

FOOD BEVERAGES

NSQF LEVEL- 4



SECTOR- FOOD INDUSTRY

COMPETENCY BASED CURRICULUM
CRAFT INSTRUCTOR TRAINING SCHEME (CITS)



GOVERNMENT OF INDIA
Ministry of Skill Development & Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN-81, Sector-V, Salt Lake City, Kolkata – 700091

FOOD BEVERAGES

(Non-Engineering Trade)

SECTOR – FOOD INDUSTRY

(Revised in 2024)

Version 2.1

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Developed By

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Ministry of Skill Development and Entrepreneurship

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1. COURSE OVERVIEW

The Craft Instructor Training Scheme is operational since inception of the Craftsmen Training Scheme. The first Craft Instructors' Training Institute was established in 1948. Subsequently, 6 more institutes namely, Central Training Institute for Instructors (now called as National Skill Training Institute (NSTI), NSTI at Ludhiana, Kanpur, Howrah, Mumbai, Chennai and Hyderabad were established in 1960's by DGT. Since then the CITS course is successfully running in all the NSTIs across India as well as in DGT affiliated institutes viz. Institutes for Training of Trainers (IToT). This is a competency based course of one year duration. "Food Beverages" CITS trade is applicable for Instructors of "Food Beverages" CTS Trade.

The main objective of Craft Instructor training programme is to enable Instructors explore different aspects of the techniques in pedagogy and transferring of hands-on skills so as to develop a pool of skilled manpower for industries, also leading to their career growth & benefiting society at large. Thus promoting a holistic learning experience where trainee acquires specialized knowledge, skills & develops attitude towards learning & contributing in vocational training ecosystem.

This course also enables the instructors to develop instructional skills for mentoring the trainees, engaging all trainees in learning process and managing effective utilization of resources. It emphasizes on the importance of collaborative learning & innovative ways of doing things. All trainees will be able to understand and interpret the course content in right perspective, so that they are engaged in & empowered by their learning experiences and above all, ensure quality delivery.

2. TRAINING SYSTEM

2.1 GENERAL

CITS courses are delivered in National Skill Training Institutes (NSTIs) & DGT affiliated institutes viz., Institutes for Training of Trainers (IToT). For detailed guidelines regarding admission on CITS, instructions issued by DGT from time to time are to be observed. Further complete admission details are made available on NIMI web portal <http://www.nimionlineadmission.in>. The course is of one-year duration. It consists of Trade Technology (Professional skills and Professional knowledge), Training Methodology and Engineering Technology/ Soft skills. After successful completion of the training programme, the trainees appear in All India Trade Test for Craft Instructor. The successful trainee is awarded NCIC certificate by DGT.

2.2 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year:

S No.	Course Element	Notional Training Hours
1.	Trade Technology	
	Professional Skill (Trade Practical)	480
	Professional Knowledge (Trade Theory)	270
2.	Training Methodology	
	TM Practical	270
	TM Theory	180
	Total	1200

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

3	On the Job Training (OJT)/ Group Project	150
4	Optional Course	240

Trainees can also opt for optional courses of 240 hours duration.

2.3 CAREER PROGRESSION PATHWAYS

- Can join as an Instructor in vocational training Institute/ technical Institute.
- Can join as a supervisor in Industries.

2.4 ASSESSMENT & CERTIFICATION

The CITS trainee will be assessed for his/her Instructional skills, knowledge and attitude towards learning throughout the course span and also at the end of the training program.

a) The Continuous Assessment (Internal) during the period of training will be done by **Formative Assessment Method** to test competency of instructor with respect to assessment criteria set against each learning outcomes. The training institute has to maintain an individual trainee portfolio in line with assessment guidelines. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in

b) The **Final Assessment** will be in the form of **Summative Assessment Method**. The All India Trade Test for awarding National Craft Instructor Certificate will be conducted by DGT as per the guidelines of DGT. The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The external examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS CRITERIA

Allotment of Marks among the subjects for Examination:

The minimum pass percent for Trade Practical, TM Practical, Soft Skills Practical Examinations and Formative assessment is 60% & for all other subjects is 40%. There will be no Grace marks.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. While assessing; the major factors to be considered are approaches to generate solutions to specific problems by involving standard/non-standard practices.

Due consideration should also be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising of the following:

- Demonstration of Instructional Skills (Lesson Plan, Demonstration Plan)
- Record book/daily diary

- Assessment Sheet
- Progress chart
- Video Recording
- Attendance and punctuality
- Viva-voce
- Practical work done/Models
- Assignments
- Project work

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of an acceptable standard of crafts instructorship with occasional guidance and engage students by demonstrating good attributes of a trainer.	<ul style="list-style-type: none"> • Demonstration of fairly good skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A fairly good level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Occasional support in imparting effective training.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a reasonable standard of crafts instructorship with little guidance and engage students by demonstrating good attributes of a trainer.	<ul style="list-style-type: none"> • Demonstration of good skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Above average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A good level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Little support in imparting effective training.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate	<ul style="list-style-type: none"> • Demonstration of high skill level to

<p>should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a high standard of crafts instructorship with minimal or no support and engage students by demonstrating good attributes of a trainer.</p>	<p>establish a rapport with audience, presentation in orderly manner and establish as an expert in the field.</p> <ul style="list-style-type: none"> • Good engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A high level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Minimal or no support in imparting effective training.
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3. GENERAL INFORMATION

Name of the Trade	Food Beverages (CITS)
Trade code	DGT/4038
NCO – 2015	2356.0100, 7515.9900
NOS Covered	FIC/N9442, FIC/N9443, FIC/N9444, FIC/N9445, FIC/N9446, FIC/N9447, FIC/N9403, FIC/N9441, FIC/N9452, MEP/N9446
NSQF Level	Level-4
Duration of Craft Instructor Training	One Year
Unit Strength (No. of Student)	25
Entry Qualification	<p>Degree in Food Technology/ Food Engineering/Food processing from recognized University.</p> <p style="text-align: center;">OR</p> <p>3 years Diploma in Food Technology/ Food Engineering/Food processing after class 10th from recognized board / University.</p> <p style="text-align: center;">OR</p> <p>Ex-serviceman from Indian Armed forces with 15 years of service in related field as per equivalency through DGR.</p> <p style="text-align: center;">OR</p> <p>10th Class with 01 year NTC/NAC passed in the trade of “Food Beverage”</p>
Minimum Age	16 years as on first day of academic session.
Space Norms	<p>Lab Space - 120 Sq. m</p> <p>Quality lab - 40 Sq. m</p>
Power Norms	6 KW
Instructor's Qualification for	
1. Food Beverages (CITS) Trade	<p>B.Voc/ Degree in Food Technology/Food Engineering/Food processing from AICTE/ UGC recognized University with two years experience in relevant field.</p> <p style="text-align: center;">OR</p> <p>Diploma (Minimum 2 Years) in Food Technology/Food Engineering/Food processing from recognized University /Board with five years experience in relevant field.</p> <p style="text-align: center;">OR</p> <p>Ex-serviceman from Indian Armed forces with 15 years of service in related field as per equivalency through DGR. Candidate should have undergone methods of instruction course or minimum 02 years of experience in technical training institute of Indian Armed forces.</p> <p style="text-align: center;">OR</p> <p>NTC/ NAC passed in Food Beverage Trade with seven years experience in relevant field.</p>

	<p><u>Essential Qualification:</u> National Craft Instructor Certificate (NCIC) in Food Beverage Trade in any of the variants under DGT.</p>
2. Soft skills	<p>MBA/ BBA / Any Graduate/ Diploma in any discipline from AICTE/ UGC recognized College/ university with Three years' experience and short term ToT Course in Soft Skills from DGT institutes. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above)</p>
3. Training Methodology	<p>B.Voc/ Degree in any discipline from AICTE/ UGC recognized College/ university with two years experience in training/ teaching field. OR Diploma in any discipline from recognized board / University with five years experience in training/teaching field. OR NTC/ NAC passed in any trade with seven years experience in training/ teaching field.</p> <p>Essential Qualification: National Craft Instructor Certificate (NCIC) in any of the variants under DGT / B.Ed /ToT from NITTTR or equivalent.</p>
4. Minimum Age for Instructor	21 Years

4. JOB ROLE

Brief Description of Job Roles:

Food Beverage processing Instructor is able to impart training and supervise the production, quality control, storage, bottling and Packaging of Food Beverage processing plant. Instructor can be able to handle the food beverage processing machines/tools/ equipment during the preparation of packaged water, Fruit juice, Non Alcoholic Beverage such as Tea and Coffee, Alcoholic Beverage such as beer, wine, rum, whisky etc. Food Beverage processing Instructor is able to impart training on food safety standards:

- Quality Analyst in Food Beverages industry.
- Supervisor in Food Beverage Industry.
- Packaging Supervisor in Food Beverage industry.
- Skilled worker in Food Beverage MNCs.
- Small Entrepreneur in Food Beverage processing.

Manual Training Teacher/Craft Instructor; instructs students in ITIs/Vocational Training Institutes in respective trades as per defined job role. Imparts theoretical instructions for the use of tools & equipments of related trades and related subjects. Demonstrate process and operations related to the trade in the workshop; supervises, assesses and evaluates students in their practical work. Ensures availability & proper functioning of equipment and tools in stores.

Food and Beverages Tasters and Graders, Other; includes workers who inspect, taste and grade various types of agricultural products, food and beverages not elsewhere classified.

Reference NCO 2015:

- i) 2356.0100-Manual Training Teacher/Craft Instructor
- ii) 7515.9900-Food and Beverage Tasters and Graders, Other

Reference NOS:

- i) FIC/N0103
- ii) FIC/N2003
- iii) FIC/N9403
- iv) FIC/N9441
- v) FIC/N9452
- vi) THC/N0302
- vii) THC/N0308
- viii) FIC/N2002
- ix) FIC/N9441
- x) MEP/N9446
- xi) MEP/N9440
- xii) MEP/N9410

5. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES (TRADE TECHNOLOGY)

1. Explain the scope, importance, industrial growth and safety measures to be followed in food beverages market. (NOS: FIC/N9442)
2. Demonstrate selection of equipments and machineries for food and beverage industry, maintenance of equipments, troubleshooting and repair of machineries. (NOS: FIC/N9443)
3. Analyse water sample and explain the techniques of purification of water for preparation of packaged drinking water. (NOS: FIC/N9403)
4. Demonstrate extraction of fruits, addition of sugar & preservatives as per standards and utilization of industry wastes. (NOS: FIC/N9444)
5. Evaluate processing of Non Alcoholic Beverages (Tea and Coffee) as per standards. (NOS: FIC/N9445)
6. Evaluate preparation, packaging, labelling and storage of carbonated water and carbonated non alcoholic drinks as per standard. (NOS: FIC/N9446)
7. Demonstrate commercial processing of various alcoholic beverages viz. beer, whisky, wine etc. as per standards. (NOS: FIC/N9447)
8. Explain the preventive approach to food safety from biological, chemical, and physical hazards in production processes based on FAO, WHO, ISO etc. standards. (NOS: FIC/N9441)
9. Check WVTR, thermal resistance, bursting, tensile, tearing strengths and drop test during bottling and packaging of processed products. (NOS: FIC/N9452)
10. Exhibit effective communication skills with logical reasoning ability and quantitative aptitude to maximize efficiency in work. (NOS: MEP/N9446)

6. COURSE CONTENT

SYLLABUS FOR FOOD BEVERAGES – CITS TRADE			
TRADE TECHNOLOGY			
Duration	Reference Learning Outcome	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
Practical 35 Hrs. Theory 10 Hrs.	Explain the scope, importance, industrial growth and safety measures to be followed in food beverages market.	1. Safety measures <ul style="list-style-type: none"> • 5s techniques in the food beverages plant. • Precautions to be observed while working in the food beverages plant. • Handling & maintenance of equipments & machineries. 2. List of different carbonated and non carbonated, alcoholic and non alcoholic beverages available in the market.	Importance of safety, safety precautions & first aid. Concept of 5S & 7QC tools, time management as employed for quality circle. Importance of healthy and hygienic environment. Application and safety to be observed while handling hand tools, special tools, equipments & machineries. Importance and types of maintenance of vehicles/engines. Safely handling of hazardous materials. Food beverage a) Scope of food beverages industry. b) Importance of beverage in modern life. c) Industrial growth and development.
Practical 45 Hrs. Theory 15 Hrs.	Demonstrate selection of equipments and machineries for food beverage industry, maintenance of equipments, troubleshooting and repair of machineries.	3. Handling and operation of all equipment. 4. Maintenance of equipments & machineries. 5. Preventive maintenance of equipments & machineries. 6. Identification and rectification of faults in machines.	Primary processing machinery: a) 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, b) Maintenance of machines.
Practical 60 Hrs.	Analyze water sample and explain the techniques of	7. General purification techniques of water. 8. Quality of packaged	Packaged drinking water: a) Pre-treatment of water for beverages.

Theory 30 Hrs.	purification of water for preparation of packaged drinking water.	<p>water.</p> <p>9. Qualitative analysis of water sample.</p> <p>10. Determination of hardness of potable water by different methods.</p> <p>11. Determination of alkalinity of potable water.</p> <p>12. Determination of chloride content of potable water.</p> <p>13. Preparation of solution of different concentration (normality, molarity, ppm, ppb and % solution)</p>	<p>b) Different types of water.</p> <p>c) Principle and method for production of packaged drinking water.</p>
<p>Practical 60 Hrs.</p> <p>Theory 30 Hrs.</p>	Demonstrate extraction of fruits, addition of sugar & preservatives as per standards and utilization of industry wastes.	<p>14. Extraction of juice from different fruits.</p> <p>15. Preservation of fruits juices with addition of preservative.</p> <p>16. Determination of Brix (TSS), pH, sugar acid ratio and % acidity of juices.</p> <p>17. Utilization of fruit beverage industry waste.</p> <p>18. Material calculation of Fruit Beverages as per FSSAI.</p> <p>19. Preparation and bottling of common fruit beverages such as squashes, crushes, cordials, syrups, nectars, R.T.S.</p> <p>20. Estimation of preservative.</p> <p>21. Clarification of fruit juices.</p>	<p>Fruit Beverages:</p> <p>a) Introduction to different fruits juices.</p> <p>b) Raw materials used in fruit beverages, and their properties.</p> <p>c) Machinery involved in different fruits juice extraction.</p> <p>d) Principle and preparation methods of Ready-To-Serve (RTS), Squash, fruit juice, nectar, concentrate, syrup, and cordial.</p> <p>Juice Extractions :</p> <p>e) Principle and methods for fruits juice manufacture, machinery used in different fruits juice extraction</p> <p>f) Process flow charts of juice extraction from various fruits.</p> <p>Preservative :</p> <p>g) Definition of Preservatives.</p> <p>h) Types of preservatives commonly used in beverage industry. Limits of usage of preservatives</p>
<p>Practical 60 Hrs.</p> <p>Theory 30 Hrs.</p>	Evaluate processing of Non Alcoholic Beverages (Tea and Coffee) as per	<p>22. Qualitative analysis of reducing and non-reducing sugars.</p> <p>23. Estimation of caffeine</p>	<p>Non Alcoholic Beverages (Tea and Coffee) :</p> <p>a) Tea types and their nutritional significance.</p>

Hrs.	standards.	<p>content of tea.</p> <p>24. Estimation of caffeine content of coffee.</p> <p>25. Detection of roasted chicory in coffee powder.</p>	<p>b) Processing of green, oolong, and black tea.</p> <p>c) Chemical changes during processing of tea.</p> <p>d) Structure and composition of coffee bean.</p> <p>e) Processing of green coffee beans (dry and wet processes).</p> <p>f) Conversion of green coffee into beverage.</p> <p>g) Manufacturing of instant and decaffeinated coffee.</p> <p>h) Chemical changes during coffee processing</p>
Practical 80 Hrs.	Evaluate preparation, packaging, labelling and storage of carbonated water and carbonated non alcoholic drinks as per standard.	<p>26. Preparation of carbonated water.</p> <p>27. Packaging, labelling and storage of carbonated water.</p>	<p>Carbonated water :</p> <p>a) Principle and method of production of carbonated water.</p> <p>b) Quality standards for carbonated water.</p>
Theory 25 Hrs.		<p>28. Selection of ingredients for carbonated non alcoholic drinks production.</p> <p>29. Preparation of different carbonated non alcoholic drinks.</p> <p>30. Packaging of soft drinks (PET and glass bottle and can)</p> <p>31. Quality testing in carbonated non alcoholic drinks.</p>	<p>Carbonated non alcoholic drinks:</p> <p>a) Technology of carbonated non alcoholic drinks.</p> <p>b) Role of ingredients.</p> <p>c) Food additives used in carbonated non alcoholic drinks.</p> <p>d) Quality control in a carbonated non alcoholic drinks manufacturing industry.</p>
Practical 75 Hrs.	Demonstrate commercial processing of various alcoholic beverages viz. beer, whisky, wine etc. as per standards.	<p>32. Selection of ingredients for the production of whiskey, beer, wine, rum, brandy.</p> <p>33. Visual inspection of beer, whiskey, wine, rum and brandy.</p> <p>34. Preparation of wine.</p> <p>35. Preparation of cider.</p> <p>36. Quality testing in alcoholic beverages.</p> <p>37. Industrial visit of alcoholic beverages industry.</p>	<p>Alcoholic Beverages :</p> <p>a) Commercial process details of manufacturing of alcoholic beverages like beer, whiskey, wine, rum and brandy.</p> <p>b) Role of ingredients used in production of various alcoholic beverages.</p> <p>c) Nutritional and energy values of alcoholic beverages.</p>
Theory 30 Hrs.			

<p>Practical 20 Hrs.</p> <p>Theory 10 Hrs.</p>	<p>Explain the preventive approach to food safety from biological, chemical, and physical hazards in production processes based on FAO, WHO, ISO etc standards.</p>	<p>38. Apply food safety management system (FSMS) like GHP, GMP, HACCP, etc. in Food beverage industry.</p> <p>39. Sensory analysis of beverages.</p>	<p>a) Food standards and regulations:</p> <p>b) Overview of Food Safety and Standards</p> <p>c) Act 2006, BIS, ISO-22000, Agmark, HACCP,</p> <p>d) International Food Standards. International food laws and regulatory agencies:</p> <p>e) International Organizations - FAO (Food & Agriculture</p> <p>f) Organization), WHO (World</p> <p>g) Health Organization), Codex Alimentarius, ISO, WTO.</p> <p>h) National Organizations - ICMR, ICAR, Council for social welfare, International Food Control Systems including CODEX GMP.</p> <p>i) Importance of personal Hygiene, Cleaning & Sanitary standards of food beverage industry.</p> <p>j) Safety aspects of beverages.</p> <p>k) Safety assessment of food contaminants and pesticide residues.</p> <p>l) Registration process for 'FOSTAC' from FSSAI recognized training certification agencies.</p>
<p>Practical 45 Hrs.</p> <p>Theory 15 Hrs.</p>	<p>Check WVTR, thermal resistance, bursting, tensile, tearing strengths and drop test during bottling and packaging of processed products.</p>	<p>40. Practical demonstration of bottle filling machine.</p> <p>41. Bursting strength, Tensile strength, Tearing strength and Drop test.</p>	<p>a) Need and importance of packaging.</p> <p>b) Types of packaging materials e.g. paper, glass, metal and plastic.</p> <p>c) Quality standards for packed processed products.</p> <p>d) Packaging evaluation: WVTR, GTR, thermal resistance, bursting strength, tensile strength, tearing strength, drop test.</p> <p>e) Label types: Function and regulations.</p>
SOFT SKILLS: 75 Hrs.			
<p>Theory Soft Skills- 75</p>	<p>Exhibit effective</p>	<p>COMMUNICATION SKILLS: Oral communication Skills, Voice, accent, Voice modulation, pace,</p>	

Hrs.	<p>communication skills with logical reasoning ability and quantitative aptitude to maximize efficiency in work.</p>	<p>Intonation, etc. Study of different pictorial expressions of non-verbal communication and its analysis. Demo on Strengths and Weaknesses Demo on Motivation, Positive attitude. Practice on personal appearance, Dressing Manners & Etiquettes. Practice on attending of mock interview of different types. Listening & doubt clarifying etc. Case studies on Interview sessions. <u>Communication & Listening Skills</u> Components of effective communication, Types of communication- Oral, Written, Reading & body language, Handling of communication, Barriers of communication, Listening Tools & Speaking Tools, Non-verbal communication and its importance. <u>Self-Management & Personality Development</u> Self-Management, SWOT analysis, self-learning and management. Motivation and Image building Techniques <u>Personal Grooming & Hygiene</u> Presentation of Self, Formal & Informal Dressing, Dressing for Occasions. <u>Techniques of Attending Interviews</u> Interview & its types. Preparation for the interview, stages of interview. Do's & Don'ts in an interview. BASIC MATHEMATICAL CALCULATION: Conversions of different units viz. length, area, mass etc. Simple Problems on Perimeter and area of a triangle, a circle, a square, rectangle, semicircle etc. Simple Problems on Comparing quantities, weight, speed, height, age, ratio, percentage, and price, etc. Simple calculation on profit and loss statement, discount calculations of products. Demonstration of utilization of mobile apps for financial transactions. Exercises on aptitude/puzzles Practice on Types of Charts and Graphs Introduction to units and dimensions of different objects. Perimeter, Area of regular shapes, viz. Triangle, Square, and Circle, rectangle, semicircle etc. <u>Quantitative Aptitude</u> Introduction, Comparing quantities viz. Speed, age, height, ratio, percentage, weight, and price, etc. Introduction to cost price, sale price, profit, loss and discounts of products. Introduction to online internet banking mechanisms, various modes of payments, cash transactions and associated mobile apps. Concept of insurance and taxes and types. Personal saving and investment mechanism. <u>Logical reasoning</u> Introduction to logical reasoning. Types of logical reasoning. Principles of logical reasoning with examples on numbers and sequences, arrangement and relations, <u>Data Interpretation</u> Data analysis and interpretation. Types of variables for different applications. Basic graph types (Bar, Line,</p>
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		<p>PIE Charts).</p> <p>ENERGY & ENVIRONMENT: Video demo on different types of energy resources. Conventional & Non-Conventional Energy Resources. Fossil Fuel, Biomass, Bio-Gas, Solar, etc. Public awareness on Energy conservation and use of clean energy.</p> <p>ENGLISH LITERACY: Pronunciation of simple words, Diction (use of word and speech) Transformation of sentences, Spellings. Reading and understanding simple sentences about self, work and environment. Construction of simple sentences Writing simple English, Speaking with preparation on self, on family, on friends/ classmates, on work. Role-playing and discussions on current affairs. Job description. Practice of Taking messages, passing on instructions. Practice making Resumes or curriculum vita. Letters of application &referencing to previous communication.</p>
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SYLLABUS FOR CORE SKILLS

1. Training Methodology (TM) (Common for all CITS trades) (270 Hrs. + 180 Hrs.)

Learning outcomes, assessment criteria, syllabus and Tool List of above Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in

7. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
TRADE TECHNOLOGY (TT)	
1. Explain the scope, importance, industrial growth and safety measures to be followed in food beverages market. (NOS: FIC/N9442)	Provide knowledge of the various types of beverages available in world market.
	Unique role of beverage industry has in expanding economy.
	Market potential for flavoured water in food beverage industry.
	Explain 5s & 7QC techniques used in food beverages industry.
	Ensure precautions to be observed while working in the food processing plants.
	Ensure Healthy and hygienic environment while processing food beverages.
	Ensure compliance of safety precautions while handling special tools, equipment & machineries.
2. Demonstrate selection of equipments and machineries for food beverage industry, maintenance of equipments, troubleshooting and repair of machineries. (NOS: FIC/N9443)	Demonstrate the equipments used in food beverages industry.
	Check the working condition of all the machineries viz. sand filters, ion exchangers, juice extractor etc.
	Explain general methods of maintenance of all the equipments and machineries.
	Identify faults during operation of these machineries.
	Demonstrate troubleshooting and repair of faults in machineries using safety measures.
3. Analyse water sample and explain the techniques of purification of water for preparation of packaged drinking water. (NOS: FIC/N9403)	Choose fresh water sample for analysis.
	Demonstrate qualitative analysis of water sample.
	Check for microbiological quality and turbidity of water.
	Assess the hygienic quality of water supply.
	Determine the hardness, alkalinity and chloride content of potable water.
	Demonstrate pre-treatment of water for beverages.
	Evaluate production of packaged drinking water.
	Observe safety and hygiene during operation.
4. Demonstrate extraction of fruits, addition of sugar & preservatives as per standards and utilization of industry wastes. (NOS: FIC/N9444)	Select fresh and perfect raw ingredients.
	Ensure maintenance of perfect hygienic standard.
	Demonstrate extraction of fruits for juices and fruit beverages viz. squashes, crushes, cordials etc. preparation.
	Determine Brix (TSS) and pH of fruit beverages.
	Determine sugar acid ratio and percentage acidity of fruit beverages.
	Illustrate the Filling of preserved fruit beverages in sterilized bottles.
	Demonstrate the corking and crowning of bottles.

	Demonstrate the Sterilization of the bottles
	Demonstrate the Labelling process.
	Observe safety measure during the processing of fruit beverages.
5. Evaluate processing of Non Alcoholic Beverages (Tea and Coffee) as per standards. (NOS: FIC/N9445)	Selection of ingredients for tea and coffee beverages.
	Demonstrate the chemical changes of tea leaves / coffee powder in water at required temperature during processing.
	Determine the caffeine content while preparing Ready-to-Drink (RTD) tea/ coffee.
	Detect the roasted chicory content in coffee powder.
	Determine the qualitative analysis of reducing and non reducing sugars.
	Illustrate filling up of Tea/ Coffee in sterilized bottles/ cans/ tetra packs.
	Demonstrate the Labelling process.
	Observe safety measure during the processing of tea and coffee beverages.
6. Evaluate preparation, packaging, labelling and storage of carbonated water and carbonated non alcoholic drinks as per standard. (NOS: FIC/N9446)	Check the quality of water for suspended particles, organic matter and bacteria.
	Demonstrate the process of filtering, sterilizing and dechlorinating of the water.
	Demonstrate mixing of ingredients like sugar and pumping of flavor concentrates in predetermined sequence.
	Carbonation added to the finished product by carefully controlling the temperature.
	Demonstrate transferring of carbonated water and non alcoholic drinks into PET and glass bottles or cans at extremely high flow rates.
	Check for quality standards for allowable dissolved solids, alkalinity, chlorides etc as per standard.
	Demonstrate labelling and storage of the processed drinks.
	Observe safety measures and hygienic environment during the processing of carbonated water and carbonated non alcoholic drinks.
7. Demonstrate commercial processing of various alcoholic beverages viz. beer, whisky, wine etc. as per standards. (NOS: FIC/N9447)	Select ingredients for processing of alcoholic beverages.
	Ensure maintenance of perfect hygienic standard.
	Inspect the fermentation process.
	Demonstrate the preparation and visual inspection of beer, whiskey, wine, rum and brandy.
	Estimate the alcohol content and check for nutritional and energy values.
	Demonstrate the Filling of beverage into sterilized bottles.
	Demonstrate the carbonation process for the Addition of

	carbon-dioxide gas.
	Demonstrate the corking, crowning and labeling of the bottles
	Evaluate the detailed project report on industrial visit to any alcoholic beverage industry.
8. Explain the preventive approach to food safety from biological, chemical, and physical hazards in production processes based on FAO, WHO, ISO etc standards. (NOS: FIC/N9441)	Explain the safety aspects of beverages as per Food standards and regulations.
	Demonstrate sensory analysis of beverages.
	Explain about Act 2006, ISO- 22000, Agmark, HACCP and International Food Standards.
	Impart knowledge about various International Food Standards and regulatory agencies viz. FAO (Food & Agriculture Organization), WHO, WTO etc.
	Impart knowledge about National regulatory agencies viz. ICMR, ICAR, Council for social welfare, Food Control Systems including CODEX GMP etc.
	Explain about the importance of personal Hygiene, Cleaning & Sanitary standards of food beverage industry.
	Explain about Safety assessment of food contaminants and pesticide residues.
9. Check WVTR, thermal resistance, bursting, tensile, tearing strengths and drop test during bottling and packaging of processed products. (NOS: FIC/N9452)	Examine the types of packaging material used in food beverage industry.
	Demonstrate selection of packing material sample for testing.
	Demonstrate selection of machine and tools for testing of the packaging materials.
	Assess the quality standards for packed processed products.
	Estimate the WVTR, GTR, BURSTING STRENGTH, TENSILE STRENGTH, TEARING STRENGTH, DROP TEST ETC as per packaging material.
	Ensure Maintenance of safety and hygienic environment.
10. Exhibit effective communication skills with logical reasoning ability and quantitative aptitude to maximize efficiency in work. (NOS: MEP/N9446)	Demonstrate reasonable quantitative aptitude and interpret data in the field of work
	Demonstrate effective communication skills with logical reasoning ability.
	Describe method of energy conservation and day-to- day contribution to work for optimum utilization of resources.
	Demonstrate English language fluency while carrying out official work.

8. INFRASTRUCTURE

LIST OF TOOLS AND EQUIPMENT - FOOD BEVERAGES (CITS)			
For batch of 25 candidates			
S No.	Name of the Tool & Equipment	Specification	Quantity
A. Equipment, Machine & Tools			
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: Auto Calibration should be provided with respect to temperature.	Capacity: 220 gm Readability: 0.1 mg or 0.0001gm Weighing Pan: 80 mm or large, with wind draft shield	01 No.
10.	Laboratory Spray dryer		1 No.
11.	Complete Lab scale bottling plant for beverage.	10 litres / 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, Qualified attended not required	01 No.
13.	Steam jacket kettle double jacketed with indenting lever, steam inlet and outlet with steel trolley and accessories to be fitted with boiler.	upto 25 litres	01 No.
14.	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. Features: Digital display, visual alarm, low energy consumption, contact for remote alarm, pull-out defrost drain for easy defrosting, lock, castors and baskets.	Technical specifications: Gross Capacity: 130 Litres. Net Capacity: 130 Litres. Temperature Range: -10°C to -45°C. Ambient Temperature: 30°C.	01 No.
15.	Vacuum pan	Capacity upto 50 litres evaporation/Driven by motor reduction gear box/inside vessel	01 No.

		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.	
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 such as Mangoes, Guavas, Peaches, 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 sieve should provided in perforations of different sizes and is easily removable for quick Interchanging and cleaning. 	<p>Allcontact parts should be of S. S. - 304Grade stainless steel.</p> <p>Capacity: Upto 10-20 Kg/Hour,</p> <p>Fitted with! / H. P. Motor.</p>	01 No.
20.	<p>Hot Air Oven:</p> <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. Air ventilators should also be provided on the sides & Air Circulation fan be a standard feature. Supply 	<p>ambient to 390⁰C with an accuracy of $\pm 3^0$C</p> <p>220/230 Volts A. C.</p> <p>Inner Size (W*D*H): 605*605*605 mm</p>	01 No.
21.	Refrigerator:	Capacity: 310 Liter dimensions Approx.	01 No.

		580x 1680x 650 mm, door cooling system, humidity controller, deodorizer, door finish vinyl, vegetable tray. Sixth sense cooling system	
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! 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.	Lemon Squeezer Stainless steel		01 No.
33.	Weighing balance (digital)	0.01gm (Min) ,5kg (Max), 100kg (Max)	01 Each
34.	Refractometers (Pocket)	0-32,28-62,58-920 Brix Sugar Scale	01 Each
35.	Thermometer (Digital)		06 No.
36.	Brinometer (Salinometer)		02 Nos.
37.	Hydrometers of different ranges	0-30, 30-60, 60-90,	01 each
38.	Brix hydrometer		As required
39.	Fruit Trays		6+2 Nos.
40.	Stainless steel mugs		08 Nos.
41.	Stainless steel bowls		08 Nos.
42.	Sandashi (Tongs)		01 No.
43.	Perforated spoons	S.S.12"Length 4 " dia	06 Nos.
44.	Coring knife		06 Nos.
45.	Pitting knife		06 Nos.
46.	Cutting knife		06 Nos.
47.	Pilfer proof capping machine		01 No.
48.	Can and cork Remover		As per requirement
49.	Stainless steel trays of assorted size		16 Nos.

50.	Stainless steel buckets or stainless buckets		06 Nos.
51.	Spoons, Wooden Ladle		16 Nos.
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 Nos.
55.	S.S. Vessels with lids.	6 lit cap	06 Nos.
56.	S.S. Vessels with lids.	10 lit cap	06 Nos.
57.	Hand Washing basin with tripod stands		03 Nos.
58.	Bottle Stand for	1 gross bottle	01 No.
59.	Stainless Steel Pricker		06 Nos.
60.	Steel scale	12" Standard steel	04 Nos.
61.	Stainless Steel Strainer/Sieve		06 Nos.
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, for Lab and near Boiler	25kg	As per requirement
67.	Filter press		01 No.
68.	Pressure pump for the washing of machines	with 2 nozzles	01 No.
69.	Carbonation machines with CO2 cylinder		01 No.
70.	Continuous water supply for lab		As required
71.	Computer/laptop for Faculty with Internet Connection with, colour Printer and photo copy Scanner	CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. RAM:-4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software.	01 No.
72.	LED multimedia Projector		01 No.
73.	UPS		As required
74.	AC		As required
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		01 No.

	Controller		
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 : standard steel	12 "	02 Nos.
88.	Steel tape	Scales 1 meter, and of 50 ft	02 Nos.
89.	Cutting equipments : Different knives, Cutters for fruits		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 Nos.
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: Must provide test piece, contact liquid and thermometer in wooden cabinet. Should include Silica Crucible (5 Pc)	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% with an accuracy of 1% on scale and 0.1 by estimation.	01 No.
101.	Fruit crusher: This machine should be suitable for crushing stone less fruits. 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 consists of stationery blades and rotary beater which crushes the loaded product.	Capacity: Up to 10-20 Kg/Hour, Fitted with! / H. P. Motor.	01 No.

102.	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.	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.
B. Consumables Tools & Items			
107.	Beaker	50, 100, 250 ml, 500 ml	12 Nos.
108.	Conical flask	50, 100, 250 ml, 500 ml	12 Nos.
109.	Measuring cylinder	100ml,250ml, 200 ml, 500ml,	12 Nos.
110.	Measuring flask of assorted sizes		12 Nos.
111.	Burrete of assorted sizes with Burrete stands		12 Nos.
112.	Pipettes of assorted sizes		12 Nos.
113.	Thermometer Digital	10°C to 110°C	16Pcs
114.	Rubber Gloves		12 pairs for each
115.	Aprons		01 for each
116.	Glass Funnels of assorted sizes		12 Nos.
117.	Funnels Separating	500ml. & 100ml	12 Nos.
118.	Test Tube With Test tube stand		25 Nos.
119.	Glass rod		10 Nos.
120.	Gas lighter		06 Nos.

121.	Ph meter Rod		02 Nos.
122.	Petri dish with cover		16 Nos.
123.	Glass slides		16Pcs
124.	Refilling of gas cylinder for lab		As required
125.	Air tight glass container of different size		As required
126.	Different types of Empty Tin Can for canning		As required
127.	Decaling agent for boiler coil		As required
128.	Fuel (Light oil) for boiler		As required
129.	Refilling of carbonation machine cylinder		As required
130.	Label for Labelling machine		As required
131.	Empty Glass Bottles	200ml, 500ml, 1000ml	As required
132.	Syphoning tube		6 Nos.
133.	Crown caps		As required
134.	Buffer solution/ tablets		As required
135.	Photo Copy Paper A4		As required
136.	Scale		As required
137.	Correcting Fluid pen		As required
138.	Dusting Cloth		As required
139.	Pen		As required
140.	Temporary marker		As required
141.	Stapler (Small & Big)		As required
142.	Puncher		As required
143.	Fevi stick		As required
144.	Stapler Pin		As required
145.	Ruled Register		As required
146.	File Folder		As required
147.	Vim Liquid		As required
148.	Dettol Hand wash		As required
149.	Scotch Bright		As required
150.	Colin		As required
151.	Aluminium Foils		As required
152.	Duster		As required
153.	Juna		As required
154.	Raw material required for food beverages		As required
155.	Seasonal Fruits		As required
156.	Salt		As required
157.	Sugar		As required
158.	Other Chemicals/Raw material Require for Practical's		As required

159.	Chemicals for cleaning and sanitization of machines/equipments		As required
160.	Tissue paper roll		As required
C. FURNITURE			
161.	Instructor Chair & Table with Glass		01 No.
162.	Magnetic White Board		01 No.
163.	Display Board		01 No.
164.	Table for computer/printer/scanner with chair		01 Set
165.	Dual Desk		13Nos.
166.	Working table with	6-3x21/2	05 Nos.
167.	Aluminium tops		
168.	Stools		25Nos.
169.	Laboratory Table with rack and sinks	8'*2'-6"-6"	04 Nos.
170.	Racks for keeping books (glass panel) etc		01 set
171.	Trainee Locker		with space for 25
172.	Storage Rack for Chemicals		01 No.
173.	Cup Board (large)		04 Nos.
174.	First Aid Box		01 No.
175.	Fire Extinguisher		As required
176.	Almirah		02 Nos.
177.	Wooden Show Case For keeping & Display sample		02 Nos.
178.	White Board		01 No.

