

Training module for 6 months on skill development in food processing

Module No.	Module Title	Duration (Hrs)
25	Manufacturing Techniques of Food Processing Techniques	630

MODULE - 25

1.	Title of the Module	:	Manufacturing Techniques of Food Processing Machineries
2.	Sector	:	Food Processing and Preservation
3.	Code	:	
4.	Entry Qualification	:	ITI / Diploma
5.	Minimum Age	:	20 years
6.	Terminal Competency	:	After completion of the course the candidate will: a) Gain an understanding of machines tools and various manufacturing techniques b) Get sufficient practice in manufacturing and fabricating equipment and prototypes c) Gain skill in the operation of machine tools d) Gain confidence to start equipment manufacturing venture e) Be able to take up engineering works
7.	Duration (in Hrs)	:	630 hours

8. Module Contents

S. No.	Theory	Practical	Contact Hours		
			T	D	P
1.	Engineering Properties of Materials	Carpentry and Fitting Skill Development			
	a. Wood-Metals- Cast iron-types- Other metals- properties	a. Identification of carpentry tools and Exercise in planning a wooden block,	4	10	10
	b. Alloys and Steel-Heat treatment of steels - purpose and method of heat treatment. Annealing, normalizing- hardening- tempering- surface hardening	b. Half lap joint and tee halving joint	4		10
	c. Special Metals and New	c. Identification of fitting tools &	4		10

	Materials for Manufacturing	Exercise in filing a metal piece,			
	d. Plastics and rubber	d. Making a "L" joint and square joint	4		10
	Total hours for this sub-module		16	10	40
2.	Introduction to manufacturing processes	Smithy and Forging Skill Development			
	a. Casting	a. Identification of smithy tools	3		10
	b. Forming process	b. Exercise in making a ring and "S" hook.	3		10
	c. Fabrication process	c. Practice in making square rods	3		10
	d. Metal removal process	d. Visit to Forging workshops and observe forging jobs	3		10
	Total hours for this sub-module		15	10	40
3.	Casting Process in Detail	Casting Skill Development			
	a. Accessories for casting-Casting sand preparation	a. Familiarizing with the accessories of casting and foundry	4		10
	b. Types of Moulds and Patterns	b. Design of moulds and patterns	4		10
	c. Errors in Casting	c. Practising casting	4		10
	d. Special casting processes	d. Visit to foundry Unit and study the different moulding and casting process	4		10
	Total hours for this sub-module		16	10	40
4.	Forming Process in Detail	Forming Skill Development			
	a. Smithy – Grain flow- Tools	a. Familiarising with smithy laboratory and accessories	4		10
	b. Forging- Power tools	b. Practising making smithy jobs	4		10
	c. Rolling-Extrusion	c. Practising making smithy jobs	4		10
	d. Specialized jobs	d. Visit to foundry Unit and study the different moulding and casting process	4		10
	Total hours for this sub-module		16	10	40
5.	Fabrication Process in Detail	Fabrication Skill Development			
	a. Welding –Basics of joints	a. Familiarizing welding workshop and accessories	4		10
	b. Types of welding	b. Practising different joints	4		10
	c. Specialized welding processes	c. Gas welding and spot welding	4		10
	d. Rivetting, Brazing and Soldering	d. Rivetting, Brazing and Soldering	4		10
	Total hours for this sub-module		16	10	40
6.	Metal Removal Process in Detail	Skill in Machine Shop Practice			
	a. Drilling	a. Drilling jobs	5		10
	b. Lathe	b. Planing, Screw cutting, Drilling etc	10		20
	c. Milling	c. Milling gear teeth	10		20
	d. Planing and Shaping	d. Shaping jobs	5		10
	e. CNC machines	e. Visit to CNC Units and study the precision metal removal processes	5		10
	Total hours for this sub-module		35	10	70
7.	Working with Plastics and				

	Rubber				
	a. Types of plastics-Composition-Properties	Manufacturing process for plastics-	4		10
	b. Manufacturing practices for plastics	b. Compression moulding- transfer moulding- moulding and blow moulding.	4		10
	c. Special plastics	c. Injection moulding- jet	4		10
	Total hours for this sub-module		12	10	30
8.	Working with Stainless Steel for Food Industry	Specialized skills on manufacturing with SS			
	a. Types of stainless steel and its importance	a. Practising manufacturing with steel	4		10
	b. Manufacturing practices for stainless steel	b. Sheet metal works	3		10
	c. Sheet metal works	c. Specialized jobs with SS	3		10
	Total hours for this sub-module		10	10	30
9.	Lay out of Work Shop				
	a. Selection of machines for manufacturing	a. Case studies	5		20
	b. Lay out based on power consideration		5		
	c. Safety measures		5		
	d. Worker’s training		5		
	Total hours for this sub-module		20	10	20
10.	Overview of food processing machineries				
	a. Familiarize about the primary, secondary and tertiary processing equipment, parts- working principles- operation and maintenance	a. Manufacturing Primary processing equipment	10		5
		b. Manufacturing Secondary processing equipment			5
		c. Manufacturing Tertiary processing equipment			5
		d. Performance evaluation of the developed equipment and improving the efficiency techniques			5
	Total hours for this sub-module		10	10	20
Total Contact Hours Individually for Theory, Demonstration & practical			160	100	370
Grand Total of Contact Hours			630		

T- Theory, D- Demonstration, P- Practical

9. Lists of Tools and Equipments for a Batch

S.No.	Description	Quantity
1	All Geared Lathe 6'	3
2	Shaping Machine	1
3	Slotting Machine	1
4	Drilling Machine	1

5	Pedestal Drilling Machine	1
6	Grinding Machine	1
7	Universal Milling Machine	1
8	Powder Hack Saw	1
9	ARC welding kit	1
10	Gas welding Kit	1
11	CNC Machining Centre	1
12	Carpentary Tools	1 Set
13	Fitting tools	1 Set
14	Smithy tools	1 Set

10. Space Required for Conducting the Module (in square feet)

- a. Theory Class Room : 600 sq.ft.
- b. Demonstration & Practical Class Room : 4000 sq.ft.

11. Power requirement 100 kW

12. Qualifications of Instructor

BE or ME in Mechanical or Production Engineering
Diploma in Mechanical Engineering

13. Suggested Readings

Text Books

- 1) Adithan, M. And A.D.Gupta. 2001. Manufacturing Technology. New Age International (P) Ltd. Publishers, Chennai.
- 2) Hajra Chowdry, S.K.1986. Elements Of Workshop Technology, Vol.I & II. Manufacturing Process. Asian Book Co., New Delhi.
- 3) Khanna, O.P. 1990. A Textbook On Welding Technology. Dhanpat Rai. New Delhi.
- 4) Khurmi, R.S. And J.K. Gupta. 2000. A Textbook Of Workshop Technology. Publication Division Of NIRJA Construction And Development Co. (P) Ltd. Ramnagar, New Delhi-110055.
- 5) Sharma, P.C. 2004. A Textbook Of Production Technology. S. Chand & Company Ltd. Ram Nagar, New Delhi-110055.

