

GOVERNMENT OF THE PUNJAB

**TECHNICAL EDUCATION & VOCATIONAL
TRAINING AUTHORITY**



**CURRICULUM FOR
KNIFE MANUFACTURING TECHNIQUES**

(6 – Months Course)
(July 2024)

**CURRICULUM SECTION
ACADEMICS WING**

96-H, GULBERG-II, LAHORE

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TRAINING OBJECTIVES

This curriculum is tailored for the knife manufacturing industry to equip students with both practical skills and essential theoretical knowledge pertinent to knife manufacturing techniques. It aims to cater to the entry-level requirements of individuals while addressing the specific needs of the knife manufacturing industry, thereby bridging the gap in skilled workforce. The training will emphasize the adoption of innovative and refined methods tailored to knife manufacturing, ensuring adherence to specific conditions and working environments, implementation of proper safety protocols, and maintenance of cleanliness standards throughout the production process.

CURRICULUM SALIENT

Name of the Course	:	Knife Manufacturing Techniques
Entry level	:	Middle preferably Matric
Duration of course	:	6-Months.
Total training hours	:	800 Contact hours
Training Methodology	:	Practical 80%
		Theory 20%
Medium of Instruction	:	Urdu / English

SKILL COMPETENCY DETAILS

On successful completion of this course, the trainee should be able to:

1. Utilize different hand and measuring tools properly.
2. Classify various types of knives and their applications.
3. Demonstrate proficiency in using AutoCAD.
4. Execute cutting techniques such as press cutting, wire cutting, and blanking.
5. Perform forging processes using equipment like forging hammers, anvils, and forging dies.
6. Execute blade processing steps including rough grinding, heat treatment and polishing.
7. Classify different types of handles used in knives and their materials.
8. Assemble various types of knives.
9. Shape and finish knife handles using appropriate techniques.
10. Proficiently perform edge profiling using fine grade grinding wheels.
11. Implement branding techniques such as punch stamping, etching etc.

KNOWLEDGE PROFICIENCY DETAILS

On successful completion of this course, the trainee will be able to:

1. Understand the characteristics and applications of various hand tools.
2. Identify different types of knives and materials used in their construction.
3. Gain proficiency in engineering drawing using AutoCAD.
4. Understand the processes involved in cutting and forging.
5. Comprehend the steps involved in processing knife blades.
6. Explain different types of handles and handle materials used in knife manufacturing.
7. Understand the assembly processes for various types of knives.
8. Define handle shaping techniques.
9. Understand edge profiling methods using fine grade grinding wheels.
10. Describe knowledge of branding techniques.

SCHEME OF STUDIES
Knife Manufacturing Techniques
(6–Months Course)

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Introduction to Hand tools and Measuring tools	6	10	16
2.	Introduction to Knives & Selection of Materials	7	7	14
3.	Engineering Drawing with CAD	18	98	116
4.	Cutting & Forging	21	91	112
5.	Processing of Blade (Rough Grinding, Heat Treatment, Polishing)	23	136	159
6.	Types of Handles and Handle Materials	12	63	75
7.	Assembling of Knives	21	98	119
8.	Handle Shaping and Finishing	7	35	42
9.	Edge Profiling	21	70	91
10.	Branding & Packaging	14	28	42
11.	Comply Health & Safety guidelines	10	4	14
Total		160	640	800

DETAIL OF COURSE CONTENTS
Knife Manufacturing Techniques
(6 – Months Course)

Sr.No	Detail of Topics	Theory Hours	Practical Hours
1.	Introduction to Hand Tools & Measuring Tools 1.1 Measuring Tools 1.1.1 Steel Foot Rule / Measuring Tape 1.1.2 Caliper Inside / Outside 1.1.3 Vernier Caliper, Kinds and Use 1.2 Hammer 1.2.1 Straight Peen Hammer 1.2.2 Cross Peen Hammer 1.3 Combination Pliers 1.3.1 Round Nose Pliers 1.3.2 Long Nose Plier 1.4 Drill Bits 1.5 Thread Taps & Dies 1.6 Screw Driver Sets 1.7 Files 1.8 Punches 1.8.1 Pin Punch 1.8.2 Centre Punch 1.8.3 Prick Punch 1.8.4 Hallow Punch 1.8.5 Hand punch	6	10

2.	Introduction to Knives & Selection of Materials Types of Knives 2.1. Fixed Blades 2.1.1 Outdoor Knives 2.1.2 Hunting Knives 2.1.3 Kitchen Knives 2.2 Swords 2.3. Folding Knives 2.3.1 Pocket Knives 2.3.2 Multi Blade Knives 2.4 Blade Materials 2.4.1 Carbon Steel 2.4.2 Stainless Steel 2.4.3 Damascus Steel	7	7
3.	Engineering Drawing With AutoCAD 3.1 Interface of AutoCAD Awareness 3.1.1 Getting familiar with the AutoCAD Interface 3.1.2 Crosshair / Cursor 3.1.3 Command Line, Status Line 3.1.4 UCS icon 3.1.5 Origin 3.1.6 Function Keys 3.1.7 Special Key Functions Pull-down 3.1.8 Menu Bar Dialog Box 3.1.9 Methods of Entering Commands 3.1.10 Shortcut Menus for Drawing Lines 3.2 Starting Auto CAD 3.2.1 Starting a new drawing 3.2.2 Saving a drawing	18	98

	3.2.3 Back up files 3.2.4 Opening an existing drawing file 3.2.5 Exiting AutoCAD 3.2.6 Exercises 3.3 Draw 3.3.1 Line 3.3.2 Construction Line 3.3.3 Polyline 3.3.4 Rectangle 3.3.5 Polygon 3.3.6 Circle 3.3.7 Arc 3.3.8 Spline 3.3.9 Ellipse 3.3.10 Join 3.3.11 Gradient 3.3.12 Hatch 3.3.13 Point 3.3.14 Make block 3.3.15 Insert block 3.3.16 Table 3.3.17 Multiline Text 3.4 Modify Tool Bar 3.4.1 Erase 3.4.2 Copy 3.4.3 Mirror 3.4.4 Offset 3.4.5 Array 3.4.6 Move 3.4.7 Rotate 3.4.8 Stretch 3.4.9 Scale 3.4.10 Trim 3.4.11 Extend 3.4.12 Explode 3.4.13 Fillet 3.4.14 Chamfer 3.4.15 Break at one point Break at two point 3.5 Object Snap 3.5.1 Object Snap 3.5.2 Node 3.5.3 Mid-Point 3.5.4 Start Point 3.5.5 End Point 3.5.6 Insertion		
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	3.5.7 Perpendicular 3.6 Layers 3.6.1 What are Layers 3.6.2 Creation of Layers 3.6.3 Settings of Layers 3.7 Dimensioning 3.7.1 What is Dimensioning 3.7.2 Types of Dimensioning 3.7.3 Dimensions tool bar 3.7.4 Linear 3.7.5 Baseline 3.7.6 Continue 3.7.7 Angular 3.7.8 Radial 3.7.9 Horizontal 3.7.10 Dimension styles 3.7.11 Creating dimension style 3.7.13 Setting of dimension styles		
4.	Cutting & Forging 4.1 Cutting 4.1.1 Laser Cutting 4.1.2 Plasma Cutting 4.1.3 Press Cutting 4.1.4 Wire Cut 4.2 Forging 4.2.1 Forging Hammer 4.2.2 Oil Furnace 4.2.3 Gas Furnace 4.2.4 Coal Furnace 4.2.5 Anvil 4.2.6 Forging of Blade 4.2.7 Forging of Damascus Steel	21	91

	4.2.8 Forging Dies 4.3 Proper disposal of wastage material		
5.	Processing of Blades (Rough Grinding, Heat Treatment, Polishing) 5.1 Processing 5.1.1 Straightening 5.1.2 Handle Hole 5.2 Rough Grinding 5.2.1 Grinding Wheels Introduction 5.2.1.1 Wheels Selection 5.2.1.2 Types and classification of grinding wheels 5.2.1.3 Methods of operations 5.2.1.4 Safety Precautions 5.2.2 Grinding Operations 5.2.2.1 Grinding Definition 5.2.2.2 Classification and types of grinding 5.2.2.3 Methods to grind each type 5.2.2.4 120 Grit belt grinding 5.2.2.5 240 / 400 Grit grinding 5.2.3 Grinding of Different Blades 5.2.3.1 Types of Knife blade 5.2.3.2 Grinding a blade in side edges 5.2.3.3 Grinding a flat blade 5.2.3.4 Grinding a sword blade 5.2.4 Rough Grinding 5.2.4.1 The hollow grind edge 5.2.4.2 Cannel grind edge	23	136

	5.2.4.3 The flat grind edge 5.2.4.4 Chisel grind edge 5.3 Heat Treatment 5.3.1 Hardening/Quenching 5.3.2 Tampering 5.3.3 Annealing 5.4 Polishing 5.4.1 Basic Introduction to Finishing, Polishing and Buffing 5.4.2 Polishing materials and there Composition 5.4.3 Chemicals 5.4.3.1 Tri-Chlorothane 5.4.3.2 Solvent 5.4.3.3 Per colon (Food Grade) 5.5 Proper disposal of wastage material		
6.	Types of Handles and Handle Materials 6.1 Knives 6.1.1 Full Tang 6.1.2 Skeletonized Tang 6.1.3 Narrow Tang 6.2 Pocket Knives 6.2.1 Straight Back 6.2.2 Clip Point 6.2.3 Multi Blade 6.3 Swords 6.3.1 Full Tang 6.3.2 Narrow Tang	12	63

	6.4 Material of Handles 6.4.1 Bone/Stag/Horn 6.4.2 Woods 6.4.3 Stacked Leather 6.4.4 Cord Wrap 6.4.5 Micarta/G10/Carbon Fiber 6.4.6 Rubber/Plastic 6.4.7 Brass 6.5 Proper disposal of wastage material		
7.	Assembling of Knives 7.1 Common Terms used in Knife Making and Designing 7.2 Assembly Process of Kitchen Knife 7.2.1 Introduction 7.2.2 Process before assembly 7.2.3 Parts List 7.2.4 Assembly Procedure 7.3 Assembly Process of Hunting Knife 7.3.1 Introduction 7.3.2 Processes before assembly 7.3.3 Parts List 7.3.4 Assembly Procedure 7.4 Assembly Process of Pocket Knife (Folding) 7.4.1 Introduction 7.4.2 Processes before assembly 7.4.3 Parts List 7.4.4 Assembly Procedure 7.5 Assembly process of Lock Back Folding Knife	21	98

	7.5.1 Introduction 7.5.2 Processes before assembly 7.5.3 Parts List 7.5.4 Assembly Procedure 7.6 Assembly process of Swords 7.6.1 Introduction 7.6.2 Processes before assembly 7.6.3 Parts List 7.6.4 Assembly Procedure 7.7 Trouble shooting and informational hints 7.7.1 Few Tips of knife assembly 7.7.2 Trouble shooting and some useful hints		
8.	Handle Shaping and Finishing 8.1 Types 8.1.1 Full Tang Handle Shaping 8.1.2 Narrow Tang Handle Shaping 8.2 Finishing 8.2.1 Matte Finishing 8.2.2 High Gloss Finishing 8.3 Proper disposal of wastage material	7	35
9.	Edge Profiling 9.1 Fine Grade Grinding Wheels 9.2 Manual Edge Profiling 9.2.1 Sand Block	21	70

	9.3 Honing 9.3.1 Introduction to honing 9.3.2 Purpose of honing 9.3.3 How to do 9.3.4 Application of honing to Knife industry 9.4 Polishing		
10.	Branding & Packaging 10.1 Stamping 10.1.1 Punch Stamping 10.1.2 Etching 10.1.3 Laser Marking 10.2 Packing 10.2.1 Wrapping with Butter Paper 10.2.2 Boxing 10.2.3 Blister Packing 10.2.4 Vacuum Packing 10.2.5 Customized Packing	14	28
11.	Comply Health & Safety guidelines 11.1 Identification of hazards at workplace 11.2 Use of Personal Protective and safety Equipment (PPEs) 11.3 Safe handling of tools, machines, equipment and materials.	10	4
		160	640

LIST OF LABS/WORKSHOPS

- **Computer Lab**
- **Press Workshop**
- **Grinding and Polishing Shop**
- **Heat Treatment Shop**
- **Assembly Workshop**
- **Packing Workshop**

Note: Single hall with partitions can be utilized as Press workshop, Assembly workshop and Packing workshop.

LIST OF TOOLS / MACHINERY / EQUIPMENT ETC(For a Class of **25** Students)

Name of Trade	Knife Manufacturing Techniques
Duration of Course	6 Months

S. No	Names of Equipment / Tools / Items	Quantity
1.	Steel rule 30 cm	15 Nos.
2.	Steel Tape 3 meter	15 Nos.
3.	Vernier Caliper	15 Nos
4.	Work benches	10 Nos.
5.	Bench vice 5"	15 Nos.
6.	Straight Peen Hammer 250 grams and 500 grams	05 Nos Each.
7.	Jamboor	10 Nos.
8.	Outside Caliper 6"/15 Cm	15 Nos.
9.	Tri square 8"	15 Nos.
10.	Combination Pliers 8"	10 Nos.
11.	Open end spanner set in Inch. (double end ¼ to 1")	03 No.
12.	Open end spanner set in mm (double end 6mm to 32mm)	03 No.
13.	Screw driver straight 8" & 12"	10 Nos. each
14.	Screw driver Philips 8" & 12"	10 Nos. each
15.	Micrometer (0 to 25 mm)	10 Nos
16.	Twist Drill set 25 pieces (1/32" to ½")	01 Nos Each.
17.	C Clamp	10 Nos.

18.	Tap and die set (6-12 mm)	02 Nos.
19.	Line scribe	25 Nos.
20.	Centre punch	10 Nos.
21.	Pedestal drill machine	02 No.
22.	Pedestal grinder wheel size 300 x 50mm	02 No.
23.	Tongs	10 Nos
24.	Files	15 Nos
25.	Belt Grinder	05 Nos
26.	Bench Grinder	05 Nos
27.	Heat Treatment Furnace	01 Nos
28.	Quenching Tank	01 Nos
Computer Lab for Auto CAD		
29.	Main Server Adequately Configured To Support 25 Work Stations	01 No
30.	Work Stations along with Networking	25 Nos.
31.	Application Software Auto CAD 2000 /2006 Or Latest	Installed on each system
32.	Laser Printer	1 No.
33.	Scanner	1No
34.	Multimedia Project	01 No.
35.	UPS	As required
36.	Computer Table	25 Nos.
37.	Revolving Chairs / Stool	25 Nos.

LIST OF PRACTICAL

1	Familiarization with basic hand tools
2	Measurement exercises
3	Knife design analysis
4	Material selection exercise
5	CAD drawing exercises
6	Dimensioning practice on CAD drawings
7	Forge operation demonstration
8	Hands-on forging
9	Rough grinding practice
10	Heat treatment of Knives
11	Polishing practice
12	Handle material identification
13	Handle shaping practice
14	Assembly of knives
15	Hands-on assembly of knives
16	Handle shaping exercises
17	Finishing of Knife Handles
18	Edge profiling practice
19	Packaging design exercise

LIST OF CONSUMABLES
(For a class of 25 students)

<u>Sr. No</u>	<u>Items</u>	<u>Quantity</u>
1	Abrasive Belts	10 Nos
2	Sand Papers	15 Nos
3	Grinding Wheels	05 Nos
4	Quenching Oil	20 Ltr
5	Polishing Compounds	10 Nos
6	Epoxy Adhesive	10 Nos
7	Rivets & Pins	10 Dozens
8	Sharpening Stones	10 Nos
10	Packaging Materials (Boxes, Bubble Wraps, Packaging Tapes)	As required
11	Printer Paper (A4)	05 Rims

MINIMUM QUALIFICATION OF INSTRUCTOR

- B.Sc Engineering Technology or B.Tech (hons) in Mechanical with one year experience, preferably in the relevant field
- OR
- D.A.E Mechanical with two year experience preferably in the relevant field.

MINIMUM QUALIFICATION OF LAB TECHNICIAN

- 05 years knife manufacturing industrial experience with matric qualification
- OR
- 10 years knife manufacturing industrial experience

REFERENCE BOOKS

1. "The Complete Bladesmith: Forging Your Way To Perfection" by Jim Hrisoulas
2. "The Knife: Form and Function" by Dietmar Pohl
3. "The Razor Edge Book of Sharpening" by John Juranitch
4. "Metalwork: Technology and Practice" by Victor E. Repp and John E. Feirer
5. "Heat Treatment, Selection, and Application of Tool Steels" by William E. Bryson
6. "Quality Control for Dummies" by Larry Webber and Michael Wallace

EMPLOYABILITY OF PASSOUTS

The pass outs of this course may find job / employment opportunities in the following areas / sectors: -

1. Knife Industry
2. Knife Vendor Workshop
3. Self-Employment
4. E. Commerce

OCCUPATIONS & Job Positions in various Industries/ Market

- Workshop Assistant
- Press man
- Grinding and Polishing Expert
- Handle Assembling and Finishing Expert
- Foreman

Curriculum Development Committee

1.	Mr. Hasan Raza Khan, Instructor, TEVTA CSTISC, Wazirabad	Convener
2.	Mr. Zafar Iqbal Bhutta, M/S Sahar Industries, Behind Darson Rubber Works, G.T Road, Wazirabad.	Member
3.	Mr. Adnan Javaid, M/S PAK Handi Crafts, Pak Town, Allahabad, Nizamabad, Wazirabad.	Member