

**Mahatma Gandhi Vidyamandir's
L.V. H. Arts, Science and Commerce College Panchavati Nashik,**

**Certificate Course in Winery
Approved by (UGC) under (NSQF).**

Aims:

- The certificate course providing high-level training for professionals interested in working in the wine-producing sector.
- For the student to acquire skills to guide in the winemaking sector.
- For the student to acquire the ability to apply innovative fermentation techniques in wineries which allow them to make wines that have the sensory characteristics that match the tastes of the target consumers.
- To resolve the major problem of job and career opportunity for needy students through this course.

Objectives to be achieved:

- To introduce the concepts in the subject winery.
- To enrich students' knowledge
- To inculcate sense of scientific responsibilities and social and environment awareness
- To help student's build-up a progressive and successful career
- Theory supplemented with extensive practical skill sets will help the student to avail the opportunities in the applied fields (research, industry or institutions).

PROGRAMME SPECIFIC OUTCOME [C.O]:-

- 1: Understand the importance of wine, their types and its quality.
- 2: Achieve knowledge of wine making.
- 3: Understand contribution of wine in increase and improve our Health, Quality and production Methods
- 4: Understand marketing strategies of growers and wine makers.
- 5: Understand knowledge of wine tech. is an essential pre-requisite for the pursuit of many applied Sciences like Alcohol tech., brewery, biochemistry, botany and Microbiology.
- 6: Understand current scenario in wine and wine making.
- 7: Understand experiments in wine technology.
- 8: Fundamentals, principles & practical skills and recent development in subject area.
- 9: Inspire and boost interest of student towards the wine technology as a main stream & Understand global market

Syllabus

Mahatma Gandhi Vidyamandir's
L.V. H. Arts, Science and Commerce College Panchavati Nashik,

Name of The Course: Certificate Course in Winery

Duration: 06 Months

Course structure

SR. NO	Code	Credits	Paper	Marks		
				Marks Internal	Marks External	Total Marks
1	WTT-1	4 Credits (60 L)	Microbiology and Biochemistry	50	50	100
2	WTT-2	4 Credits (60 L)	Wine Technology Paper -1	50	50	100
3	WTT-3	4 Credits (60 L)	Wine Technology Paper -2	50	50	100
4	WTP-1	6 Credits (90 L)	Microbiology and Biochemistry Practical	75	75	150
5	WTP-2	6 Credits (90 L)	Wine Technology Practical	75	75	150
6	WTP-3	6 Credits (90 L)	Wine Technology Practical and Project.	75	75	150
Total credits		30 Credits	Total Marks	375	375	750

Dr. T. B. Pawar
Co-ordinator

Principal
L.V.H. College,
Panchavati, Nasik-3

Course code: WTT-1 Microbiology and Biochemistry

(4 Credit course) Total Hours=60

Unit -1: Introduction to Microbiology (08L)

- 1.1 The Scope of Microbiology
- 1.2 The Characterization of micro-organisms- morphological, chemical, cultural, genetic and physiological characteristics.
- 1.3 Classification, nomenclature & Identification of microorganisms.

Unit-2 Study of yeasts and their role in wine making. (12L)

- 2.1 Taxonomy of Yeast
- 2.2 Morphology, isolation, enumeration & identification.
- 2.3 Life cycle of yeast
- 2.4 Factors affecting Yeast growth
- 2.5 Yeast metabolism : Fermentation, Pasteur effect, Crabtree effect
- 2.6 Morphology, Cultivation & Reproduction of *Saccharomyces carviesca*

Unit-3 Sterilization technique. (08L)

- 3.1 Concept of contamination, disinfection & sterilization
- 3.2 Filtration: Bacteriological filters, types & uses, air sterilization.
- 3.3 Disinfectant types, action & applications, fumigation.

Unit-4 Fermentation Process (12L)

- 4.1 Primary and secondary screening
- 4.2 Strain development
- 4.3 Inoculum preparation
- 4.4 Standard cultures, culture collection centers and their objectives and working
- 4.5 Concepts of upstream & down stream processing
- 4.6 Biochemistry of ethanol fermentation

Unit 5 The Macromolecules (12L)

- 5.1 General concept of monomer, polymer & various bonds in polymers like, glycosidic, peptide, phosphodiester & ester linkages as they appear in biomolecules
- 5.2 Carbohydrates – Definition, classification, properties & function of carbohydrates
- 5.3 Proteins- Definition , classification, general properties & function of proteins, structure &

classification of amino acids

Unit-6 Enzymes (08L)

- 6.1. Definition, structure & general properties
- 6.2 Models for enzyme catalysis.
- 6.3 Effect of substrate concentration, pH, temperature, metal ions, inhibitors & activators on enzyme activity.

Course code: WTT-2 Wine Technology Paper -1
(4 Credit course) Total Hours=60

Unit -1: Introduction (20L)

- 1.1 Winemaking: Introduction to winemaking, definition and terminologies.
- 1.2 Viticulture: Introduction to viticulture, definition and terminologies.
- 1.3 History of wine-making and viticulture: Wine-producing regions of the world and different practices of wine making & viticulture.
- 1.4 Status of Indian viticulture and winemaking.

Unit-2 Introduction to grapevine. (20L)

- 2.1 Grapevine: Classification, anatomy and function of various parts of grapevine
- 2.2 Cultivars and development of hybrids varieties of grapevine.
- 2.3 Introduction of soil and influence on the grapevine: Structure of soil and growth of grapevine roots and shoot system
- 2.4 Effect of climatic condition on the cultivation of grapevine (sunlight, temperature, wind, rain, hail, frost).

Unit-3 Wine-making. (20L)

- 3.1 Classification of wine: Generic classification, varietal classification, Vinification classification and classification on the basis of chemical Constituents.
- 3.2 Flow chart of white wine-production and recommended varieties.
- 3.3 Flow chart of Red wine-production and recommended varieties.
- 3.4 Flow chart of Fortified wine-production and recommended varieties.
- 3.5 Production of wine from fruits other than grapes.
- 3.6 Grape variety as criteria for quality wine production: Study of criteria such as tractability, distinctive flavors, other special characteristics.

Course code: WTT-3 Wine Technology Paper -2

(4 Credit course) Total Hours=60

Unit -1: Introduction to sensory evaluation of wine (20L)

- 1.1 Sensory evaluation and terminologies: Importance of sensory Evaluation of wine and study of terminologies used in describing wine.
- 1.2 The basic tastes of wine and sensory perception: The taste of bitterness, acidity, salt, sweetness, glycerol and alcohol on the tongue, study of tongue anatomy with reference to sensory response and study of perception.
- 1.3 The technique of tasting wine: Selection of glass, serving temperature, design of room for wine tasting, timing of tasting wine and taste the wine on the basis of three important senses i.e. vision, smell/aroma and palate structure.
- 1.4 Sensory evaluation and score-card: Rose worthy score-card, Davis score-card and Sparkling wine score-card
- 1.5 Matching wine with food: Theory of food combination such as sweet, sour, salty and spicy food with wine.

Unit-2 Commercial aspects of wine production. (20L)

- 2.1 Comparison of wine with other beverages: Wine with vodka, Gin, Brandy, Whiskey, Rum, Beer, fruit wines fruit juice, carbonated drinks.
- 2.2 Traditional and commercial wine-making: A comparison of traditional and new wine-making practices
- 2.3 Raw materials and equipment use in wine production: crusher, press fermentor, filtration and additives used in wines
- 2.4 Vintage and quality of wine: Vintage year in Southern and Northern Hemisphere and management of vintage
- 2.5 Economic significance of grape growing and winemaking.

Unit-3 The world of wine. (20L)

- 3.1 Chemical constituents of grapes and wines: Sugar, Acids, Phenolics and Alcohol
- 3.2 Wine and health: Beneficial and harmful effects of wine on the human health.
- 3.4 New trends in the world of wine: Advantages and disadvantage of different closure (Screw cap, cork, Zork, synthetic cork, vino seal and crown caps) used for wine bottles.
- 3.5 White Wine objective.
- 3.6 White wine Varieties and style.
- 3.7 White wine making process. Harvesting – crushing – pressing – juice – addition of active yeast

Course code: WTP-1 Microbiology and Biochemistry Practical
(6 Credit course) Total Hours=90

- 1) Glassware used in Microbiology laboratory & its cleaning.
- 2) Study of different equipments- Bunsen burner, water bath, Autoclave, Laminar air flow, Incubator, Hot air oven, Spectrophotometer, Centrifuge, and Refrigerator.
- 3) Study of Microscope- Compound Microscope & its parts. Use of oil immersion objective.
- 4) Preparation of liquid medium -nutrients broth, sugar fermentation media.
- 5) Preparation of nutrient agar, agar slant , agar butt and glucose yeast extract medium (GYE).
- 6) Isolation of microorganism by streak plate method.
- 7) Isolation of microorganism by pour plate method.
- 8) Isolation of microorganism by spread plate method.
- 9) Isolation of bacteria and yeast from natural sources.
- 10) Hanging drop preparation for observation of motility.
- 11) Staining of microorganisms by Monochrome staining.
- 12) Gram staining for differentiation of bacteria.
- 13) Effect of pH on Microbial Growth.
- 14) Effect of Temperature on microbial growth.
- 15) Effects of salt on microbial growth.
- 16) Microscopic observation of fungi.
- 17) Laboratory Equipments
 - a). Distillation unit
 - b) Colorimeter & spectrophotometer
 - c) pH meter
 - d) Balance of different capacities
 - e) Centrifuge [General introduction to above equipments their operation & application]
- 18) Practicals on carbohydrates
 - a) Detection of sugars (Benedicts/Felhing) detection of starch, differentiation between reducing & non reducing sugar
 - b) Estimation of total sugar by phenol sulphuric method. Estimation of reducing
 - c). Paper chromatography of sugars.

19) Practicals on Proteins

- a). Paper Chromatography of amino acid
- b). Protein estimation- Folin Lowry method

20) Practicals on water

- a) Water: Determination of chlorine
- b) Determination of alkalinity
- c) Determination of heavy metals
- d) Determination of salts

Course code: WTP-2 Wine Technology Practical -1 (4 Credit course)
Total Hours=60

1. Identification of grape and wine varieties.
2. Identification of basic tastes of wine in water
3. Threshold detection of acid taste.
4. Threshold detection of sweet taste.
5. Threshold detection of bitter taste.
6. Wine tasting and score card
7. Identification of the aroma constituents in the given sample
8. Interaction of sweet and acid taste
9. Interaction of sweet, acid and bitter taste.
10. Effect of pH on the sensory evaluation of wine
11. Effect of age on the appearance of white and red wine
12. The sense of feel
13. The art of tasting wine: White, Red, Rosé and sparkling wine
14. Matching wine with food.

Course code: WTP-3 Wine Technology Practical -2 (4 Credit course)

Total Hours=60

1. Isolation and purification of wine yeast from stock culture
2. Home made wine production: grape, jamoon, pomegranate or any other fruit
3. Microscopic observation of yeast during wine production
4. Collection of soil sample and determination of N,P,K. 2. Studies on fruit-bud differentiation by visual identifications.
5. Propagation techniques for grapes: budding and grafting
6. Pruning techniques for grape vine and harvesting technique for grapes
7. Preparation of solutions and mixtures: Bordeaux mixture, antibiotics and plant growth regulators
8. Study of morphology, anatomy and microscopic features of grape(Microscopy)
9. Determination of pH, total and volatile acidity of grapes
10. Estimation of proteins, tannins, ethanol, anthocyanins and metals (copper and iron) from grapes and wine
11. Analytical tests for identification of wine sediments: Potassium bitartrate, calcium tartarate, copper casse, yeast and bacteria cells
12. Wine fermentation: standardization of yeast inoculum and nutrient medium for wine production
13. Identification of wine grape variety and rootstock by visual observations.
14. Project:
 - a) A small survey on “Wine as an alcoholic drink”: Report writing
A visit to the winery: Report writing
 - b) PROJECT: WINERY ESTABLISHMENT (Each student is expected to carry out the project/dissertation work in the winery)

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Wine Technology

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