronics divices		
	2nd Day	Soldering electronics divices and wiring		
	3rd Day	Clamping and wiring, Lapping		
	4th Day	Task and practice for Electronics wiring		
	5th Day	Task and practice for Electronics wiring		
TRAINING CONTENTS	<p>1. Electronics Devices kind and features of electronics divices, basic handling, processing for wiring</p> <p>2. Soldering solder, soldering tools and equipment, principle of soldering basic soldering methods, exercises of soldering</p> <p>3. Clamping clamping method, clamping terminals, clamping tools, basic clamping and procedures, exercises of clamping and wiring</p> <p>4. Lapping lapping method, lapping post and vires, lapping tools and equipment, basic lapping procedures, exercises of lapping and wiring</p> <p>5. Basic assembling skill screws, application screws for wiring, fastening skills</p>			
INSTRUCTORS IN CHARGE AGUS, KARTAINI			COURSE FEE 265, 000 RP.	
MAIN EQUIPMENT Circuit tester, Soldering tools, Clamping tools, Lapping tools, Tool Set				

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD	ELECTRONICS	CODE NO.	EL- 24	TIME : 40 hours
TRAINING COURSE	MOTOR SPEED CONTROL BY INVERTER SYSTEM			
TRAINING TARGETS Foreman, or lower level technician who are engaged in the work such as Machine designing, production engineering, facility maintenance or production Machine operation.				
TRAINING OBJECTIVE This course aims to train skills and sufficient knowledge for three phase motor speed control and some applications by inverter system. It would probably help if you have studied basic electric, electronics and automatic control. By the end of the training periods, the participants are expected to be able to get the knowledge and techniques of the following: (1) be able to get a clear concept and functions of inverter system. (2) be able to understand the meaning of parameter and its application. (3) be able to set appropriate condition for driving motor by inverter. (4) be able to understand for application to PID control.				
DAY'S PROGRAM	1st Day	Characteristic of Induction motor, Basic sys. operation		
	2nd Day	Characteristic of motor, Principle of inverter system		
	3rd Day	Principle of Inverter system, Parameter		
	4th Day	Parameter and application		
	5th Day	Programed running, Application for PID control		
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Characteristic of three phase induction motor principle of induction motor, torque, load current, power, speed and frequency 2. Converter system converter circuit, smoothing circuit, inverter circuit, break circuit, I/O circuit for control 3. Operation and measurement basic operation procedures, measuring input values, measuring output values, checking converter and inverter devices, wave form observation by oscilloscope. 4. Parameters meaning of parameters, how to set parameters 5. Application programed motor control by inverter system, application for PID control 			
INSTRUCTORS IN CHARGE AGUS, KARTAINI		COURSE FEE 245,000 RP.		
MAIN EQUIPMENT Inverter training equipment, Three phase motor, Powder break system, Tester Oscilloscope, Watt meter, etc.				



MEMBANGUN
MANUSIA KARYA

CEVEST



**SKILL-UPGRADING TRAINING
COURSE GUIDE
1996/1997**

ELECTRIC/ AIR CONDITION FIELD

**THE CENTER FOR VOCATIONAL
&
EXTENSION SERVICE TRAINING
(CEVEST)**

Jl. Guntur Raya No.1 Bekasi 17144

**Tel.: 885-2415, 884-1147
Fax.: 885-2415, 884-1146**

COURSE LIST
(ELECTRIC TRADE)

CODE	COURSE	HOURS	FEE
LS-01	Measuring of Electrical Components	40	247,000
LS-02	Refrigerant Basic	40	224,000
LS-03	Airconditioning Basic	40	308,000
LS-04	Refrigerator and Freezer	40	317,000
LS-05	Airconditioning (1)	40	331,000
LS-06	Ice Maker and Show Case	40	275,000
LS-07	Airconditioning (2)	40	366,000
LS-08	Airconditioning (3)	40	393,000
LS-09	Factory Lighting Installation	40	275,000
LS-10	Electric Maintainance	40	275,000
LS-11	Repairing 3 Phase Induction Motor	40	375,000
LS-12	Sequence Control Circuit	40	275,000
LS-13	Digital Control Circuit	40	275,000
LS-14	PLC Basic Programming (1)	40	275,000
LS-15	PLC Basic Programming (2)	40	275,000

C O U R S E L I S T
(E L E C T R I C / A I R C O N D I T I O N T R A D E)

AIRCONDITIONING (3) CONTINUE LS-08		INTERMEDIATE PLC (SEQUENCER) LS-15
AIRCONDITIONING (2) CONTINUE LS-07		BASIC PLC (SEQUENCER) LS-14
AIRCONDITIONING (1) CONTINUE LS-05	ICE MAKER AND SNOW CASE LS-06	DIGITAL CONTROL LS-13
AIRCONDITIONING BASIC LS-03	REFRIGERATOR AND FREEZER LS-04	SEQUENCE CONTROL MECHANIC LS-12
REFRIGERANT BASIC LS-02	ELECTRIC MAINTENANCE LS-10	REWINDING MOTOR 3 PHASE LS-11
	FACTORY LIGHTING INSTALLATION LS-09	
MEASURING OF ELECTRICAL COMPONENTS LS-01		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-01.	TIME = 40 H
TRAINING COURSE : MEASURING OF ELECTRICAL COMPONENTS.		
TRAINING TARGET : Maintenance or workers who have equal standard.		
<p>TRAINING OBJECTIVE : This course aim to train about measuring instruments like : Ampere meter, volt meter, watt meter, $\cos \phi$ and frequency meter.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to measure at the instruments. 2. be able to make installation of electric instruments 		
DAY'S PROGRAM	1st Day	Introduction measuring electric instruments.
	2nd Day	Measuring the current all kinds of electric load 1 phase and 3 phase.
	3rd Day	Measuring the power of all kinds of electric load 1 phase and 3 phase.
	4th Day	Measuring the power of all kinds of electric load.
	5th Day	Measuring the $\cos \phi$, and the frequency electric load.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Introduction the electric instruments. <ul style="list-style-type: none"> - Ampere meter. - Watt meter. - $\cos \phi$ meter. - Frequency meter. 2. Measuring the electric load current. <ul style="list-style-type: none"> - Lamp. - Electric heater. - Electric motor. 3. Measuring the current, voltage electric load. <ul style="list-style-type: none"> - Lamp. - Electric heater. - Electric motor. 4. Measuring the electric power with one watt meter. <ul style="list-style-type: none"> - Lamp. - Electric heater. - Electric motor. 5. Measuring the electric power with two watt meter. <ul style="list-style-type: none"> - Electric motor 3 phase. 6. Measuring the power factor and frequency. <ul style="list-style-type: none"> - 3 phase motor. 	
Instructor : Suhendar/Maryo.		Training FEE : Rp. 247.000,-
MAIN EQUIPMENT : 1. Ampere, watt, $\cos \phi$, and Frequency meter. 2. 1 phase and 3 phase motor 3. Combination plier.		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-02.	TIME : 40 H
TRAINING COURSE : BASIC REFRIGERANT.		
TRAINING TARGET : Technician or maintenance of cooler section.		
TRAINING OBJECTIVE : This training aim for giving understanding about technic cooler. By the end of the training period, the participants are expected to be able to get knowledge / techniques the following : 1. be able to explain basic heater , pressure and temperature. 2. be able to explain basic subject by technic cooler.		
DAY'S PROGRAM	1st Day	Understanding basic heater .
	2nd Day	Basic Pressure and temperature.
	3rd Day	Situation curve.
	4th Day	Cooler cycles.
	5th Day	The general basic refrigeration.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Understanding basic heater . <ul style="list-style-type: none"> - Heater transfer. - Heater units. - Heater and energy. 2. Pressure and temperature. <ul style="list-style-type: none"> - Pressure. - Pressure units. - Temperature. - Pressure and temperature connection. 3. Situation curve. <ul style="list-style-type: none"> - Situation point for substance cooler. - Changes situation point. 4. Cooler cycles. <ul style="list-style-type: none"> - Compression. - Condensation. - Evaporation. - Expansion. 5. General basic refrigeration . <ul style="list-style-type: none"> - Refrigeration with substance cooler. - Refrigeration with electric system. - Refrigeration with heater system. 	
Instructor : Sangat Sunarto/Suhendar		TRAINING FEE : Rp. 224.000,-
MAIN EQUIPMENT : <ol style="list-style-type: none"> 1. Thermometer. 2. Barometer. 		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-03.	TIME = 40 H
TRAINING COURSE : BASIC AC.		
TRAINING TARGET : Maintenance or technician in the air condition field.		
<p>TRAINING OBJECTIVE : This training aim for giving ability on AC window and AC separate.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to break into pieces and assemble AC window. 2. be able to break into pieces and assemble AC separate. 3. be able to maintain and repair AC window and AC separate. 		
DAY'S PROGRAM	1st Day	Basic air system .
	2nd Day	Components air machine system.
	3rd Day	Overhaul AC window.
	4th Day	AC window wiring.
	5th Day	Overhaul AC separates and wiring.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Basic air system . <ul style="list-style-type: none"> - Humidity. - Air speed. - Fresh air. - Air temperature. 2. Components air conditioning system. <ul style="list-style-type: none"> - Compressor, condenser, evaporator and expansion valve. - Drier filter, accumulator. 3. Overhaul AC window. <ul style="list-style-type: none"> - Making and drawing electric circuit. - Breaking into pieces condenser and evaporator. 4. Wiring . <ul style="list-style-type: none"> - assembling AC window. - Leak test. 5. Overhaul AC separates. <ul style="list-style-type: none"> - Inside unit. - Outside unit. - Assembling and trouble shooting. 	
Instructor : Sangat Sunarto/Suhendar		TRAINING FEE : Rp. 308.000,-
MAIN EQUIPMENT : 1. AC Simulator 2. Thermometer, Manifold Gauge. 3. AC window, AC separate. 4. Charging Cylinder		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-04.	TIME = 40 H
TRAINING COURSE : REFRIGERATOR/FREEZER.		
TRAINING TARGET : Technioian and maintenance section in the field re- frigerator / freezer.		
TRAINING OBJECTIVE : This training aim for giving understanding and skill in the field of the refrigerator/freezer. By the end of the training period, the participants are expected to be able to get knowledge / techniques the following : <ol style="list-style-type: none"> 1. be able to explain and understand refrigerator problem. 2. be able to break open and install refrigerator freezer. 3. be able to maintain and repair refrigerator/freezer. 		
DAY'S PROGRAM	1st Day	Basic frost.
	2nd Day	Refrigerator/freezer components.
	3rd Day	Control instruments at freezer.
	4th Day	Wiring and overhaul refrigerator.
	5th Day	Rewiring and trouble shooting.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Basic frost. <ul style="list-style-type: none"> - Frost point. - Temperature and frost pressure. 2. Refrigerator components. <ul style="list-style-type: none"> - Compressor. - Condenser. - Capillary tube. 3. Control instruments at freezer. <ul style="list-style-type: none"> - Thermostat. - Defrost timer. 4. wiring and overhaul. <ul style="list-style-type: none"> - To draw of electric circuit. - To break into pieces of compressor. - To break into pieces of condenser. 5. Rewiring and trouble shooting. <ul style="list-style-type: none"> - To draw of electric circuit. - To break into pieces of compressor. - Trouble shooting. 	
Instructor : Sangat Sunarto/Maryo.		TRAINING FEE : Rp. 317.000,-
MAIN EQUIPMENT : 1. Refrigerator. 2. Manifould Gauge. 3. Thermometer. 4. Charging Cylinder.		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-05.	TIME : 40 H
TRAINING COURSE : CONTINUE AC I.		
TRAINING TARGET : Technician and maintenance in the AC field.		
<p>TRAINING OBJECTIVE : This training aim for giving knowledge and skill in the AC field .</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to explain and care of AC packaged, unit fan coil and cooling tower. 2. be able to explain the method main components at AC and refrigerator. 		
DAY'S PROGRAM	1st Day	All kinds of AC type and method.
	2nd Day	Main components and explanation.
	3rd Day	Aid components for AC.
	4th Day	Parts and function of security implements.
	5th Day	The other implements.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. All kinds of AC type and method. <ul style="list-style-type: none"> - AC packaged. - Air condition unit. - Fan coil unit and water handling. 2. Main components and explanation. <ul style="list-style-type: none"> - Compressor. - Condenser. - Evaporator. - Expansion valve. 3. Aid components for AC. <ul style="list-style-type: none"> - Oil separator. - Heat exchanger. - Distribution. - Drier and filter. 4. Parts and security implements. <ul style="list-style-type: none"> - Implements secure. - Breaking into pieces of compressor. - Implements check. 5. The other implements. <ul style="list-style-type: none"> - Stop valve. - Check valve. - Crank case. 	
Instructor : Sangat Sunarto. Suhendar.		TRAINING FEE : Rp. 331.000,-
MAIN EQUIPMENT : 1. AC packaged . 2. AC simulator. 3. Ring key.		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-06.	TIME = 40 H						
TRAINING COURSE : ICE MAKER AND SHOW CASE.								
TRAINING TARGET : Technician and maintenance in the cooler field.								
TRAINING OBJECTIVE : This training aim to give knowledge and skill in the cooler field. By the end of the training period, the participants are expected to be able to get knowledge / techniques the following : <ol style="list-style-type: none"> 1. be able to explain the method and process from ice maker. 2. be able to maintain and repair ice maker. 								
DAY'S PROGRAM	1st Day	Process of the ice maker.						
	2nd Day	Structure and function method.						
	3rd Day	Principle of the ice box control.						
	4th Day	Wiring diagram, timing chart.						
	5th Day	Structure of the show case.						
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Ice maker process. <ul style="list-style-type: none"> - Ice maker. - De ice. 2. Structure and the method function. <ul style="list-style-type: none"> - Mechanism cooler. - Structure from main water. - Control system. 3. Principle ice box control. <ul style="list-style-type: none"> - Detection of ice maker system. - Construction. - Ice stock control. 4. Wiring diagram, timing chart. <ul style="list-style-type: none"> - Wiring diagram ice maker. - Timing chart in ice maker. 5. Structure show case. <ul style="list-style-type: none"> - Kind of show case cabinet. - Cooler system. 							
Instructor : Sangat Sunarto. Suhendar.		TRAINING FEE : Rp. 275.000,-						
MAIN EQUIPMENT : <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">1. Show case.</td> <td style="width: 33%;">3. Thermometer.</td> <td style="width: 33%;">5. Tool set.</td> </tr> <tr> <td>2. Ice maker.</td> <td>4. Tester.</td> <td></td> </tr> </table>			1. Show case.	3. Thermometer.	5. Tool set.	2. Ice maker.	4. Tester.	
1. Show case.	3. Thermometer.	5. Tool set.						
2. Ice maker.	4. Tester.							

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-07.	TIME : 40 H
TRAINING COURSE : CONTINUE AC II.		
TRAINING TARGET : Technician and supervisor in the AC field.		
<p>TRAINING OBJECTIVE : This training aim to give knowledge and skill in the AC field.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to lay pipe for AC type water chilling. 2. be able to maintain and repair AC type water chilling. 		
DAY'S PROGRAM	1st Day	Piping system.
	2nd Day	Piping construction.
	3rd Day	Water piping.
	4th Day	Gutter construction.
	5th Day	Isolation material.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Piping system. <ul style="list-style-type: none"> - Single. - Double. - The open system and closed system. 2. Piping construction. <ul style="list-style-type: none"> - Account of the water circulation. - Account of the pipe diameter. - Choice of the pump capacity. 3. Water piping. <ul style="list-style-type: none"> - Water implements - Attention on the construction pipe. - setting pipe. 4. Gutter construction. <ul style="list-style-type: none"> - General concept. - The method making trap. 5. Isolation material. <ul style="list-style-type: none"> - Isolated at cooler pipe. - Isolated at heater pipe. - Kind of materials. 	
Instructor : Sangat Sunarto. Suhendar.		TRAINING FEE. : Rp. 366.000,-
MAIN EQUIPMENT : 1. Water chilling system. 2. Water pipe wrench.		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION		CODE NO : LS-08.	TIME = 40 H
TRAINING COURSE : CONTINUE AC III.			
TRAINING TARGET : Supervisor or technician Ap.			
<p>TRAINING OBJECTIVE : This training aim to give knowledge and skill in the AC field.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to calculate and to devise room load. 2. be able to calculate and to devise AC package ducting. 3. be able to maintain and repair AC. 			
DAY'S PROGRAM	1st Day	Basic of Mollier diagram.	
	2nd Day	Calculate and Air conditioning.	
	3rd Day	Psychometric chart.	
	4th Day	Account of room load.	
	5th Day	Account and ducting.	
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Basic Mollier diagram. <ul style="list-style-type: none"> - How to read Mollier diagram. - Cooler cycles and Mollier diagram. 2. Account and condition work. <ul style="list-style-type: none"> - Cooler capacity. - Air conditioning. 3. Psychometric chart. <ul style="list-style-type: none"> - How to read psychometric chart. - Air condition process at psychometric. - Cooler capacity. 4. Account of cooler load. <ul style="list-style-type: none"> - To used. - Coefficient from cooler load. - Example. 5. Account and ducting. <ul style="list-style-type: none"> - Air duct. - Duct system. - Duct contraction. - Air volume at cooler. - Ducting plan. 		
Instructor : Sangat Sunarto. Maryo.		TRAINING FEE. : Rp. 393.000,-	
MAIN EQUIPMENT : 1. AC packaged. 2. Manifold Gauge. 3. Charging Cylinder. 4. AVO meter.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIBLD : ELECTRIC/AIR CONDITION	CODE NO : LS-09.	TIME : 40 H
TRAINING COURSE : FACTORY LIGHTING INSTALLATION.		
TRAINING TARGET : Electric technician or same level worker.		
<p>TRAINING OBJECTIVE : This course aim to train about electric installation and power supply distribution before that's not underatand about electric knowledge.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techni-ques the following :</p> <ol style="list-style-type: none"> 1. be able to get the knowledge of Ohm, Watt, Volt Ampere. 2. able to know procedure to install lighting installation, power and distribution load/distri-bution power. 3. be able to draw lighting installation. 4. be able to install lighting and grounding. 		
DAY'S PROGRAM	1st Day	Electric theory, Procedure and lighting insta-llation and rule.
	2nd Day	Drawing of the lighting and the power supply panel.
	3rd Day	Installation of the lighting.
	4th Day	Installation of the power.
	5th Day	Making grounding and ground installation.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Electric theory. <ul style="list-style-type: none"> - Ohm. - Ampere, Volt. - Watt. 2. Procedure and rules. <ul style="list-style-type: none"> - Polarity and wiring. - Setting the electric equipment in the room. - To secure at Voltage part. 3. Wiring. <ul style="list-style-type: none"> - Lighting. - Power. 4. Grounding. <ul style="list-style-type: none"> - Making ground. - Ground installation. - Ground measuring. 	
Instructor : Maryo. Suhendar.		TRAINING FEE : Rp. 275.000,-
MAIN EQUIPMENT : 1. Analog and digital tester. 2. Earth Tester. 3. Combination plier, cutting plier		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION		CODE NO : LS-10.	TIME = 40 H
TRAINING COURSE : ELECTRIC MAINTENANCE.			
TRAINING TARGET : Maintenance in the electric field.			
<p>TRAINING OBJECTIVE : This training aim to give knowledge and skill in the electric field.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to repair and maintain of the lighting installation and power circuit. 2. be able to repair and maintain of the electric motor circuit. 			
DAY'S PROGRAM	1st Day	Trouble shooting at the lighting installation.	
	2nd Day	Trouble shooting at the control circuit.	
	3rd Day	Trouble shooting at the control instrument.	
	4th Day	Trouble shooting at the magnetic contactor.	
	5th Day	Trouble shooting at the electric motor circuit.	
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Trouble shooting at the lighting installation. <ul style="list-style-type: none"> - Lighting. - Connection method. - Cable connection. 2. Trouble shooting at the power installation. <ul style="list-style-type: none"> - cable connection. - Connection method. - Connection point. 3. Trouble shooting at the control instrument. <ul style="list-style-type: none"> - Over current. - Over load. - Power control instrument and temperature. 4. Trouble shooting at the magnetic contactor. <ul style="list-style-type: none"> - Connection at the contactor is no good. - Contactor coil. 5. Trouble shooting at motor circuit. <ul style="list-style-type: none"> - Connection point at electric motor. - Coil at electric motor and electric motor contact. - Construction of the crank case. 		
Instructor : Maryo. Suhendar.		TRAINING FEE : Rp. 275.000,-	
MAIN EQUIPMENT : 1. Cramp meter. 2. Tester. 3. 1 & 3 Phase motor. 4. Combination plier, cutting plier			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION	CODE NO : LS-11.	TIME : 40 H
TRAINING COURSE : REWINDING MOTOR 3 PHASE.		
TRAINING TARGET : Maintenance or same level worker.		
<p>TRAINING OBJECTIVE : This course aim to train rewinding against electric motor 3 phase.</p> <p>The knowledge needs : electric measure and basic electricity.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to draw winding at the 3 phase motor. 2. be able to rewind the 3 phase motor. 		
DAY'S PROGRAM	1st Day	Introduction of principle and part electric 3 phase motor.
	2nd Day	drawing, repairing the part and winding electric 3 phase motor.
	3rd Day	Making the gauge and rewinding cable at gauge.
	4th Day	Putting on the cable to groove starter 3 phase motor.
	5th Day	Putting on the cable to groove, road test and measuring r.p.m.
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Introduction the principle and motor structure. <ul style="list-style-type: none"> - Rotor. - Stator. 2. Drawing. <ul style="list-style-type: none"> - 1500 rpm. - 3000 rpm. - Spiral winding. - Centrifugal winding. 3. Making gauge and winding cable at gauge. <ul style="list-style-type: none"> - Two side coil. - Three side coil. 4. Put on cable to groove stator 3 phase motor. <ul style="list-style-type: none"> - 1500 rpm. - 3000 rpm. 5. Road test. <ul style="list-style-type: none"> - Motor revolution. - Motor current. - Coil at electric motor and electric motor contact. - Construction of the crank case. 	
Instructor : Maryo. Suhendar.		TRAINING FEE : Rp. 375.000,-
MAIN EQUIPMENT : 1. 1 phase and 3 phase motor. 2. Rewinding gauge. 3. Tachometer. 4. AVO meter 5. Ampere meter.		

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION		CODE NO : LS-13.	TIME : 40 H
TRAINING COURSE : DIGITAL CONTROL.			
TRAINING TARGET : Maintenance and electric foreman or same level worker.			
TRAINING OBJECTIVE : This training to aim for to explain and making motor control circuit electric 3 phase with logic system. The knowledge to be important : electric control mechanic (sequence control/magnet contactor). By the end of the training period, the participants are expected to be able to get knowledge / techniques the following : <ol style="list-style-type: none"> 1. be able to control logic circuit. 2. be able to make logic control circuit. 3. be able to make 3 phase motor control circuit with logic system. 			
DAY'S PROGRAM	1st Day	Introduction of the component logic control system.	
	2nd Day	Introduction the logic symbols and drawing logic control circuit.	
	3rd Day	Making motor control circuit 3 phase.	
	4th Day	Making motor control circuit 3 phase, with timer.	
	5th Day	Making reverse control circuit 3 phase, with star/delta.	
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Introduction of the component logic circuit. <ul style="list-style-type: none"> - IC OR. - IC AND. - IC NOT. - Translator. 2. Drawing logic control circuit. <ul style="list-style-type: none"> - Self holding. - Motor reversal. - Timer. - Star/delta. 3. Making control logic circuit. <ul style="list-style-type: none"> - Self holding. - Motor reversal. - Timer. - Star/delta. - Elevator. 		
Instructor : Sangat Sunarto. Suhendar.		TRAINING FEE : Rp. 275.000,-	
MAIN EQUIPMENT : 1. Logic Circuit block. 2. Logic checker. 3. Tweezers. 3. Tester. 4. 3 phase motor.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION		CODE NO : LS-14.	TIME : 40 H
TRAINING COURSE : BASIC PLC.			
TRAINING TARGET : Electric maintenance electric and electric foreman.			
<p>TRAINING OBJECTIVE : This course aim to train making basic program, 3 phase motor control circuit and monitoring control circuit.</p> <p>By the end of the training period, the participants are expected to be able to get knowledge / techniques the following :</p> <ol style="list-style-type: none"> 1. be able to control PLC C20 circuit. 2. be able to write input and output of C20. 3. be able to draw, to read the symbols and function from PLC C20. 4. be able to make planing 3 phase motor control circuit. 			
DAY'S PROGRAM	1st Day	Introduction the component by PLC C20, wiring input, output PLC C20.	
	2nd Day	Reading to draw and operation PLC C20, monitoring circuit.	
	3rd Day	Making plan self holding control circuit and 3 phase motor reversal.	
	4th Day	Making plan motor circuit with timer, counter.	
	5th Day	Making plan star/delta motor, 3 phase motor circuit and star/delta.	
TRAINING CONTENTS	<ol style="list-style-type: none"> 1. Introduction the component by PLC C20. <ul style="list-style-type: none"> - CPU. - Input and output. - PLC function. 2. To read drawing. <ul style="list-style-type: none"> - Logic circuit block. - Input data to PLC and monitor. 3. Making plan 3 phase motor control. <ul style="list-style-type: none"> - Self holding. - Motor reversal. - Timer, counter. - Star/delta, 3 phase motor circuit. 		
Instructor : Maryo. Suhendar.		TRAINING FEE : Rp. 275.000,-	
MAIN EQUIPMENT : 1. PLC C20 trainer. 2. Input-output unit. 3. Tester. 4. Air Cylinder(Sensor). 5. 3phase motor.			

SKILL-UPGRADING TRAINING COURSE GUIDE

TRAINING FIELD : ELECTRIC/AIR CONDITION		CODE NO : LS-15.	TIME = 40 H
TRAINING COURSE : INTERMEDIATE PLC.			
TRAINING TARGET : Electric maintenance and electric foreman.			
TRAINING OBJECTIVE : This training aim to improve PLC circuit program. By the end of the training period, the participants are expected to be able to get knowledge / techniques the following : 1. be able to make the air cylinder circuit. 2. be able to make the life circuit. 3. be able to make the robot circuit by the air cylinder and the electric motor.			
DAY'S PROGRAM	1st Day	Making C200H program by the air cylinder.	
	2nd Day	Making plan air cylinder with C200H.	
	3rd Day	Making plan lift circuit with the elevator simulator.	
	4th Day	Making plan the robot circuit with air cylinder.	
	5th Day	Making plan the robot with electric motor.	
TRAINING CONTENTS	1. Making plan air cylinder with C200H. - One air cylinder (one valve). - Two air cylinder (one valve). - Three air cylinder (two valve). - With timer and counter, shift register. 2. Making plan lift circuit. - Without photo sensor. - With photo sensor, timer. 3. Making plan robot circuit. - Robot with the air cylinder. - Robot with the electric motor.		
Instructor : Meryo. Suhendar		TRAINING FEE : Rp. 275.000,-	
MAIN EQUIPMENT : 1. PLC C200H Trainer. 2. Input-output. 3. Air Cylinder(Sensor) 4. Elevator simulator(Sensor)			

4-6 訓練用教材作成リスト

作成教材リスト(1)

向上計画(2006) NOV.1998

教材名	使用コース		担当名	内 容	作成予定時期					備 考
	コース番号	コース名			1992	1993	1994	1995	1996	
旋削作業 MESIN BURUT	MS-1~7	MESIN BURUT, JURKUS DAN TURUS ETC. # The Lathe Processing Work	J. CAMALI	1.外装とナベ加工 2.内通加工 3.ネジ切り作業 4.角ネジ切り作業 5.面形ネジ切り作業 6.多角ネジ切り作業 7.偏心切り作業 8.総合組立作業	—	—	■	—	—	1994年印刷 製本完了
フライス削り MESIN FRANS	MS-8~16	PESEKAPAN KERJA PANDA MESIN FRANS ETC. # The Milling Processing Work	E. KOSASTIH	1.フライスの理論、操作と刃加工、仕上加工 2.コマシヤク削り及刃研削加工 3.あり溝加工法 4.下溝加工法 5.アムスによる旋削作業 6.スライラル超硬加工 7.余量削り加工	—	—	—	■	—	1994年印刷 製本完了
平面研削作業	MS-09 (For 1998)	MESIN GERINDA DATAR # The Grinding machine	J. CAMALI	平面研削機の取扱い、基本加工 作業実習	—	—	—	—	—	1994年印刷 製本完了
工具研削作業	MS-17	MESIN GERINDA # Tool Grinding Machine for Milling Tools	MULIYONO	工具研削機の取扱い ニードミル研削、各種工具研削	—	—	—	—	—	1994年印刷 製本完了
自動プログラミング FAPT MILL 1	MS-20	Auto programming Computer FAPT MILL 1	MULIYONO	自動プログラムの構成、運動定義、図形定義 プログラムの作成練習	—	—	—	—	—	1994年印刷 製本完了
自動プログラミング FAPT MILL 2	MS-21	Auto programming Computer FAPT MILL 2	MULIYONO	ジョグ、コピー命令、マクロ、点群 点列、プログラム作成練習	—	—	—	—	—	1994年印刷 製本完了
マシニング プログラム FAPT MILL 2	MS-18 MS-10	Vertical Machining Center Programming MANUAL	ARVIN	マシニングのプログラム作成練習	—	—	—	—	—	1994年印刷 製本完了

注：マシニングコースは1995年使用

— 作成予定時期

■ 印刷製本実施、または予定済可

作成教材リスト(2)

新編及び改訂作成教材

向上出版 (株) NOV. 1996

教材名	使用コース		担当名	内容	作成予定時期				備考
	コード番号	コース名			1992	1993	1994	1995	
旋削作業	XS-1	LATHE MACHINE Basic Skill on Lathe X	ARMIX	外径、内径の旋削加工と仕上げ、削定法 チーパー加工、ネジ切り					1996年印刷 校本完了
旋削作業	XS-2	LATHE MACHINE Basic Skill on Lathe X	RAMVALIS	旋削による外径、仕上げ加工、削定法 旋削加工のJob Sheet					
旋削作業 (中級)	XS-3	Assembling Work (Lathe Machine)	NAZIK	総合NC旋削作業 (旋削機)					
切削工具と切削条件	XS-4	MULTI-TOOL PAINT BIT Grinding method of Tools (For Lathe Machine)	し. CUMBALI	旋削用工具、 各種工具研削方法					1994年印刷 校本完了
フライス削作業	XS-5	Milling Machine Basic Skill on Milling	B. KOSASIH	旋削削法、六面体加工、削定法 加工手順等のJob Sheet					1996年印刷 校本完了
フライス削作業	XS-6	Milling Machine Basic Skill on Milling	B. KOSASIH	六面体加工、エンドミルの使用法 加工及び削定法等のJob Sheet					1996年印刷 校本完了
7軸削作業 (中級)	XS-7	Assembling Work (Milling Machine)	B. KOSASIH	はめ合わせ総合課題					1996年印刷 校本完了
カマクシカ実習編	XS-13 XS-14	Vertical Machining Center Training Manual	ARMIX	加工旋削用ジョブシート CA製削機(旋削)					
NC旋削加工 プログラム実習編	XS-10 XS-11	NC Lathe Training Manual	MULTIWORK	NCプログラミング、トレーニング マニュアル					1996年印刷 校本完了
マクロ プログラミング	TEXT BOOK	Macro Programming	し. CUMBALI	マクロプログラミング作成マニュアル					1996年印刷 校本完了
切削加工の基礎知識 XS-1~XS-3までの テキスト	TEXT BOOK XS-1~XS-3	Fundamentals of Machine Processing	し. CUMBALI	旋削加工技術者のための基礎知識 (XS-1~XS-3までのテキスト)					1996年印刷 校本完了

注: マニュアル番号は1996年度用(95年度にコースの取直しの場合)

作成予定期間 1996年度末まで予定済み

作成教材リスト

向上型電子教材 1996

教材名	使用コース		担当名	内容	作成時期					備考
	コース番号	コース名			1992	1993	1994	1995	1996	
電気測定	LS-01	Pengukuran Besaran Besaran Listrik	MARYO	オームの法則、電圧、電流測定 テスター使用法、電圧測定						1994印刷 製本完了
冷暖房機	LS-02	Dasar-linear Refrigerasi	SANGAT SURWANTO	冷暖の原理、各種冷暖房機等の説明 冷暖サイクル						1995作成済み 1996製本完了
AC基礎	LS-03	AC Dasar	SANGAT SURWANTO	空気システム、空調エアコン分解修理 原理						1994印刷製本完了 1995印刷製本完了
冷暖房/冷凍機	LS-04	Kulkas / Freezer	MARYO	冷媒の種類、冷蔵庫、冷凍機分解修理、配管						1995作成済み 1996製本完了
AC応用 1	LS-05	AC Lanjutan I	SUHENDAR	各種エアコン、冷暖房機製作 各種安全電気点検整備						1994印刷製本完了 1995印刷製本完了
製氷機/冷たい水	LS-06	Ice Maker / Show Case	SANGAT SURWANTO	製氷方法、内部構造と機能点検 ダイヤグラムの配管						1995作成済み 1996製本完了
AC応用 2	LS-07	AC Lanjutan II	SANGAT SURWANTO	配管システム、水冷配管 バックジョージアコン脱臭、整備						1995作成済み 1996製本完了
AC応用 3	LS-08	AC Lanjutan III	SANGAT SURWANTO	モリエル検図、空調システム設計 空調負荷計算、ダクト計算と施工						1995作成済み 1996製本完了
工業電気制御作業	LS-09	Instalasi Pengeraman Fabrik	SUHENDAR	照度配管、配管図、配管図 ブレーカー、電力計取付方法						市販の印刷物を 使用
電気制御作業作業	LS-10	Electric Maintenance	SUHENDAR	故障診断 照明器具・制御回路・ 制御装置・安全コネクタ						1995作成済み 1996製本完了
3相モーター巻機	LS-11	Revolving motor 3 Phase	MARYO	モーター分解、組立、各種3相モータ 一巻き接続						1995印刷 製本完了
有接点自動制御	LS-12	Sequen Control Mekanik	SUHENDAR	リレー、タイマー、タイムチャート図 ON, OFF, 自己保持、ロック、Y-Δ接続						1994印刷 製本完了
デジタル制御	LS-13	Digital Control	H.H. SURWANTO	ロジック制御システム、シンボル、 回路、モーター、タイマー、Y-Δ接続						1994印刷 製本完了
P.L.C基礎	LS-14	P.L.C Dasar	MARYO	インソール、キーボード操作、C-20 基本操作、プログラム、シンタックス、印刷						1994印刷製本完了 1995印刷製本完了
P.L.C応用	LS-15	P.L.C Lanjutan	MARYO	C-200基本操作、プログラム、シンタ クス印刷、エレベーター制御						1994印刷 製本完了

作成時期 1992 1993 1994 1995 1996

教材作成計画(1)

向上型電子科 Rev.1996

科目名	使用コース		担当CP名	内容	作成予定時期					備考
	コース番号	コース名			1992	1993	1994	1995	1996	
電気の基礎	E1-1	Dasar Kelistrikan	KARTINI	電圧・電流・抵抗、オームの法則、電圧回路、交流回路、電気の応用			■			1995印刷 製本完了
電子計測機器の応用法	E1-2	Pengukuran Instrumentasi	IMAN	電圧・電流・抵抗等の物理量の計測、オシロスコープによる各種波形観測				■		1995印刷 製本完了
電子部品	E1-3	Komponen Elektronika	AGUS	抵抗・コンデンサ等の受動素子、トランジスタ・IC等能動素子の原理動作				■		1995印刷 製本完了
電子回路	E1-4	Rangkaian Elektronika	KARTINI	電流回路、電圧回路、電源回路、フィルタ回路等基本電子回路動作					■	1995印刷 製本完了
電子機器組立	E1-5	Teknik Perakitan	KARTINI	各種電子部品のプリント基板への取付 実法および機器組立並びに評価法					■	1994印刷 製本完了
デジタル回路基礎	E1-6	Digital Dasar	SIBANDI	デジタルICの種類と特徴、フリップフロップ、データアックの応用					■	1995印刷 製本完了
デジタル回路応用	E1-7	Pengendali Digital	SIBANDI	カウンタ回路、A/D、D/A回路 計数表示制御回路、モータ制御回路					■	1995印刷 製本完了
電源回路	E1-8	Regulator	AGUS	電圧変換回路、逆電流保護回路、短絡保護回路、定電圧回路他					■	1993印刷 作成完了
オペアンプ	E1-9	Operasional Amplifier	IMAN	OPアンプの基礎と特性、OPアンプの素子回路、OPアンプの応用回路					■	1995印刷 製本完了
ラジオ技術	E1-10	Teknik Radio Penerima	KARTINI	チューナ回路、中間周波回路、自動利得制御回路他					■	1995印刷 製本完了
白黒テレビ技術	E1-11	Televisi Hitam Putih	AGUS	音声信号回路、映像信号回路、水平同期回路等並びに故障修理技術					■	1995印刷 製本完了
カラーテレビ技術	E1-12	Televisi Warna	AGUS	音声信号回路、映像信号回路、各種の同期回路等並びに故障修理技術					■	1995印刷 製本完了

—— 作成予定期間 ■ 印刷済または電子作成済

教材作成計画(2)

向上型電子科 Rev.1996

教材名	使用コース		担当CP名	内容	作成予定時期					備考
	コード番号	コース名			1992	1993	1994	1995	1996	
オーディオ技術	EL-13	Teknik Audio	KARTINI	加算機回路、電力増幅回路及び電源回路並びに故障修理技術					■	1994印刷 製本完了
MS-DOS	EL-14	MS-DOS	IWAN	MS-DOS概要ファイル、内部及び外部コマンド、パッチ他				■		1995印刷 製本完了
BASIC	EL-15	Program BASIC	KARTINI	QBASIC概要、コマンドの環境と使用法、プログラムの作成等				■		1994印刷 製本完了
WORDSTAR	EL-16	WORDSTAR	KARTINI	ワードスター概要、各種操作・編集法及びファイルの作成法等				■		1994印刷 製本完了
LOTUS123	EL-17	LOTUS1-2-3	SANDI	ロータス1-2-3 概要、シート、コマンド、プリントシート、データ、グラフ				■		1994印刷 製本完了
dBASE	EL-18	dBASE	AGUS	dBASE概要、ファイル作成、データ表示・操作・検索、ファイル編集他				■		1994印刷 製本完了
Z80マイコン回路	EL-19	Z80 Micro Computer	IWAN	マイクロコンピュータの概要、Z80 CPUと命令セット、プログラム作成					■	1995印刷 製本完了
Z80マイコン制御	EL-20	Micro Computer Control	IWAN	マイコン制御プログラムの考え方、温度制御、モーター制御					■	1995印刷 製本完了
センサーアプリケーション	EL-21	Aplikasi Sensor Untuk Kendali	AGUS	センサー概要、近接センサー、光電センサー、超音波センサーの原理と使用法の実例					■	1995年外 原稿完了
パーソナルコンピュータ入門	EL-22	Pengenalan Komputer	IWAN SUBANDI	パソコンの構成と基本操作、ソフトウェアのインストールと使い方						1995印刷 作成了
電子回路板設計	EL-23	Teknik Perawatan Untuk Peralatan Elektronika	AGUS KARTINI	電子回路板設計の基礎理論、電子部品表示、各種回路板設計方法の実例						1995印刷 作成了
三相電機板のインバータ制御	EL-24	Motor Speed Control by Inverter System	AGUS, IWAN KARTINI	三相誘導電動機の特徴、インバータ装置の原理、パラメータの設定と運転						1995印刷 作成了

—— 作成予定期間 ■ 印刷製本完成予定時刻

4-7 補完技術移転状況表
 11-1-1-1 加工技術移転多岐用加工機

向上訓練機械科 Nov. 1996

T-NO.	ユース名称	内容	カウチン・パートナー				
			ARMIN	MUL.TYONO	I. CHIARA	E. KOSASI	RAMAYURI
MS-01	Basic Skill on Lathe Machine 1	旋盤加工 1	A	A	A	A	A
MS-02	Basic Skill on Lathe Machine 2	旋盤加工 2	A	A	B	B	B
MS-03	Assemble work (For Lathe Machine)	機械加工組立 (旋盤用中級)	A	A	B	A	B
MS-04	Cutting Tools and Cutoff & Condition	切削工具と切削条件	A	A	B	B	B
MS-05	Milling Machine 1	フライス盤加工 1	A	A	B	A	B
MS-06	Basic Skill on Milling Machine 2	フライス盤加工 2	A	A	B	A	B
MS-07	Milling Machine Assembleing work	フライス盤作業 (中級課題)	A	A	B	A	B
MS-08	Grinding Endmill	工具研削作業	A	A	B	B	C
MS-09	Basic Grinding Machine	研削盤作業	A	A	B	A	C
MS-10	NC Lathe Machine (1)	NC 旋盤作業	A	A	A	C	C
MS-11	Cycle Program and Automatic Program	NC 旋盤用サイクル加工プログラム	A	A	B	C	C
MS-12	NC Lathe Machine (2)	NC 旋盤作業	A	A	B	C	C
MS-13	Vertical Machining Center (1)	マシニングセンター (1)	A	A	A	B	C
MS-14	Vertical Machining Center (2)	マシニングセンター (2)	A	A	B	C	C
MS-15	FANUC Auto Program Tool FAPT MILL (1)	自動マシニング FAPT MILL (1)	A	A	A	C	C
MS-16	FANUC Auto Program Tool FAPT MILL (2)	自動マシニング FAPT MILL (2)	A	A	A	B	C
MS-17	Cutting Program 3 Dimension MACRO PROGRAMING	自動プログラム作成 DIG-III 各種曲面加工プログラム マクロによるプログラム作成	A	A	A	C	C

技術移転達成度 A : 100%-80%, B : 80%-60%, C : 60%-40%, D : 40%-20%, E : 20%-

一一一ス別住支術系多中云状況表

向上訓練電気科 Nov. 1996

工-NO.	コース名称	内容	カワター・パート氏名			
			MARYO	SOLARSON	SUHENDAR	BUDIYONO
LS-01	Pengukuran Besaran-Besaran Listrik	電圧測定 オームの法則、電圧、電流測定 システム使用法、電力測定	a	a	a	b
LS-02	Dasar-Dasar Refrigerasi	冷凍基礎 冷凍の原理、各種使用機器の説明 冷凍サイクル	a	a	a	d
LS-03	AC Dasar	AC基礎 空気のシステム、窓型エアコン分解検査 修理	a	a	a	
LS-04	Kulkas / Freezer	冷蔵庫/ 冷凍庫 各種冷気、冷蔵庫、故障診断 分解検査、配線	a	a	a	
LS-05	AC Lanjutan I	AC応用1 各種エアコン、付属機器製作 各種安全装置点検整備	a	a	a	
LS-06	Ice Maker / Show Case	製氷機/ ショーケース 製氷方法、内部構造と機能点検 ダイヤモンド配線	a	a	a	
LS-07	AC Lanjutan II	AC応用2 配管システム、水冷配管 バックアップエアコン取扱い整備	a	a	a	
LS-08	AC Lanjutan III	AC応用3 モリエレ線図、空調システム設計 各種負荷計算、ダクト計算と施工	a	a	a	
LS-09	Instalasi Penerangan Pabrik	工場電気 照明配線、展開図、配管図 ブレーカー、電力計取付配線	a	a	b	
LS-10	Electric Maintenance	電気保守 故障診断 照明器具・制御回路・ 制御装置・マイクロコンタ	a	b	c	
LS-11	Rewinding motor 3 Phase	3相モーター 巻替え モーター分解、組立、各種3相モーター巻替え	a	a	a	
LS-12	Sequen Control Mekanik	有接点 リレー、タイマー、タイムチャート図 ON, OFF、自己保持、インターロック、V-Δ接続	a	a	e	a
LS-13	Digital Control	デジタル 自動制御 ロジック制御システム、シンボル、 回路、モーター、タイマー、V-Δ接続	a	a	e	
LS-14	PLC Dasar	PLC基礎 基本操作、プログラム、シンタックス、 基本操作、プログラム、シンタックス、 シンボル、キーボード操作、C-20	a	a	e	a
LS-15	PLC Lanjutan	PLC応用 C-200基本操作、プログラム、シン タックス、エレベーター制御	a	b	e	c
	PLC Atas	PLC上級 C-2000基本・応用操作、プログラ ム、ハードウェア、温度制御	c	e	e	d
				95.11~ D III 2期生	96.8本省 へ転勤	96.7~新 練も担当

技術修成率 a:100%-80%, b:80%-60%, c:60%-40%, d:40%-20%, e:20%-

コース別技術修習状況表

向上訓練電子科 Nov. 1986 (その1)

コースNo.	コース名称	内容	カワター・パート氏名			
			IHAN IRIANA	AGUS MUCHTAR	KARTAINI	SUBANDI
EL-1	Dasar Kelistrikan	電気の基礎	a	a	a	a
EL-2	Pengukuran Instrumentasi	電圧・電流・抵抗、オームの法則、直流回路、交流回路、電気の応用	a	a	a	a
EL-3	komponen Elektronika	電子用計測器の使用法	a	a	a	a
EL-4	Rangkaian Elektronika	電子部品	a	a	a	a
EL-5	Teknik Perakitan	電子回路	a	a	a	a
EL-6	Digital Dasar	電子機器組立	a	a	a	a
EL-7	Pengendali Digital	デジタル回路基礎	a	a	a	a
EL-8	Regulator	デジタル回路応用	a	a	a	a
EL-9	Operasional Amplifier	電源回路	a	b	a	b
EL-10	Teknik Radio Penerima	オペアンプ	a	a	a	a
EL-11	Televisi Hitam Putih	ラジオ技術	a	a	a	a
EL-12	Televisi Warna	白黒テレビ技術	a	a	a	a
	(備考)	音声信号回路、映像信号回路、水平垂直同期回路等並びに故障修理技術	a	a	a	a
		音声信号回路、映像信号回路、各種の同期回路等並びに故障修理技術	a	a	a	a
						96.7~訓練も担当

技術修習達成度 a:100%-80%, b:80%-60%, c:60%-40%, d:40%-20%, e:20%.

コース別技術移転状況表

向上訓練電子科 Nov. 1986 (その2)

コースNO.	コース名称	内容	カウター・パートナー氏名			
			IMAN IRIANA	AGUS MUCITAR	KARTINI	SUBANDI
EL-13	Teknik Audio	オーディオ技術	a	a	a	b
EL-14	MS-DOS	前段増幅回路、電力増幅回路及び帰還回路等並びに故障修理技術	a	a	a	a
EL-15	Program BASIC	MS-DOS 概要ファイル、内部及び外部コマンド、バッチ他	a	d	a	d
EL-16	WORDSTAR	BASIC 概要、コマンドの種類と使用方法、プログラムの作成等	a	a	a	d
EL-17	LOTUS 123	WORDSTAR 及びファイルの作成法等	c	a	a	b
EL-18	dBASE	LOTUS 1-2-3 概要、シート、コマンド、プリントシート、データ、グラフ	c	a	a	b
EL-19	Z80 Micro Computer	dBASE 概要、ファイル作成、データ表示・操作・検索、ファイル編集他	a	b	b	b
EL-20	Micro Computer Control	Z80マイコン回路	a	b	b	b
EL-21	Aplicasi Sensor Untuk Kendali	Z80マイコン制御	b	b	d	b
EL-22	Pengenalan Komputer	センサ概要、近接センサ、光電センサ超音波センサ等原理と使用法の実例	a	c	a	-
EL-23	Teknik Pengawatan Untuk Peralatan Elektronika	パソコン入門	-	b	b	c
EL-24	Motor Speed Control by Inverter System	電子回路接続法の基礎理論、電子部品の表示、各種回路配線方法の実例	-	-	-	-
	(備考)	三相誘導電動機の特徴、インバータ装置の原理、パラメータの設定と運転				96.7~訓練も担当

技術移転達成度 a:100%-80%, b:80%-60%, c:60%-40%, d:40%-20%, e:20%-

JICA