

CURRICULUM FOR

RICE MILLING PLANT OPERATOR

6-MONTHS
(Certificate course)

National Vocational & Technical Training Commission, Islamabad (February, 2012)



CONTENTS

Training Objectives.....	1
Curriculum Salient	3
Skill Competency Detail.....	2
Knowledge Proficiency Detail.....	3
Curriculum Delivery Structure.....	4
Scheme of Studies	5
Detail of Course Contents	5
List of Tools, Machinery & Equipment.....	10
Employability of Pass Out	13
Minimum Qualifications of Instructor	13
References	14
Evaluation Performa.....	15
Individual Evaluation Performa.....	16

TRAINING OBJECTIVES

The objective of the course is to:

- Produce Semi-Skilled operators for Rice milling machinery by imparting them basic theoretical knowledge and practical training on the typical rice milling machines so that they may join the rice industry as trainee operator and develop themselves into trained rice millers to benefit the industry and themselves.
- Obtain basic skills of workshop practices, handling the tools, electrical technology including AC & DC Motors, identification of paddy varieties and testing of paddy, practices of sun drying and mechanical drying of paddy, safe storage of paddy, husking of paddy, polishing of brown rice, grading of rice and finally developing good quality white milled rice and minimizing the milling loses.
- Confer with management or subordinates to resolve worker problems, complaints, or grievances.
- Enforce safety and sanitation regulations.
- Direct and coordinate the activities of employees engaged in the production or processing of goods, such as inspectors, machine setters, and fabricators.
- Read and analyze charts, work orders, production schedules, and other records and reports to determine production requirements and to evaluate current production estimates and outputs.

CURRICULUM SALIENTS

Entry Level	:	Middle
Duration of Course	:	6-Months
Total Training Hours	:	800 Hours
	:	40 Hours / week
	:	6 Days / week
	:	7 Hours / day
	:	5 Hours Friday
Training Methodology	:	Practical 85%
	:	Theory 15%

SKILL COMPETENCY DETAILS

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

1. Apply all safety precautions for personnel and equipment.
2. Practice basic skills of tools needed for operations of a rice mill
3. Distinguish between various varieties of paddy with special reference to basmati varieties and become competent to analyze samples.
4. Deploy best practices of drying paddy while retaining its quality and moisture level at milling stage including mechanical drying.
5. Install, dismantle, repair, replace usable parts and adjust machines to best operational capabilities, thus ensuring;
 - a. Maximum / complete cleaning of paddy at the pre-cleaner stage.
 - b. Minimum breakage and maximum rice husking at husking stage.
 - c. Nil to minimum blowing out of rice tips, broken rice by husk blower.
 - d. Maximum separator output and least recycling of husk rice and breakage.
 - e. Minimum breakage during different polishing stages.
 - f. Nil or minimum broken rice in powder produced.
 - g. A continuous milling process to have lesser wastages and maximum output v/s energy consumption.
 - h. The level of polish and quality of output required.
 - i. The general operations of the electrical systems and accessories.
6. Locate and diagnose fault's effects and related results of the same in the final product.

KNOWLEDGE PROFICIENCY DETAILS

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

1. Observe all the safety precautions for personnel as well as for the equipment.
2. Understand basic skills of tools needed for operations of a rice mill.
3. Explain various varieties of paddy with special reference to basmati varieties and become competent to analyze samples.
4. Learn best practices of drying paddy while retaining its quality and moisture level at milling stage including mechanical drying.
5. Describe Installation, dismantling, repairing, replacement of usable parts and adjusting of machines to best operational capabilities, thus ensuring:-
 - a. Maximum / complete cleaning of paddy at the pre-cleaner stage.
 - b. Minimum breakage and maximum rice husking at husking stage.
 - c. Nil to minimum blowing out of rice tips, broken, rice by husk blower.
 - d. Maximum separator output and least recycling of husk rice and broken.
 - e. Minimum breakage during the different polishing stages.
 - f. Nil or minimum broken rice in powder produced.
 - g. A continuous milling process to have lesser wastages and maximum output v/s energy consumption.
 - h. The level of polish and quality of output required.
 - i. The general operations of the electrical systems and accessories.
6. Elaborate the process of locating and diagnosing faults effects, and related results of the same in the final product.

CURRICULUM DELIVERY STRUCTURE

W E E K	CURRICULUM DELIVERY	REVISION	CO-CURRICULAR ACTIVATES	FINAL TEST	TOTAL
	1-20	21	22-25	26	26
	20	1	4	1	

SCHEME OF STUDIES RICE MILLING & PROCESSING PLANT OPERATOR (6 –MONTHS COURSE)

Main Topics	Theory Hours	Practical Hours	Total Hours
Workshop Practice (Mechanical)	16	64	80
Basic Electrical Theory and AC Motors & Conductors	08	32	40
Paddy Varieties, their identification, Procedure of testing of Paddy & Learning Lab Analysis	16	64	80
Paddy , Rice Varieties, Identification and Lab Testing	32	128	160
Paddy Parboiling and developing Sela Rice	40	-	40
Practical on the Job Training in a Rice Mill as Trainee	-	80	80
(a) Lab Analysis & Testing of Paddy	-	240	240
(b) Rice Milling / Operation	-	80	80
(c) Rice Parboiling	-	-	-
Total	112	688	800

DETAIL OF COURSE CONTENTS
RICE MILLING & PROCESSING PLANT OPERATOR
(6 –MONTHS COURSE)

Sr. No.	Main Topics	Theory Hours	Practical Hours
1.	Basic Workshop Practice(Mechanical)		
	1.1. Introduction (Workshop, Work Place, Tools)	1	-
	1.1.1. Order of workplace		
	1.1.2. Introduction to general tools used in the metal workshop, their care and proper use		
	1.1.3. Safety precautions (Safety, Health & Environment)		
	1.2. Measuring (General Introduction)	1	4
	1.2.1. Purpose of measuring and checking tools		
	1.2.2. Accuracy of measuring		
	1.2.3. Linear measuring (steel rules, calipers, vernier calipers)		
	1.2.4. Measuring Faults		
	1.2.5. Maintenance of Measuring tools		
	1.3. Marking	1	4
	1.3.1. Necessity of marking		
	1.3.2. Common marking tools (scriber, steel rule, & centre punch)		
	1.4. Filing	1	4
	1.4.1. Process of filing		
	1.4.2. Types of files with regards to cut and shape		
	1.5. Sawing	1	4
	1.5.1. Cutting principle (rake angle)		
	1.5.2. Types of blade (pitch of teeth, setting of teeth and tightening the blade in the Hacksaw frame)		
	1.6. Drilling	1	4
	1.6.1. Purpose & Process of Drilling of metal holes (effect of movements of the drill, cutting process)		

	<p>1.6.2. Main parts of drill (their name, function & material)</p> <p>1.6.3. Clamping and removing of twist drills</p> <p>1.6.4. Drilling faults</p> <p>1.6.5. Sharpening of Drill</p> <p>1.7. Reaming</p> <p>1.7.1. Purpose and process of reaming</p> <p>1.7.2. Types of reamers (Hand reamers, machine reamers and adjustable reamers)</p> <p>1.8. Counter Sinking and Counter boring</p> <p>1.8.1. Purpose, Procedure & Counter sinking tools</p> <p>1.8.2. Size / No. of Counter bore and counter sink</p> <p>1.9. Filing Exercise – I</p> <p>1.9.1. Filing of Channel</p> <p>1.10. Marking Exercise</p> <p>1.10.1. Flat Filing</p> <p>1.10.2. Marking</p> <p>1.10.3. Centre Punching</p> <p>1.11. Filing Exercise – II</p> <p>1.11.1. Flat Filing</p> <p>1.11.2. Square Filing</p> <p>1.12. Sawing Exercise</p> <p>1.12.1. Sawing and Square Filing within size</p> <p>1.13. Sheet Metal Box – I</p> <p>1.13.1. Shearing</p> <p>1.13.2. Marking</p> <p>1.13.3. Filing</p> <p>1.14. Drilling Exercise</p> <p>1.14.1. Marking</p> <p>1.14.2. Center Punching</p> <p>1.14.3. Drilling</p> <p>1.14.4. De burring</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>2</p>	<p>4</p> <p>4</p> <p>4</p> <p>4</p> <p>7</p> <p>7</p> <p>7</p> <p>7</p>
2.	Basic Electrical Theory and AC & DC Motors & Conductors		
	2.1. Introduction to electrical Theory and AC & DC Motors	½	-

	2.2. Basic Mathematics & Basic Electrical Units	½	1
	2.3. Introduction to Electrical Instruments & Equipment	½	1
	2.4. Electrical Symbols	½	1
	2.5. Ohm's Law	½	1
	2.6. Series circuit	½	1
	2.7. Parallel circuit	½	1
	2.8. Combined series and parallel circuit	½	2
	2.9. Work, power and electrical energy	½	2
	2.10. Earthing & Necessity	½	4
	2.11. Volt meter & Uses	½	4
	2.12. Ampere meter & Uses	1	4
	2.13. Multi-meter & Uses	1	4
	2.14. Power Measurement (Direct & Indirect Method)	½	6
	2.15. Single Phase & Three Phase Motors	1/2	-
3.	Paddy , Rice Varieties, Identification and Lab Testing		
	3.1. Paddy Varieties		8
	3.1.1 Basmati Varieties	1	-
	3.1.2 Non-Basmati Varieties	1	-
	3.1.3 Other Varieties	2	-
	3.2. Procedure For Testing Of Paddy For Purchase	2	8
	3.3. Paddy Testing And Lab Analysis		
	3.3.1 Moisture	1	10
	3.3.2 Trash, Dirt/ Inert Matter And Broken	1	10
	3.3.3 Damaged/Discolored And Pecks	1	10
	3.3.4 C.V/Red Rice/Other Basmati Varieties And Shrivelled Grains	1	10
	3.4. Identification Of Varieties Of Basmati & Non-Basmati Rice	8	8
4.	Rice Milling		
	4.1. Sun Drying of Paddy	1	4
	4.2. Mechanical Drying of Paddy.	1	4
	4.3. Cleaning, Drying & Storage of Paddy.	1	4
	4.4. Processing, Husking & Milling Of Paddy.		
	4.4.1. Paddy/Rice Cleaner	1	4

	4.4.2. Mechanical Conveying Equipment for Transfer and Movement of Paddy and Rice from One Machine to Another.		
	4.4.3. De-Stoner		
	4.4.4. Husker/Huller	1	12
	4.4.5. Husk Separator	1	12
	4.4.6. Paddy Separator	1	4
	4.4.7. Width Grader Oversize	1	12
	4.4.8. Whitener	1	4
	4.4.9. Polisher	1	12
	4.4.10. Sifter	1	12
	4.4.11. Length Grader	1	12
	4.4.12. Width Grader Under - Sized	1	4
	4.4.13. Cyclones	1	12
	4.4.14. Packing Bins	1	4
	4.4.15. Electrical Control Panel	1	2
	4.4.16. Color Sorting Machine	1	2
	4.4.17. Packing Machines	1	6
	4.5. Pakistan Standard Specification For Rice – Ps 3342.	1	2
	4.6. Rice Fumigation.	1	2
	4.7. Definitions Of Terms Used For Rice And Paddy	8	-
		1	-
		4	-
5.	Rice Parboiling (Developing Sela Rice)		
	5.1. Introduction	5	
	5.2. Technique of soaking in water	5	
	5.3. Steam Treatment (Gelatinization)	10	-
	5.4. Drying of Paddy	5	
	5.5. Husking and Bran Removing	5	
	5.6. Abrasive Polishing/ Whitening	5	
	5.7. Resultant amber color rice	5	
6.	Practical on the Job Training in a Rice Mill as Trainee		
	6.1. Lab Analysis & Testing of Paddy	-	80

	6.2. Rice Milling / Operation	-	240
	6.3. Rice Parboiling	-	80
Total:		112	688

LIST OF TOOLS, MACHINERY & EQUIPMENT

Name of Trade	Rice Milling and Processing Plant Operator
Duration of Course	6-Months

Main Machinery for Milling & Paddy Cleaning

Sr. No.	Name of Item /Equipment	Quantity
1.	Paddy/ Rice Cleaner	1 No.
2.	Intake Hopper	1 No.
3.	Elevators	1 No.
4.	De-Stoner	1 No.
5.	Husker	1 No.
6.	Husk Separator	1 No.
7.	Paddy Separator	1 No.
8.	Magnets	1 No.
9.	Width Grader, Oversize	1 No.
10.	Whiteners	1 No.
11.	Polishers	1 No.
12.	Sifters	1 No.
13.	Length Graders	1 No.
14.	Width Graders Undersize	1 No.
15.	Cyclones	1 No.
16.	Packing Bins	1 No.
17.	Electric Control Panel	1 No.
18.	Color sorting Machine	1 No.
19.	Packing machines	1 No.

Laboratory Equipment

20.	Table Paddy Cleaner	3 Nos.
21.	Table Paddy Huller/Husker	3 Nos.
22.	Table Whitener	3 Nos.
23.	Table Polisher	3 Nos.
24.	Grader	3 Nos.
25.	Heater (Double Hot Plate)	3 Nos.
26.	Hot Air Oven	2 Nos.
27.	Sieves	10 Nos. of various size each
28.	Moisture Meter	3 Nos.
29.	Whiteness Meter	1 Nos.
30.	Grain Meter for length measurement	3 Nos.
31.	Sample Divider	3 Nos.
32.	Slates	25 Nos.
33.	Beakers	6 Nos.
34.	Calculator	3 Nos.
35.	Mirror strips	25 Nos.
36.	Top Loaded Scales	3 Nos.
37.	Probes (small ,medium & large)	5 each size
38.	Plates	12 Nos.
39.	Sieve to remove water	3 Nos.
40.	Thermometers	3 Nos.
41.	Saucepan with Lid	3 Nos.
42.	Sampling Jars / Cylinders	3 Nos.
43.	Desicator	3 Nos.
44.	Spoons	6 Nos.
45.	Grinder etc.	3 Nos.

46.	Phosphine Gas Meter	1 Nos.
-----	---------------------	--------

Tools for Operation of Plant

47.	Tool Box	5 Nos.
48.	Screw Wrench 10" & 12"	5 Nos. each
49.	Screw Driver 12"	5 Nos.
50.	Screw Driver Philip head 9"	5 Nos.
51.	Pipe Wrench	5 Nos.
52.	Spanner Set mm to 24'	5 Nos.
53.	Hammer 1Lb, 2 Lbs	5 Nos.each
54.	Cold Chisel	5 Nos.
55.	Measuring Tape 2 M	5 Nos.
56.	Center Punch	5 Nos.
57.	Hole Punch 8 mm, 10 mm	5 Nos. each
58.	Grip Pliers	5 Nos.
59.	Helmet	5 Nos.
60.	Goggles	5 Nos.
61.	Gloves	5 Nos.
62.	File Flat 10"	5 Nos.
63.	File Round 3"& 8"	5 Nos.each
64.	Hack Saw Frame with Blade	5 Nos.
65.	Nose Pliers	5 Nos.
66.	Flout Pliers	5 Nos.
67.	Volt Meter	5 Nos.
68.	Ampere Meter	5 Nos.
69.	Multimeter	5 Nos.

EMPLOYABILITY OF PASS OUTS

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

- Rice Mills (in various cities of Pakistan)
- Rice Export Association Pakistan (R.E.A.P.)
- Basmati Growers Association Pakistan
- Furthermore:
 - a. He will be responsible for basic repair and maintenance of rice machinery and equipments;
 - b. He will perform as rice selector;
 - c. He will provide services for drawing paddy to basmati varieties;
 - d. He will work as simple analyst of rice;
 - e. He will be able to install and dismantle, repair, replace useable parts and adjust machines to the best operational capabilities;
 - f. Locate and diagnose faults and affects related to the results of the same in the final product.

MINIMUM QUALIFICATION OF INSTRUCTOR

B.Sc. Mechanical Engr. With 2-Years relevant Industry /Teaching Experience

OR

D.A.E in Mechanical Technology with 5 years relevant experience in the relevant field.

OR

Certificate of Rice Milling Plant Operator (G-II Level) with 10 years experience
in the relevant field.

REFERENCE / RECOMMENDED BOOKS & MANUALS

- Hand Book on Rice Varieties in Pakistan by Ch. Mushtaq Ahmed, Director Rice Research Institute, Kala Shah Kaku
- Rice Testing Methods and Equipment, (Agriculture Services Bulletin), Food & Agriculture Organization of U.N.1973
- Manual for Identification of Rice varieties by Haroon Kasam (Late), Former Vice Chairman, R.E.A.P
- Pakistan Standard –Specification for Rice (PS:3342-1993)

STANDING OPERATING PROCEDURE FOR EVALUATION OF SHORT COURSE STUDENTS AGREED BY RESPECTIVE BOARD TECHNICAL EDUCATION

Following procedure will be followed for the evaluation of students of short courses: -

1. Admitted students will be registered with the respective Board of Technical Education within one month after the last date of admission.
2. The testing of the students shall be carried out as follows: -

a. Grading System (Theory & Practical).

- A+ Grade from 80% and above.
- A Grade from 70% to 79%.
- B Grade from 60% to 69%
- C Grade from 50% to 59%
- F Less than 50%.
- Fail Below 40% in Theory & 50% in Practical

- Candidate has to pass both Theory & Practical

b. Attendance.

Students below 80% attendance will not be admissible to appear in examination.

c. Examining Body.

Respective Board of Technical Education will be the Testing and Evaluation Authority.

d. Testing.

1. **Conduct.** The testing shall be conducted in respective institutions under overall supervision of respective Board of Technical Education.

2. **Methodology.**

Following testing methodology will be adopted:-

- (a) Class attendance / participation = 10%
- (b) Sessional Performance = 40%
(Practical exercises/ quizzes / assignments).
- (c) Final Exams.
 - I Theory = 10%

II	Practical.	=	<u>40%</u>
	Total	=	<u>100%</u>

3. The concerned institute will forward the result of students to respective Board of Technical Education on TEV/CURR/F-1 form (Attached) within seven days of termination of course.
4. Respective Board of Technical Education will process the result carrying out its scrutiny / vetting and issue certificate to successful candidates as per specimen attached.
5. The secretary respective Board of Technical Education will sign the certificate.

6. *Miscellaneous*

a. Registration Fee

No registration fee will be taken from short course students for the time being.

b. Examination Fee

An examination fee of Rs. 50/- per student will be charged.

10													
11													
12													
13													
14													
Prepared By	All entries in this sheet checked and corrections made where necessary			In case of any difference, actual marks of all the above elements are to be adjusted as per above allocation		Number of Candidates passed							
Check by:	Name and Signatures of Scrutinizers with date:			Controller of Examinations Respective Board of Technical Education		Number of Candidates failed							

Principal	1 _____		Grading Criteria A+ 80% above A 70-79% B 60-69% C 50-59% F Less than 50%
	2 _____		

Curriculum for Rice Milling Plant Operator (Agriculture - 6 Months Course)

Sr #	Name	Designation & Organization	Qualification	Contact #	E-Mail
1	Engr. Liaqat Ali Jamro	Deputy Director, S.TEVTA, Karachi	i) M.E. (Ind. Engg & MGM) ii) B.E (Mech)	0333-2606334	Engr_laj@yahoo.com
2	Mr. Atta Muhammad	Ch. Instructor, GCT, B/Pur	B.Tech (Hons) (Mech)	0300-6846797	attawarya@yahoo.com

3	Engr. Muhammad Rashid	Sr. Instructor, GCT, B/Pur	B.Sc. Engg (Mechanical)	0333-6389163	Rashid_bwp@yahoo.com
4	Mr. Saeed Ahmed	Sr. Instructor, GTTI, B/Pur	B.Tech. (Hons) (Mech)	0346-8844287	Sanaahmad9115@yahoo.com
5	Engr. Munir Ahmed	Sr. Instructor, GCT, Sahiwal	B.Sc. Engg (Mech)	0321-6934290	Engr.munir68@hotmail.com

REVIEWED

Errors on Highlighted areas