

Syllabus for the subject

of

FOOD BEVERAGES

Under

CRAFT INSTRUCTOR TRAINING SCHEME (CITS)

Designed in

- 2014 -

By

**Government of India
Ministry of Labour & Employment
Directorate General of Employment & Training**

GENERAL INFORMATION

1. Name of the Course : Craft Instructor Training
2. Duration of Instructor Training : 1 Year (Two semesters each of six months duration including Vocational calculation and science (V.C.S) and P.O.T (Principle of Teaching).
3. Name of the Subject : FOOD BEVERAGES
4. Examination : AITT to be held at the end of each semester.
5. Space Norms :
Lab Space - **120 Sq. M**
Class Room Space - **30 Sq. M**
Quality lab- **40 Sq. M**
6. Power Norms : 10 kw
7. Unit strength(Batch Size) : 20
8. Entry qualification : NTC / NAC from NCVT in FOOD BEVERAGES trade **OR** Diploma/Degree in Food Technology/ Food Engineering/Food processing from AICTE recognized Board / University.
9. Trainers' Qualification : Diploma or Degree in Food Technology/Food Engineering/Food processing/ from AICTE recognized Board / University with five /two years experience respectively.

FOOD BEVERAGES**SYLLABUS: FIRST SEMESTER**

Weeks	Practical	Theory
1-6	<ul style="list-style-type: none">• General purification techniques of water.• Quality of packaged water.• Qualitative analysis of water sample.• Determination of hardness of potable water by different methods.• Determination of alkalinity of potable water.• Determination of chloride content of potable water.• Preparation of solution of different concentration (normality, molarity, ppm, ppb and % solution)	<p>Introduction to different food beverage.</p> <ul style="list-style-type: none">• Status and scope of beverage industry in India,• Nutritional significance of beverages.• Classification of food beverages.• Selection of raw materials for beverages.• Food additives used in different beverages. <p>Packaged drinking water :</p> <ul style="list-style-type: none">• Pre-treatment of water for beverages.• Different types of water.• Principle and method for production of packaged drinking water.
7-11	<ul style="list-style-type: none">• Handling and operation of all equipment.• Identification and rectification of faults in machines.• Industrial visit.	<p>Primary processing machinery:</p> <ul style="list-style-type: none">• Principle and working of equipments used in beverage industry e.g., sand filters, membrane filters, ion exchangers, juice extractor, pulper, fermenter, vinegar generator, crown corking machine, bottle filling machine, Soda water machine, basket press, filter press, carbonation machine and labelling machine,• Maintenance of machines.
12-17	<ul style="list-style-type: none">• Extraction of juice from different fruits.• Preservation of fruits juices with addition of preservative.• Determination of Brix (TSS), pH, sugar acid ratio and % acidity of juices.• Utilization of fruit beverage industry waste.	<p>Juice Extractions :</p> <ul style="list-style-type: none">• Principle and methods for fruits juice manufacture, machinery used in different fruits juice extraction• Process flow charts of juice extraction from various fruits. <p>Preservative :</p> <ul style="list-style-type: none">• Definition of Preservatives.• Types of preservatives commonly used in beverage industry.• Limits of usage of preservatives
18-24	<ul style="list-style-type: none">• Material calculation of Fruit Beverages as per FSSAI.• Preparation and bottling of common fruit beverages such as squashes, crushes, cordials, syrups, nectars, R.T.S.• Estimation of preservative.• Clarification of fruit juices.	<p>Non Alcoholic Beverages (TEA and COFFEE) :</p> <ul style="list-style-type: none">• Tea types and their nutritional significance.• Processing of green, oolong, and black tea.• Chemical changes during processing of tea.

	<ul style="list-style-type: none"> • Qualitative analysis of reducing and non reducing sugars. • Estimation of caffeine content of tea. • Estimation of caffeine content of coffee. • Detection of roasted chicory in coffee powder. 	<ul style="list-style-type: none"> • Structure and composition of coffee bean. • Processing of green coffee beans (dry and wet processes). • Conversion of green coffee into beverage. • Manufacturing of instant and decaffeinated coffee. • Chemical changes during coffee processing <p>Fruit Beverages</p> <ul style="list-style-type: none"> • Introduction to different fruits juices. • Raw materials used in fruit beverages, and their properties. • Machinery involved in different fruits juice extraction. • Principle and preparation methods of Ready-To-Serve (RTS), Squash, fruit juice, nectar, concentrate, syrup, cordial, • Quality control in fruit beverage industry.
25-26	Revision/Examination	

FOOD BEVERAGES**SYLLABUS: SECOND SEMESTER**

Weeks	Practical	Theory
1-3	<ul style="list-style-type: none">• Study of different carbonated and non carbonated, alcoholic and non alcoholic beverages available in the market	Food beverage <ul style="list-style-type: none">• Scope of food beverages industry.• Importance of beverage in modern life.• Industrial growth and development.
4-6	<ul style="list-style-type: none">• Preparation of carbonated water.• Packaging, labelling and storage of carbonated water	Carbonated water : <ul style="list-style-type: none">• Principle and method of production of carbonated water.• Quality standards for carbonated water.
7-10	<ul style="list-style-type: none">• Selection of ingredients for carbonated non alcoholic drinks production• Preparation of different carbonated non alcoholic drinks.• Packaging of soft drinks (PET and glass bottle and can)• Quality testing in carbonated non alcoholic drinks.	Carbonated non alcoholic drinks : <ul style="list-style-type: none">• Technology of carbonated non alcoholic drinks.• Role of ingredients.• Food additives used in carbonated non alcoholic drinks.• Quality control in a carbonated non alcoholic drinks manufacturing industry.
11-16	<ul style="list-style-type: none">• Selection of ingredients for the production of whiskey, beer, wine, rum, brandy.• Visual inspection of beer, whiskey, wine, rum and brandy.• Preparation of wine.• Preparation of cider.• Quality testing in alcoholic beverages.• Industrial visit of alcoholic beverages industry.	Alcoholic Beverages : <ul style="list-style-type: none">• Commercial process details of manufacturing of alcoholic beverages like beer, whiskey, wine, rum and brandy.• Role of ingredients used in production of various alcoholic beverages.• Nutritional and energy values of alcoholic beverages.
17-20	Application of HACCP and GMP in Food beverage industry. Sensory analysis of beverages.	Food standards and regulations: Overview of Food Safety and Standards Act 2006, BIS, ISO-22000, Agmark, HACCP, International Food Standards. International food laws and regulatory agencies: <ul style="list-style-type: none">• International Organizations – FAO (Food & Agriculture Organization), WHO (World Health Organization), Codex Alimentarius, ISO, WTO. National Organizations – ICMR, ICAR, Council for social welfare, International Food Control Systems including CODEX

		<p>GMP. Importance of personal Hygiene, Cleaning & Sanitary standards of food beverage industry.</p> <ul style="list-style-type: none"> • Safety aspects of beverages. • Safety assessment of food contaminants and pesticide residues.
21-24	<ul style="list-style-type: none"> • Practical demonstration of bottle filling machine. • Bursting strength, • Tensile strength, • Tearing strength, • Drop test. 	<ul style="list-style-type: none"> • Need and importance of packaging, • Types of packaging materials e.g. paper, glass, metal and plastic. • Quality standards for packed processed products. • Packaging evaluation: WVTR, GTR, thermal resistance, bursting strength, tensile strength, tearing strength, drop test. • Label types: Function and regulations
25-26	Revision/Examination	

Equipment, Machine & Tools		
Sl. No.	Item/ Specification	Quantity proposed batch of 20 for a trainees
1.	Vacuum filter	1 no
2.	Soda water machine	1 no
3.	Basket press	1 no
4.	Filter press	1 no
5.	Form fill seal machine	1 no
6.	Centrifuge	1 no
7.	Glass jars, various sizes and screw-on caps	As required
8.	Wooden spoons	05 no
9.	Digital Weighing Balance: Capacity: 220 gm Readability: 0.1 mg or 0.0001 gm Weighing Pan: 80 mm or large, with wind draft shield. Auto Calibration should be provided with respect to temperature.	01 no
10.	Laboratory Spray dryer	1 no
11.	Complete Lab scale bottling plant for beverage. 10 litre / hrs.	01 no
12.	Baby Boiler coil type, Fuel light oil, force circulation 3 pass design Capacity of steam output 100kg/hr, fuel firing automatic, Electric supply AC,3 PH, 415 V,50HZ,4 Wire system,	01 no

	Qualified attended not required.	
13.	Steam jacket kettle upto 25 litre double jacketed with indenting lever, steam inlet and outlet with steel trolley and accessories to be fitted with boiler.	01 no
14.	<p>Deep freezer: High performance freezers with lock, digital display and contact for remote monitoring. Flexible grid dividers can be configured to suit your individual requirement.</p> <p>Features: Digital display, visual alarm, low energy consumption, contact for remote alarm, pull-out defrost drain for easy defrosting, lock, castors and baskets.</p> <p>Technical specifications: Gross Capacity: 130 Litres. Net Capacity: 130 Litres. Temperature Range: -10⁰C to -45⁰C. Ambient Temperature: 30⁰C.</p>	01 no
15.	Vacuum pan (Capacity upto 50 litre evaporation/Driven by motor reduction gear box/inside vessel made up of thick stainless steel plate/outer jacket is of S.S./with mail hole and sight glasses on 2 sides/Stirrer are made of Teflon blades. Fitted with an outer at the bottom and a condensate receiving vessels.	01 no
16.	Mechanical peeler/ Batch type for fruit and vegetable peeling.	01 no
17.	Water purifier with pre filter, activates charcoal / resin unit and UV exposure units. Complete with water supply tank and piping.	01 no
18.	Fruit mill (junior model, upto 20kg/hr with 1/2 hp motor)	01 no
19.	<p>Pulper:</p> <ul style="list-style-type: none"> • Capable of extracting the pulp of fruits and vegetables such as Mangoes, Guavas, Peaches, Tomatoes, Bananas etc. • Mounted on heavy duty mild steel stand, the central pulping unit of the machine consists of a pair of brushes fixed on stainless steel shaft and one stainless steel sieve. The gap between the sieve and the brushes should be adjustable • The sie beve should provided in perforations of different sizes and is 	01 no

	easily removable for quick interchanging and cleaning. All contact parts should be of S. S. -304 Grade stainless steel. Capacity: Upto 10-20 Kg/Hour, Fitted with ½ H. P. Motor.	
20.	Hot Air Oven: <ul style="list-style-type: none"> • Should be double walled unit:- outer chamber should made up of M.S. Sheet duly painted & inner must be made up of S.S. Sheet. • Temperature should be controlled by Microprocessor Based PID Digital Temperature Indicator-cum-Controller from ambient to 390°C with an accuracy of ±3°C. • Air ventilators should also be provided on the sides & Air Circulation fan be a standard feature. • Supply- 220/230 Volts A. C. Inner Size (W*D*H): 605*605*605 mm	01 no
21.	Refrigerator: Capacity: 310 Liter, dimensions Approx. 580x 1680x 650 mm, door cooling system, humidity controller, deodorizer, door finish vinyl, vegetable tray. Sixth sense cooling system	01 no
22.	Auto claves 20 lit cap	01 no
23.	Juice Extractor (Screw type) 1 HP motor	01 no
24.	Lime Juice Extractor & orange juice halving & Burring	01 no
25.	Crown corking machine hand/paddle operated one.	01 each
26.	PH Meter (Digital)	01 no
27.	Bottle washer: with ½ HP motor, single phase, two heads for brushes, water spray unit of 10-12 bottles.	01 no
28.	Improved stove made up of MS with proper safety measures , with gas cylinders	02 no
29.	Heat Sealing Machine Hand/Pedal Operated	01 no
30.	Liquid filling machine: For filling liquid in bottles, 200ml, 500ml, 1000ml. Manually operated	01 no
31.	Electric Mixer	02 no
32.	Vernier Calliper: 15cm 0.01 mm LC	01 no
33.	Lemon Squeezer Stainless steel	01 no
34.	Weighing balance (digital) 0.01gm (01 each

	Min) ,5kg (Max),100kg (Max)	
35.	Refractometers (Pocket) 0-32,28-62,58-920 Brix Sugar Scale	01 each
36.	Thermometer (Digital)	06 no
37.	Brinometer (Salinometer)	02 no
38.	Hydrometers of different ranges 0-30, 30-60, 60-90, Brixhydrometer	01 each
39.	Fruit Trays	6+2 no
40.	Stainless steel mugs	08 no
41.	Stainless steel bowls	08 no
42.	Sandashi (Tongs)	01 no
43.	Perforated spoons S.S.12”Length 4 “ dia	06 no
44.	Coring knife	06 no
45.	Pitting knife	06 no
46.	Cutting knife	06 no
47.	Pilfer proof capping machine	01 no
48.	Can and cork Remover	As per requirement
49.	Stainless steel trays of assorted size	16 no
50.	Stainless steel buckets or stainless buckets	06 no
51.	Spoons, Wooden Ladle	16 no
52.	Masons Jars for 1 gross bottle	01 no
53.	Water Tank with tap 4’x4’x3’	01 no
54.	S.S.Vessels with lids 20 lit cap.	10 no
55.	S.S. Vessels with lids 6 lit cap.	06 no
56.	S.S.Vessels with lids 10 lit cap.	06 no
57.	Hand Washing basin with tripod stands	03 no
58.	Bottle Stand for 1 gross bottle	01 no
59.	Stainless Steel Pricker	06 no
60.	Steel scale 12” Standard steel	04 no
61.	Stainless Steel Strainer/Sieve	06 no
62.	Electronic Geyser 25 litre	01 no
63.	Stainless steel knife	6pcs+16pcs
64.	Spoons of assorted size	16pcs
65.	Exhaust fan for lab	As per requirement
66.	Fire Extinguisher CO2, 25kg for Lab and near Boiler	As per requirement
67.	Filter press	01 no
68.	Pressure pump for the washing of machines with 2 nozzle	01 no
69.	Carbonation machines with CO2 cylinder	01 no
70.	Continuous water supply for lab	
71.	Computer/laptop for Faculty with Internet Connection with, colour Printer and photo copy Scanner	01 no
72.	LED multimedia Projector	01 no
73.	UPS 650 VA	02 no
74.	AC 5 star rating	As per requirement

75.	Labelling machine	01 no
76.	Incubator with thermostat	01 no
77.	Water Bath	01 no
78.	Platform scale balance : 100 Kg Capacity,	01 no
79.	Seed germinator : Cabinet type, Different chambers, Temp and RH Controller	01 no
80.	Vinegar generator : Chamber made of SS, with sparger and baffles	01 no
81.	Fermenter : Bioreactor, SS, with sparger and baffles	01 no
82.	Automatic pouch machine / filler sealer machine	01 no
83.	Can body reformer	01 no
84.	Can seamer	01 no
85.	Exhaust box	01 no
86.	Cup sealer	01 no
87.	Steel scale : 12 “ standard steel	02 no
88.	Steel tape : Scales 1 meter, and of 50 ft	02 no
89.	Cutting equipments : Different knives, Cutters for fruits /Vegetables	As required
90.	Sinks : standard size	01 no
91.	Hot plate : Electrical 2 KW	01 no
92.	Tanks SS : 50 liters capacity, cylindrical with cap	01 no
93.	Syrup tanks : 50, 100 lit capacity SS	01 each
94.	Pressure Cooker : 5 Kg and 10 Kg SS	01 each
95.	SS filter : Sieve type cloth filter, hydraulic,	01 no
96.	Bottle opener : Heavy duty, Stainless Steel	04 no
97.	Stainless steel / Aluminium pots : Different Capacities	As required
98.	Wooden spoons : Different sizes	As required
99.	Alcohol Distillation Unit: Distillation unit with fraction distillation unit.	01 no
100.	Abbe Refractometer: <ul style="list-style-type: none"> • Refractive index range 1.3 to 1.7 with an accuracy of 0.001 direct on scale and 0.0001 by estimation. • Sugar percentage range 0 to 95% 	01 no

	<p>with an accuracy of 1% on scale and 0.1 by estimation.</p> <ul style="list-style-type: none"> • Must provide test piece, contact liquid and thermometer in wooden cabinet. <p>Should include Silica Crucible (5 Pc)</p>	
101.	<p>Fruit crusher: This machine should be suitable for crushing stoneless fruits and vegetables. Mounted on a heavy duty mild steel stand equipped with motor and starter. The material should be fed into the stainless steel hopper which feeds the product into the crushing drum, which must consist of stationary blades and rotary beater which crushes the loaded product. Capacity: Upto 10-20 Kg/Hour, Fitted with ½ H. P. Motor.</p>	01 no
102.	<p>Water Analyzer: Instrument measure pH/mV, conductivity/ TDS/salinity, dissolved oxygen, temperature, colorimetric-Absorption, % Transmittance, and concentration and turbidity. pH: Range 0-14 resolution 0.01pH Temp.: Range 0-100⁰ C Resolution: 0.1⁰ C mV: Range ±1999 mV Resolution: 1 mV Conductivity : Range 0.1-100micro mho at TDS factor 0.5 approx Salinity : Range 0-40 ppt Resolution: 0.1 ppt D O : Range 0-20ppm Resolution: 0.1 ppm Colorimeter : Range 0-2.50Abs 0-100 % Transmittance Resolution: 0.001 abs, 0.1 % Transmittance Filter : blue, green and red Source: Tungsten lamp Turbidity: Range 0-100NTU Source: Tungsten lamp General: Display: 2 line 20 char, Power: 230 V A C.</p>	01 no
103.	Bursting strength machine,	01 no
104.	Tensile strength machine,	01 no
105.	Tearing strength machine	01 no
106.	Drop tester machine.	01 no

Consumables Tools & Items		
Sl. No	Name of Item	Quantity
1.	Beaker 50, 100, 250 ml, 500 ml	12 no
2.	Conical flask 50, 100, 250 ml, 500 ml	12 no
3.	Measuring cylinder 100ml,250ml, 200 ml, 500ml,	12 no
4.	Measuring flask of assorted sizes	12 no
5.	Burrete of assorted sizes with Burrete stands	12 no
6.	Pipettes of assorted sizes	12 no
7.	Thermometer (10°C to 110°C) Digital	16Pcs
8.	Rubber Gloves	12 pair for each trainee
9.	Aprons	01 for each trainee
10.	Glass Funnels of assorted sizes	12 no
11.	Funnels 500ml. & 100ml. Separating	12 no
12.	Test Tube With Test tube stand	25 no
13.	Glass rod	10 no
14.	Gas lighter	06 no
15.	Ph meter Rod	02 no
16.	Petri dish with cover	16 no
17.	Glass slides	16pcs
18.	Refilling of gas cylinder for lab	As per required
19.	Air tight glass container of different size	As per required
20.	Different types of Empty Tin Can for canning	As per required
21.	Decaling agent for boiler coil	As per required
22.	Fuel (Light oil) for boiler	As per required
23.	Refilling of carbonation machine cylinder	As per required
24.	Label for Labelling machine	As per required
25.	Empty Glass Bottles 200ml,500ml,1000ml	As per required
26.	Syphoning tube	6 no
27.	Crown caps	As required
28.	Buffer solution/ tablets	As required

Consumables items & chemicals		
Sl. No	Name of Item	Quantity
1.	Photo Copy Paper A4	As per required
2.	Scale	As per required
3.	Correcting Fluid pen	As per required
4.	Dusting Cloth	As per required
5.	Pen	As per required
6.	Temporary marker	As per required
7.	Stapler (Small & Big)	As per required
8.	Puncher	As per required
9.	Fevi stick	As per required

10.	Stapler Pin	As per required
11.	Ruled Register	As per required
12.	File Folder	As per required
13.	Vim Liquid	As per required
14.	Dettol Hand wash	As per required
15.	Scotch Bright	As per required
16.	Colin	As per required
17.	Aluminium Foils	As per required
18.	Duster	As per required
19.	Juna	As per required
20.	Raw material required for food beverages	As per required
21.	Seasonal Fruits	As per required
22.	Salt	As per required
23.	Sugar	As per required
24.	Other Chemicals/Raw material Require for Practical's	As per required
25.	Chemicals for cleaning and sanitization of machines/equipments	As per required
26.	Tissue paper roll	As per required

Furniture		
Sl. No	Name of Item	Quantity
Sl. No.	Class Room	Qty. for 20 trainees
1	Instructor Chair & Table with Glass	01 no
2	Magnetic White Board	01 no
3	Display Board	01 no
4	Table for computer/printer/scanner with chair	01 Set
5	Dual Desk	10 no
Sl. No.	Workshop/Lab	Qty. for 20 trainees
1	Working table with 6-3x21/2 Aluminium tops	05 no
2	Stools	20 no
3	Laboratory Table with rack (8'*2'-6"-6") and sinks	04 no
4	Racks for keeping books (glass panel)etc	01 sets
5	Trainee Locker with space for 20	01 no
6	Storage Rack for Chemicals	01 no
7	Cup Board (large)	04 no
8	First Aid Box	01 no
9	Fire Extinguisher	As per required
10	Goodrej Almirha	02 no
11	Wooden Show Case For keeping & Display sample	02 no
12	White Board	01 no

- Raw material, Testing chemicals & equipments and consumables are not included in the list.
- All machines with Annual AMC.

- Proper facility for removal of waste water used for cleaning of machines from lab.
- Proper pest control facility in lab.