

APPENDIX 4. Training Curriculum

TRAINING CURRICULUM

(i) Theoretical Courses

- a. Ordinary courses (Total 450H)
 - (a) Special lectures
 - (b) Principles of pedagogy
 - (c) Pedagogical psychology
 - (d) Training and instruction techniques
 - (e) Theory of student counseling
 - (f) Foreign language
 - (g) Physical education
 - (h) Others
- b. Specialized courses (Total 500H)
 - (a) Manual finishing methods and tools
 - (b) Machine tools, machining methods and tools
 - Shaping machine, sawing machine, double head grinding machine
 - Lathe
 - Milling machine
 - Vertical drilling machine, radial drilling machine
 - Horizontal boring machine
 - Turret lathe
 - Vertical milling machine (digital control type)
 - Gear hobbing machine
 - Surface grinder
 - Cylindrical grinder
 - (c) Cutting tool grinding machines of various kinds and machining methods
 - Drill grinding machine
 - Universal tool grinding machine
 - Ultra-hard cutting tool grinding machine
 - (d) Precision-measurement methods
 - (e) Machine drafting & industrial standards
 - (f) Heat-treatment of mechanical material and metallic materials
 - (g) Design of machine elements, fundamentals of design calculation
 - (h) Maintenance of machine tools, theory of electricity and electric circuits of machine tools

- (i) Maintenance of machine tools, lubricants, hydraulics and hydraulic circuits
- (j) Labour safety & factory sanitation
- (k) Automatic control

(ii) Practical Training (Total 2,000 H)

a. Basic practical training

- (a) Machine design and drafting
- (b) Precision-measuring
- (c) Labour safety and factory sanitation
- (d) Manual finishing
- (e) Machining work of various kinds
 - Sawing machine, shaping machining, double-head grinding machine
 - Lathe
 - Milling machine
 - Vertical drilling machine, radial drilling machine
 - Horizontal boring machine
 - Turret lathe
 - Vertical milling machine (Digital control type)
 - Gear hobbing machine
 - Surface grinder
 - Cylindrical grinder
- (f) Cutting tool grinding machines of various kinds
 - Drill grinding machine
 - Universal cutting tool grinding machine
 - Ultra-hard cutting tool grinding machine
- (g) Heat-treatment of metallic materials
- (h) Maintenance, inspection (electric and hydraulic circuit), repair and precision-checking of machine tools

b. Applied practical training

Construction of parts and components in accordance with the proposed themes.

Practical training at factories and teaching practice (Total 450H).

TRAINING CURRICULUM

- (i) Theoretical courses (1,150H)
 - a. Ordinary theoretical courses common to all students (450H)
 - (a) Special lectures
 - (b) Principles of pedagogy
 - (c) Training and instruction techniques
 - (d) Theory of student counseling
 - (e) Pedagogical psychology
 - (f) Foreign language
 - (g) Physical education
 - (h) Others
 - b. Specialized courses (700H)
 - (a) Welding I (Covered electrode arc welding)
 - (b) Welding II (Gas welding & cutting)
 - (c) Welding III (Automatic & semi-automatic welding)
 - (d) Welding IV (Non-ferrous metal welding)
 - (e) Welding V (Others)
 - (f) Design & drafting
 - (g) Metallic materials
 - (h) Strength of materials
 - (i) Introduction to mechanical engineering
 - (j) Machining with machine tools
 - (k) Introduction to electrical engineering
 - (l) Theory of welding inspection
 - (m) Safety & sanitation
 - (n) Submerged arc welding
 - (o) Inspection of welded parts
 - (p) Basic plate working
 - (q) Basic forging
 - (r) Safety & sanitation

(ii). Practical training (1,800H)

- a. Basic practical training
 - (a) Basic measuring work
 - (b) Basic mechanical work
 - (c) Covered electrode welding I (Welding steel plates)
 - (d) Covered electrode welding II (Welding steel plates & steel pipes)
 - (e) Gas welding & cutting
 - (f) CO₂ gas & MAG welding
 - (g) TIG welding
 - (h) MIG welding
 - (i) Plasma welding & cutting
 - (j) Non-gas welding
- b. Applied practical training
 - (a) Construction of welded products in accordance with proposed themes.

(iii). Practical training at factories and teaching practice (450H)

TRAINING CURRICULUM

- (i). Theoretical course (1,150H)
 - a. Ordinary theoretical courses common to all students (450H)
 - (a) Special lectures
 - (b) Principles of pedagogy
 - (c) Training and instruction techniques
 - (d) Theory of student counseling
 - (e) Pedagogical psychology
 - (f) Foreign language
 - (g) Physical education
 - (h) Others
 - b. Specialized courses (700H)
 - (a) Plate working method
 - (b) Automotive vehicle plate working
 - (c) Plumbing method
 - (d) Introduction to stamping
 - (e) Pipe machining method
 - (f) Introduction to machining
 - (g) Design & drafting
 - (h) Metallic materials
 - (i) Strength of materials
 - (j) Basic welding theory
 - (k) Introduction to electrical engineering
 - (l) Machining methods
 - (m) Safety & sanitation

(ii). Practical training (1,800H)

a. Basic practical training

- (a) Basic measuring work
- (b) Basic work with machines
- (c) Basic Plate working
- (d) Basic Plumbing & pipe laying work
- (e) Basic Plumbing work
- (f) Basic plate working for automotive vehicles
- (g) Basic welding work
- (h) Automotive vehicle painting work
- (i) Basic forging work
- (j) Safety f sanitation

b. Applied practical training

- (a) Construction of parts and components in accordance with the proposed theme.

(iii). Practical training at factories and teaching practice (450H).

TRAINING CURRICULUM

- (i). Theoretical course (1,150H)
 - a. Theoretical courses common to all students (450H)
 - (a) Special lectures
 - (b) Principles of pedagogy
 - (c) Training and instruction techniques
 - (d) Theory of student counseling
 - (e) Pedagogical psychology
 - (f) Foreign language
 - (g) Physical education
 - (h) Others
 - b. Specialized theoretical courses (700H)
 - (a) Structure of automotive vehicles
 - (b) Structure of internal combustion engines
 - (c) Electrical equipment
 - (d) Maintenance method
 - (e) Inspection method
 - (f) Machining methods
 - (g) Materials
 - (h) Drafting
 - (i) Law and regulations
 - (j) Strength of materials

(ii). Practical training (1,600H)

a. Basic practical training (1,300H)

- (a) Basic measuring work
- (b) Basic finishing work
- (c) Basic machine operation
- (d) Basic plate working and welding
- (e) Basic painting work
- (f) Basic engine & engine accessories overhaul
- (g) Basic body & chassis overhaul
- (h) Basic vehicle testing
- (i) Safety & sanitation

b. Applied practical training (300H)

Comprehensive maintenance work

(iii). Practical training at factories and teaching practice (450H).

TRAINING CURRICULUM

- (i). Theoretical course (1,450H)
 - a. Ordinary theoretical courses common to all students (450H)
 - (a) Special lectures
 - (b) Principles of pedagogy
 - (c) Orientation and instruction techniques
 - (d) Theory of student counseling
 - (e) Pedagogical psychology
 - (f) Foreign language
 - (g) Physical education
 - (h) Others
 - b. Specialized courses (1,000H)
 - (a) Theory of electricity
 - (b) Applied electricity
 - (c) Electric equipment
 - (d) Measuring & testing
 - (e) Handicraft
 - (f) Drafting & electrical wiring diagram
 - (g) Electrical construction work
 - (h) Power distribution and electrical wiring design
 - (i) Electrical wiring apparatuses & materials
 - (j) Laws and regulations
 - (k) Air-conditioning methods
 - (l) Others

- (ii). Practical training (1,500H)
 - a. Basic practical training (900H)
 - (a) Basic measuring
 - (b) Basic handicraft
 - (c) Disassembling/assembling electrical equipment
 - (d) Winding & insulation
 - (e) Assembling & repairing basic control circuits
 - (f) Handling & connecting electric wires
 - (g) Basic electric construction work
 - (h) Basic operation of freezing/air-conditioning equipment
 - (i) Others
 - b. Applied practical training (600H)
 - (a) Electrical wiring (equipment & control circuit)
 - (b) Assembling/disassembling (equipment and control circuit)
 - (c) Repair/adjustment (equipment and control circuit)
 - (d) Inspection (equipment and control circuit)
 - (e) Winding and insulation
 - (f) Extension wiring construction work
 - (g) Test, inspection and maintenance of electrical wiring

TRAINING CURRICULUM

- (i). Theoretical course (1,450H)
 - a. Ordinary theoretical courses common to all students (450H)
 - (a) Special lectures
 - (b) Principles of pedagogy
 - (c) Orientation and instruction techniques
 - (d) Theory of student counseling
 - (e) Pedagogical psychology
 - (f) Foreign language
 - (g) Physical education
 - (h) Others
 - b. Specialized theoretical courses (1,000H)
 - (a) Theory of electricity
 - (b) Theory of electricity
 - (c) Electric equipment
 - (d) Measuring methods & test methods
 - (e) Handicraft
 - (f) Parts and materials
 - (g) Drafting
 - (h) Others (The required knowledge of mathematics shall be taught in each course)

- (ii). Practical training (1,500H)
 - a. Basic practical training (900H)
 - (a) Basic measuring work
 - (b) Basic handicraft
 - (c) Circuit diagram drafting
 - (d) Basic circuit assembling work
 - (e) Electronic circuit assembling & disassembling work
 - (f) Handling high frequency
 - (g) Others
 - b. Applied practical training (600H)
 - (a) Measuring & testing
 - (b) Repair & adjustment of electronic equipment
 - (c) Others (Construction of MES teaching materials, etc.)

- (iii). Practical training at factories and teaching practice (450H)

.

APPENDIX 5. Equipment List

Required Machinery and Equipment List

Major Articles Vocational Training Dept.

I. MACHINING

1. Lathe
2. Universal Milling Machine
3. Vertical Milling Machine
4. Shaping Machine
5. Radial Drilling Machine
6. Upright Drilling Machine
7. Bench Drilling Machine
8. Surface Grinding Machine
9. Cylindrical Grinding Machine
10. Universal Cylindrical Grinding Machine
11. Carbon Tool Grinder
12. Double Headed Grinder
13. Drill Grinding Machine
14. Band Saw
15. Furnace (Heat Treatment Equipment)
16. High Speed Cutting Machine
17. Compressor
18. Universal Shadowing Machine
19. Metal Microscope
20. Metal Polishing Equipment
21. Gear Inspecting Machine
22. Surface Roughness Inspection Machine (Tracer Type)
23. Auto Collimeter
24. Comparing Tester of the Length
25. Hightmaster
26. Measuring / Instrument
27. Tools
28. Parts

II. WELDING

1. A.C. Arc Welding Machine
2. D.C. Arc Welding Machine
3. Engine Welder
4. TIG Welding Machine
5. MIG Welding Machine
6. CO2 Arc Welding Machine
7. Non-Gas Arc Welding Machine
8. Plasma Welding / Cutting Machine
9. Submerged Arc Welding Machine
10. Oxy-Acetylene Gas Equipment
11. Power Sheering Machine
12. Pillar Drilling Machine
13. Bench Drilling Machine
14. Hack-Sawing Machine
15. Electrode Drying Machine
16. Tension Tester
17. X-ray Equipment
18. Ultrasonic Equipment
19. Hardness Tester
20. Automatic Gas Cutting Machine
21. Universal Shadow Machine
22. Buff Grinder
23. Bending Tester
24. Belt Surfacers
25. Bevel Angle Processing Machine
26. High Speed Cutting Machine
27. Grinding Machine
28. Shaping Machine
29. Welding Positioner
30. Foot Shear
31. Air Compressor
32. Spot Welding Machine
33. Heavy Oil Furnace
34. Measuring Instruments
35. Tools
36. Parts

III. SHEET METAL / PIPE FITTING

1. Press Brake
2. Crank Press
3. Frame Aligner
4. Portable Spot Welder
5. Beading Rollers
6. Screw Press
7. Hydraulic Press
8. Bending Rollers
9. Vibro Shear
10. Universal Bender
11. Power Shearing Machine
12. Foot Shear
13. Pipe Bender
14. A.C. Arc Welding Machine
15. CO2 Arc Welding Machine
16. Pillar Drilling Machine
17. Bench Drilling Machine
18. Electrode Drying Machine
19. High Speed Cutting Machine
20. Grinding Machine
21. Pipe and Bolt Threading Machine
22. Air Compressor
23. Lift
24. Portable Hydraulic Press
25. Ultra Red Ray Dryer
26. Oxy-Acetylene Gas Equipment
27. Measuring Instruments
28. Tools
29. Parts

IV. AUTOMOBILE REPAIRING

1. Chassis Dynamometer
2. Brake Tester
3. Side Slip Tester

4. Head Light Tester
5. Auto Lift
6. Hydraulic Press
7. Car Washer
8. Steam Cleaner
9. Parts Cleaner
10. Tire Changer
11. Wheel Balancer
12. Brake Drum Lathe
13. Brake Lining Bonding Oven
14. Brake Shoe Grinder
15. Air Compressor
16. Portable Hydraulic Press
17. A.C. Arc Welder
18. Double Headed Grinder
19. Universal Test Benck
20. Auto Analyzer
21. Battery Charger
22. Sample Hydraulic System
23. Valve Refacer
24. Valve Seat Grinder
25. Valve Spring Tester
27. Hydraulic Bady Crane
28. Pinhole Honing Machine
29. Horn Tester
30. Vehicles
31. Engines
32. Measuring Instruments
33. Tools

V. ELECTRICITY

1. High-Low Voltage Power Distribution System
2. Sequence Control Training Equipment
3. Logic Circuit Training Equipment
4. Electric Locomotive Control Model
5. Automatic Warehouse Control Model

6. Testing Generator
7. Single Phase Induction Voltage Regulator
8. Rectifier
9. Coil Winding Machine
10. Transformer
11. Load Rheostat
12. Three Phase Balancer Load
13. Variable Reactor
14. Oil Pressure Bending Machine
15. Oil Pressure Press Tool
16. Oil Pressure Puncher
17. Electric Pipe Screw Machine
18. Bench-Drilling Machine
19. Double Headed Grinder
20. House Wiring Training Board
21. Small-Sized Refrigeration
22. Middle-Sized Refrigeration
23. Refrigeration Showcase
24. Chilling Unit
25. Cooling Tower
26. Package Type Air Conditioner
27. Fan Coil Unit
28. Room Cooler
29. Refrigeration Equipment Training Unit
30. Domestic Air Conditioning Control Training Unit
31. Refrigeration Equipment Electric Circuit Training Unit
32. Motor - Pump
33. Measuring Instruments
34. Tools
35. Parts

VI. ELECTRONICS

1. Oscilloscope
2. Universal Counter
3. X-Y Recorder
4. Pulse Generator

5. L.C.R. Bridge
6. Transistor Checker
7. Q Meter
8. Synchroscope
9. Variable Air Condenser
10. Variable Filter Training Set
11. Color Television Expansion Set
12. Color Television and Monochrome Sets
13. Color Bar Generator
14. Standard Signal Generator
15. Video Tape Recorder
16. Wireless / Amplifier
17. Interphone
18. Transceiver
19. SSB Equipment
20. Electronic Circuit Training Unit
21. Modulation-Demodulation Training Unit
22. Transistor Circuit Training Unit
23. DC Circuit Training Unit
24. Pulse Circuit Training Unit
25. AC - DC Converter
26. Micro Computer
27. DC - AC Converter
28. Bench Drilling Machine
29. Measuring Instruments
30. Tools
31. Parts

VII. RESEARCH AND DEVELOPMENT

1. Video Camera
2. Camera Control Unit
3. Video TV Recorder
4. Telecine
5. 16 mm TV Film Projector
6. 35 mm Slide Projector
7. Teaching Aids Presentation Equipment

8. Switcher
9. Flexible Wire Controller
10. Tripod
11. Camera Cable
12. Monitor TV Set
13. Editing Control Unit
14. Audio Mixer
15. Tape Recorder
16. Vector Scope
17. Oscilloscope
18. 35 mm Camera
19. Copy Machine
20. Printing Machine
21. Transparency Maker
22. Typewriter
23. Related Equipments & Attachments

VIII. AUDIOVISUAL / LIBRARY

1. Audiovisual Equipments
2. 16 mm Cineprojector
3. Slide and Filmstrip Projector
4. Overhead Projector
5. Video-film Reproduction Equipment
6. Related Equipments
7. Related Books

Image Projection Systems

1. Overhead Projectors
 - 1.1. Fixed Type
 - 1.2. Portable

2. 16 mm Movie Projector
 - 2.1. Fixed Type
 - 2.2. Portable

3. VTR Playback Unit
 - 3.1. Video Playback
 - 3.2. TV Set

4. Slide Projectors
 - 4.1. Magazine Type
 - 4.2. Carousal

5. Transformers and Voltage Regulators

6. Screen
 - 6.1. Stand Type
 - 6.2. Portable Type

7. Easels for Flip Charts

8. Magnetic Boards
 - 8.1. Portable
 - 8.2. Fixed Type

Industrial Extension Training Tools

1. Stop Watch + Clipboard
2. Pegboards
3. Work Sampling Simulator
4. Low-Cost Automation Training Kit System

Training Resources

Initial Supply of:

- (a) Training Films - 50 Sets of various titles (on industrial engineering, Small group activities, organization & development, production systems, production processes, etc.)
- (b) Video Tapes - 50 Sets of various titles (including "If Japan can, why can't we").
- (c) Training Manuals (including tapes/cassettes transparencies and session leaders notes)
- (d) Training & Development Books & Materials from American Society of Training & Development
- (e) 3 year subscription to various journals on Training & Development. Small scale industries, business management & industrial technology.

Public Address System

1. Power Amplifier Unit with Booster
2. Baffle speakers with Tweeters
3. Micro phone Sets
 - 3.1. Table Type
 - 3.2. Cordless
4. Tape Recording System

Training Materials Production System

1. Photo copying machines
 - 1.1. For speed reproduction w/sorting mechanism
 - 1.2. For reduction capacities
2. Memographing machine
3. Binding Systems
 - 3.1. Spring binders
 - 3.2. Staple binders
4. Drafting Equipment
 - 4.1. Drawing (Engineering Drawing Table)
 - 4.2. Drafting Set
5. VTR Electronic Edit System
 - 5.1. Editing capacity
 - 5.2. VTR Camera w/portapeck
 - 5.3. 16 mm Movie Camera
 - 5.4. Still Photo Camera (Nikon Pentax)

Laboratory Equipment

- 1.1. Personal Computer
- 1.2. Measuring and Analyzing equipment

JICA