

## CERTIFICATE COURSE

Designed By,

**Rajarambapu college of Sugar Technology, Islampur**

Approved By,

**Shivaji University, Kolhapur**

(DEPARTMENT OF LIFELONG LEARNING AND EXTENSION)

1	Name of Course	<b>Certificate course in Distillery plant operator</b>					
2	Max. No's of Student	15 Students					
3	Duration	1 Year(6 Months Theory+ 6 Months In plant Training)					
4	Type	<b>Part Time</b>					
5	Nos Of Days / Week	5 Days					
6	No Of Hours Per Day	3 Hrs					
7	Space Required	Class Room = 200 Sq. Feet					
8	Admission Eligibility	12 <sup>th</sup> Pass					
9	Objective Of Course	To Provide the theory and practical know-how. Of distillery plant operation. .					
10	Employment Opportunity	<b>Distillery unit</b>					
11	Teacher's Qualification	<b>B.Sc.DIFT/M.Sc.Alcohol technology./M.Sc.wine technology</b>					
12	Training System	<b>Training System Per Week</b>					
		Theory	In-Plant Visit	Total			
		15 hrs	6 hrs	21 hrs			
13	Exam. System						
		Sr. No	Subject	Th/Pr	Hours	Max. Marks	Min. Marks
		1	Fermentation technology,	TH	3	100	35
		2	Alcohol technology	TH	3	100	35
		3	General	TH	3	100	35

		engineering				
	4	Inplant Training				
		a)Project	Project		200	100
		b)Seminar		50	20	
		c)Viva		50	20	
		Total			600	245

## Syllabus

### 1) SUBJECT- Fermentation technology.

Molasses:- molasses production, molasses quality, composition of molasses, gradation of molasses, .storage of molasses, Factors affecting the composition of molasses on Fermentation

Propagation of pure yeast culture: Isolation of yeast, preservation of yeast cell Preservation of culture on Agar slant. Purpose of preservation..Fundamental of yeast growth aerobic & anaerobic .Effect of medium composition on propagation..Propagation stages and aseptic conduction.

Microbial contamination and factors affecting on alcoholic production:-source of contamination,culture,water,air,molasses,chemicals&additives..Effect of contamination, type of contamination,yeast,bacterial,viral. Control of contamination.

Fermentation process, Traditional batch, fed batch, continuous, Cascade continuous Biostill continuous Difference between batch &continuous process. Alcohol production from sweet sorghum, Alcohol production from cane juice/syrup ,Alcohol production from grain. Alcohol production from malt.

#### References:

- 1)Fermentation Technology and Biotechnology Second Edition by S.J.Hall  
 2)Principles of Fermentation Technology by PF standburg

### 2) SUBJECT - Alcohol technology

Definition. Molasses, reducing sugar, un fermentable sugar, fermentable sugar, residual sugar .wort, Brix, specific gravity, Industrial Alcohol, Ethyl Alcohol, proof sprit.Strengt.ofsprit.Saccharification,Scaling,Scrubber,Starchsucose,Rectification Gelatinization, liquefaction, Reboiler.

Distillation theory, type of distillation process. Atmospheric distillation, MPR distillation,MPR vacuum distillation .Process of ENA Production ,process of R.S.production .process of An hydrous Alcohol production. . Dehydration with molecular sieve process Dehydration with membrane process.

Indian makes foreign liquor production technology (country liquor).its requirments Manufacturing of carbon dioxide. Theoretical yield of carbon dioxide use of carbon dioxide.Beer manufacturing process.

Effluent treatment system in distillery- waste generation ,its characteristics &IS norms.  
Fundamental of Biological treatments, various treatments method, Aerobic principle.  
Anaerobic system. Reverse osmosis treatments ,evaporation &drying technology

**References:** 1)Hand book Of Alcoholtechnology S.V.Patil  
2)Distillation Technology By S.C Barron  
3)Alcohol Text Book By T.P.Lyons

3) **General Engineering:**

Water quality -- surface water, ground water, hard water, industrial water, drinking water.  
domestic water.

Treatments of water—

Drinking: screening or pre sedimentation, coagulation, flocculation, sedimentation,  
filtration&disinfection.

Hard ground water –Aeration softening filtration, chlorination, disinfection.

Industrial water(boiler and cooling):D.M ,water, water softening, Reverse osmosis,  
processing for TDS-membrane,distillation,freezing.

Pumps-centrifugal pumps, Bernoulli's theorem, understanding of head ,BHP, NPSH,  
impellers, other components, total suction head, total discharged. &efficiency of pumps.

Valves- different type of valves ,gate, ball, Diaphragm, check, non return globe,butter  
fly .plug, needle and safety / relief valves etc. valve function&basic parts of valve.

Heat exchanger unit - shell and tube heat exchanger, condenser(vertical &horizontal),  
Reboilers. Plate type heat exchanger,

Evaporation-natural circulation, forced circulation , agitated film type

Evaporator type-1 single ,double &multiple.2-long tube rising or falling film, conventional  
Robert.3-forward feed ,backward feed ,mixed feed, parallel feed etc.

Steam generation system Use of steam, properties of steam, boiler and its components, type  
of boiler ,fire tube water tube, packed FBC ,furnace its type, stoke fire, spreader stoker,  
travelling grate stoker.

Boiler blows down method its benefits. Boiler feed water treatments, internal &external  
treatment.

#### **4)IN PLANT TRAINING—In distillery during running**

##### **A)PROJET**

###### **a)Introduction:**

Factory- Organization structure, Function of all Departments, No of employees in each department, Detail flow chart of distillery unit

**b) Fermentation section:** Equipment used for weighing of molasses. Dilution of molasses, TRS of molasses, fermentation processes used, type of fermentor, capacity of fermenter, fermentable sugar % in molasses, contamination of molasses, use of yeast in both cascade /biostill continuous fermentation. Quantity of fresh used, Recycle of spent wash for reduction of fresh water effect of recycling of spent wash on quality of alcohol.

**c) Distillation section.** Details of equipments used for distillation, specification of equipments, detail of process used for distillation..Process for production of ENA, process of production of ethanol. Process for production of country liquor. process for production of carbon dioxide

**e) Effluent treatment plant :** quantity of effluent produced, process used for treatment, flow diagram of process, quality of effluent after treatment, disposal system.

**f) Student** Need to Visit all above sections and Prepared the Detail Project report of distillery unit which consist of fermentation Station, Distillation Sections.ETP section This report may include various instruments used for process control..

**B) workshop/seminar** Group of students shall arrange workshop/seminar any topic of above 3 sections.

**C) VIVA** Students have appeared for VIVA at the time of submitting the Project.

### **Nature Of Question Paper:**

Each subject Carries 100 Marks Theory Paper and Their Nature is as Follows:

- |  |          |
|--|----------|
| Q.1)a)Fill In the Blanks                             | 05 Marks |
| b)Define The Terms                                   | 05 Marks |
| c)State True Or False                                | 10 Marks |
| d)Multiple Choice Question                           | 10Marks  |
| e)Match the Pairs                                    | 10Marks  |
| Q.2)Long Question Each Carry 15 Marks any 2 out Of 3 | 30Marks  |
| Q.3)Short Note Each Carry 6 Marks Any 5 Out OF 6     | 30 Marks |