**Savitribai Phule Pune University**

**Akole Taluka Education Society**

**Agasti Arts, Commerce and Dadasaheb Rupwate Science College,**

 **Akole, Dist-A’Nagar**

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**Department of Wine Technology**

**Format for PSO and CO for academic year 2019-20**

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| --- | --- |
| Name of Faculty | Science & Technology |
| Name of Department | Wine Tech. |
| UG Programme | B.Sc. Wine Tech. |

**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 applie

 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

10: Create foundation for advance studies, research & development in wine & vine.

**Course Outcomes [C.O]: F.Y.B.Sc. [SEMESTER-I]**

**WT-101 Basic Microbiology Paper-I**

-To understand theHistory, Branches and Scope of Microbiology.

-To know Importance, occurrence and types of microorganisms.

-To learn Microbial Physiology**,** Cell Biology, bacterial cell organelles, cell wall, cell membrane,

 Capsule, endospore, flagella, types of flagella, mechanism of flagellar movement.

**-** To understand Cell inclusions (Gas vesicles, carboxysomes, PHB granules, metachromatic

 Granules, and glycogen bodies, starch granules, magnetosomes, sulfur granules, chlorosomes.

- To know Microbiology of yeast**.**

**WT-102 Industrial Microbiology Paper-I**

**-** To understand Industrial Microbiology, Definition & Scope of Industrial Microbiology.

- To understand Historical development in fermentation industry, Microbiology in industry

- To learn Sterilization technique, Concept of asepsis, disinfection.

 - To learn Sterilization, Sterilization by Heat, Sterilization by radiation, Filtration& its types

- To know Disinfectant types, action & applications, fumigation, pure culture techniques**.**

**WT-103 Introduction to Botany**

**-** To understand Botany - Definition and Multidisciplinary nature of Botany.

- To know Plant as a living system, Unique features of plants, Plant diversity.

- To learn Morphology of vegetative plant organs, Structure of typical plant, parts of plant .

- To understand Reproductive development, Inflorescence, Types of inflorescence and Significance

 Of inflorescence, Fruit & its types

- To know the unique features of a plant cell, Cell cycle, cell division, mitosis and meiosis

- To understand Programmed Cell Death- ageing, senescence and necrosis

**WT-104 Plant Development and Anatomy**

- To know Unique features of plant, Shift from vegetative to reproductive phase & factors

 Affecting.

- To understand Microsporogenesis, Megasprogenesis, Double fertilization and triple fusion

- To learn Plant growth regulators and their role in growth and development.

-To understand Plant Anatomy Definition, concept, scope and objectives.

- To understand Meristem & Meristematic tissue system: Types of meristematic tissues based on

 Their position & function.

- To understand Structure & function of simple tissues, Complex tissue, Concept of Mechanical

 Tissue system Epidermal & Secretary tissue system,

- To know Anatomy of Monocot & Dicot (root, stem & leaf)

**WT-105 Basic Biochemistry Paper-I**

- To understand Biochemistry, Concept & scope of Biochemistry.

- To know Application of biochemistry in wine science.

- To know water Types of bond, Covalent and non-covalent interactions in biomolecules.

 Properties of water, biological molecules in water

- To understand Buffers - Biological buffers-concept, types and their importance

-To learn Carbohydrates, Classification of carbohydrates, Functions of Carbohydrate .

-To understand Lipids**,** Classification of lipids, Structure, chemical and physical properties,

 Function of lipids.

**WT-106 Metabolic Pathways Paper-I**

- To understand Bioenergetics, Concept of bioenergetics, Concept of free energy,

 Laws of thermodynamics and their relevance to metabolism.

- To know Metabolism: Definitions & Concepts: Catabolism, anabolism, anapleurotic reactions.

- To learn Carbohydrate metabolism, Glycolysis, T.C.A. cycle, Fermentation.

- To understand Electron transport System, Fatty acid degradation- β- oxidation in relation to energy

 Production.

**WT-107 Basic Wine Technology**

**-** To understand Wine making, important terminologies of wine.

- To know Viticulture, Introduction to viticulture, important terminologies.

- To know Wine history.

- To learn Classification of wine: Generic classification, varietal classification, Vinification

 Classification and classification on the basis of chemical Constituents.

- To understand Flow chart of white wine, Red wine, Sparkling wine, Production of wine from fruits

- To know Grapevine, Classification, function of grapevine.

- To understand Introduction to barrel: Distribution, species and advantages of oak.

**WT-108 Sensory Evaluation of Wine Paper-I**

**-** To understand Sensory evaluation and terminologies

- To know the basic tastes of wine, Sensory perception, Factors influencing taste perception.

- To learn the art of tasting wine – color, aroma and taste of wine. Neurophysiological mechanism

 Of tasting, Sensory evaluation and scorecard, aroma wheel.

- To understand Design of tasting room, timing of tasting wine, Taste the wine on the basis of

 Vision, smell and palate structure.

- To know Selection & different types of glass, serving wine, Opening the bottle etc.

**WT 109: Practical’s based on Microbiology**

1. To know the Safety Measures and Good Laboratory Practices in Microbiology laboratory.

2. Understand the operation, precautions and use of common microbiology laboratory

 Instruments

3. To learn the use of common laboratory glass wares, learning basic techniques in Microbiology

4. To know Microscope-Compound Microscope & its parts. Use of oil immersion objective.

5. Basic staining techniques, Monochrome staining, Negative staining, Staining of Endospore

 Staining of Capsule

6. To Understand the Hanging drop preparation for observation of motility.

7. To know the Preparation of liquid medium -nutrients broth, Sabouraud broth and PDB, agar

 Medium, agar Slant and PDA

8. Wet Mount slide preparation and its observation – Fungi. Slide culture technique

**WT 110: Practical’s based on Botany**

1. To Understand the Study of typical plant and plant parts

2. To learn Observation of different types of inflorescence in plants.

3. To learn Observation of parts of flower

4. To Understand Study of different types of fruits

5. To learn Study of plant cell types using squash techniques and Maceration

6. To know Study of Programmed Cell Death in plants

7. To Understand Study of meristematic tissue system

8. To know Study of complex and permanent tissue system.

9. To Understand Study of trichomes & secretary tissue system

10. To learn Observation of typical monocot & Dicot root and stem.

**WT-111 Practical Based on Biochemistry**

1. To learn Safety Measures and practices in chemistry laboratory.

2. To Understand Molarity, molality, normality, ppm, ppb.

3. To learn Laboratory Equipments: Working Principle and Handling

4. To know Preparation of Buffers of desire pH and Molarity

5. To Understand Determination of alkalinity of water.

6. To learn Titration of Strong acid with the strong base.

7. To know Titration of Weak acid with strong base.

8. Determination of Ascorbic acid.

9. To learn Estimation of reducing sugar by DNSA method.

10. To Understand Paper chromatography& TLC of sugars &amino acids.

**WT-112 Practical based on Wine Technology**

1. To learn Wine technology Laboratory and common Wine technology laboratory instruments.

2. To Understand Identification of grape and wine varieties.

3. To know small survey and Report writing.

4. To know study threshold detection of acid taste.

5. To Understand study threshold detection of sweet taste.

6. To learn study threshold detection of bitter taste.

7. To Understand study threshold detection of bitter taste.

8. To learn Study of aroma wheel.

9. To Understand types of wine glasses.

**Semester –II**

**WT-201 Basic Microbiology Paper-II**

-To understand Microscopy Principles and applications microscope.

-To know Microbial Growth, Reproduction in microorganisms, and Measurement of Bacterial

 Growth

-To understand staining techniques, properties and role of fixatives, types of stain

**WT-202 Industrial Microbiology Paper-II**

- To understand fermentation medium, Role of nutrients in microbial growth.

- To learn Antifoam agents, Stock cultures and its maintenance

- To know Industrial microbiological products as Primary and secondary metabolites.

- To understand Concept of fermentation and types of fermentation.

- To learn Primary and secondary screening, Strain improvement, Inoculum preparation.

WT-203 Plant Physiology

- To know Physiology –Definition, concept.

- To understand Permeability, Diffusion, Osmosis.

- To learn Absorption of water, Transpiration & Gutation, Overview of Photosynthesis & Respiration

- To understand Translocation –Definition, concept, pathway of translocation, Source sink

 Relationship.

-To understand Stress Physiology, Physiology of Flowering, Seed Germination, and Fruit

 Ripening.

 - To know Response of plants to biotic stresses and a biotic stresses.

- To learn General classification, physiology of flowering, Metabolic changes during seed

 Germination & fruit ripening.

**WT-204 Applied Botany**

**-** To understandMethods of Plant Propagation, Sexual propagation and asexual plant propagation

**-** To learn Vegetative propagation, artificial propagation.

- To knowPlant Tissue Culture**,** Organization of plant tissue culture laboratory,

- Media preparation & Aseptic techniques, its sterilization, Concept of differentiation,

 dedifferentiation and redifferentiation, Callus formation, organogenesis & embryogenesis.

- To understand Organ culture technique.

**WT-205 Basic Biochemistry Paper-II**

-To learn Proteins**,** Amino acids and their Classification, Protein structure, Protein denaturation

 And renaturation, Functions of proteins,

- To understandEnzymes, general properties, enzyme activation and inhibition, Enzyme

 Classification.

- To knowNucleic acids- Definition, general structure of DNA and RNA.

- Understand theVitamin**s** Classification**,** Biochemical functions .

**WT-206 Metabolic Pathways Paper-II**

**-** To knowProtein metabolism, Transamination and oxidative deamination,Nucleic acid

 Metabolism.

- Understand theNucleic acid Metabolism.

- To learn Biochemistry of ethanol Fermentation, Concept of Primary & secondary metabolites

 Overview of anaerobic fermentations.

- To understandMetabolic Regulation, Concept of homeostasis, Regulation at Enzyme level .

**WT-207 Basic of Beer, Wine and Alcohol Technology**

- Understand the Traditional and Commercial winemaking practices.

- To knowRaw materials and equipment use in wine production, Automation in wine industry

 New concept in wine production.

- To learn Introduction and History of Brewing, Basic concept of alcoholic beverages

 Alcoholic beverage and health, Status of Indian brewing, winemaking and alcohol.

-To understand constituents of oak and liberation of oak flavors from the barrel in beer and alcohol.

- To know Work with barrels, Oak chips versus oak barrels, Pre-fermentation actions.

**WT-208 Sensory Evaluation of Wine paper-II**

- To know Concept of wine clarity, Wine aroma, New trends In the world of wine.

- To learn tasting sheet, matching wine with food, Theory of food combination such as

 sweet, sour, salty and spicy food with wine.

- To understand pre- tasting organization, tasting situations, tasting exercises, Study of

 Effervescence, ISO standard glass, Tears.

**WT 209 Practical’s based on Microbiology**

1. To know Isolation of bacteria and yeast from natural sources.

2. Observation of the growth of cultures, and reporting of colony and cultural characteristics.

3. To understand Isolation of microorganism by streak plate method, spread plate method

 Pour plate method.

4. To learn Yeast for enumeration of yeast by Neubauer’s chamber.

5. To know Effect of pH, salts, Temperature, on Microbial Growth.

6. To understand Aseptic Transfer Techniques, Microscopic observation of fungi.

 Preservation of cultures on slants.

**WT 210 Practical’s based on Botany**

1**.** To know osmosis and turgor pressure, Diffusion Pressure Deficit, translocation in plants.

2. To understand rate of respiration, Study of stomata and transpiration in plants

3. To learn Separation of leaf pigments by strip chromatography.

4. Preparation of nursery beds and rising of plants by different propagation methods.

5. Understand the Stock solutions & media preparation Effect of plant growth regulators on in vitro

 response of explants.

6. To know Initiation of shoot tip & axillary bud culture, anther culture

**WT-211 Practical based on Biochemistry**

1. To know Qualitative test for carbohydrate, Lipid/ Proteins.

2. To learn pH measurement Use of pH indicator, Use of pH meter

3. Understand the Carbohydrate estimation by phenol sulphuric acid method,

4. To know Paper chromatography of amino acids, TLC of lipids

5. To understand Protein estimation Folin Lowry method. Biuret method.

6. Extraction of lipids in organic solvents, Enzyme assay, Determination of chlorine content in water.

**WT-212 Practical based on Wine Technology**

1. To know scoring of wine using different tasting sheet.

2. Understand the Sensory evaluation, matching wine with food.

3. learn the Effect of age on the appearance, serving temperature, sensory evaluation of wine.

4. Understand the Interaction of sweet and acid taste, bitter taste.

5. The sense of feel, Identification of off odors in wine.

**S. Y. B. SC WINE TECHNOLOGY SEMESTER I**

 **WT - 211: Yeast Culture Technology – I**

**-** Understand the Importance of yeast strains in wine making.

- Maintenance of yeast strains and preservation of it, Yeast culture techniques.

- Learn the Normal micro flora and pathogens of grapevine.

- To know Types of microbial spoilage of wine, Prevention of microbial spoilage

 curing and storage of wine.

**WT – 212: Vineyard Technology – I**

- To understand the study of soil and its function, Physical and Chemical properties of soil.

- Learn the Principles of weathering of rocks and materials.

- To knowStudy of vineyard establishment, Relationship of grapevine and climatic factors.

- To understand Selections of grape (wine grapes) varieties for plantation, Method of plantation.

-Learn the Care of young vine, Weed control.

- To understand Definition and concept of canopy, Canopy microclimate, Training and pruning

 Practices.

(WT-212) BIOCHEMISTRY – I

-Study the general methods of extraction & purification of metabolites.

-Learn the different techniques of Centrifugation, Crystallization, ion exchange, Electro dialysis &

 Solvent extraction.

-Study the Phenolic compounds present in wine.

-Understand the process of Malolactic fermentation & its role in wine making process

**WT-214-Fermentation-I**

-To study about fermentation process and various types of ferment .

-The learner will acquired the knowledge of various parts of ferment.

-To study about the manufacturing process of fermentor.

-To learn about various utilities required for fermentation.

**WT-215-Fermentation-II**

-To study the process of optimization.

-To learn about the various process parameters and their importance.

-To know about the immobilization of whole cells and enzymes.

- To understand thecomputer applications in process controls.

**WT – 216: Wine Technology – I**

 - Understand theRed wine – objectives**,** red wine varieties and styles, making of rose style wines.

- To know red wine making process, differentiate it from white wine making.

- To learn evaluation of a number of Australian red wine styles,Red wine making process.

- Learn the Bottling- maturation in bottle.

- To understand theInfluence of climate, temperature, humidity& seasonal fluctuations.

- To know managing wine grape garden under aberrant climate conditions.

**Semester II**

**WT – 221: Yeast Culture technology – II**

**-** To understand the Preparation of yeast starter cultures, contamination of yeast, growth of yeast.

- To know Role of yeast in grape flavor development, transformation of Aromatic substances.

- Learn the Significance of yeast and bacterial enzymes.

- Controlling degree of anaerobiosis, Killer factors in fermentation.

**WT – 222: Vineyard Technology – II**

-To learn the different propagation techniques, Collection and storage of cuttings.

-To know Propagation of own rooted vines, grafted vines, grafting technique, budding techniques.

-To understand the grape and its maturity, composition of mature grape.

-Development stages of grape, berry morphology, Changes in grape during maturation.

-Learn theStudy of harvesting techniques and machinery, hand harvesting:, machine harvesting.

-To understand thePlant management program, Study of different disease and pest, different

 Disorders, different nutrient deficiency.

 **(WT-223) BIOCHEMISTRY – II**

-To know Study of microbiological control of wine during storage.

-To learn Study of causes of food spoilage.

-Understand the characteristics and storage condition of Food.

 - To know Concept of mechanical damage with Example.

 -To learn Distinguish between French oak & American oak and its components

**WT – 224: Waste Treatment – I**

**-**To understand theFermentation industry waste, Wastewater composition, characterization studies

- Learn thePhysical Unit Operations, Flow measurement, Screening.

- To know Accelerated gravity separation, Flotation, Granular medium filtration.

- Understand theChemical Unit Processes, Chemical precipitation, Disinfection, Dechlorination.

-To learn theBiological Unit Processes**:** Aerobic, Anaerobic, Denitrification, and Biosorption.

**WT – 225: Waste Treatment – II**

**-** To learn the Removal of phosphorus, toxic compounds and refractory organics.

- To understand the Sludge treatment and disposal.

- To know In-situ bioremediation, Design principles and designing of ETPs.

- Understand theTroubleshooting, Environmental Impact Assessment.

**WT – 226: Wine Technology – II**

**-** To learn the Production of white wine, White Wine objective, Varieties and style.

- To understand the physiology of grape : Component, principal, location, fate.

-To know White wine making process, Harvesting, crushing, pressing, juice, addition of active yeast

- Control of fermentation parameter, Clarification and stabilization, Maturation and aging.

- Understand the Blending, bottle aging and post bulk operation.

- To knowCooperage for wine making**,** oak barrel making in world.

- To learn Racking: role and technique, Theory of protein fining, Fining teachings, and products used

 in Fining, Clarification treatment.

**S.Y.B.Sc. WINE TECH. Semester I and II Practicals**

**Course – I**

1. To know Isolation and purification of wine yeast from stock culture, flowers, fruits and erries.

2. Understand the Measurement of growth of wine yeast, bacterial count, direct cell count

 and total viable count, count of yeast from the wort and wine.

3. To learn Inoculum development of yeast and determination of exponential phase of growth.

4. To understand Determination of proteolytic activity of yeast strain during fermentation.

5. To know Strain development of yeast for tolerance to higher alcohol and SO2 concentrations.

6. Homemade wine production: grape, jamoon, pomegranate or any other fruit.

7. To understand Microscopic observation of yeast during wine production.

8. To know Determination of the course of fermentation and the rate of alcohol production.

9. Whole cell immobilization of yeast. Determination of the sugar alcohol

 Conversion coefficient in immobilized and free cell systems.

10. To understand Determination of the ability to produce acetic acid by yeast strain.

11. To learn Determination of the aptitude to form sulfite and sulfide (H2S) by yeast strains

**Course – II**

1. To learn Collection of soil sample and determination of N,P,K.

2. To know Studies on fruit-bud differentiation by visual identifications.

3. To understand the Propagation techniques for grapes: budding and grafting

4. To know Pruning techniques for grape vine and harvesting technique for grapes

5. To learn Preparation of solutions and mixtures: Bordeaux mixture, antibiotic sand plant growth

 Regulators.

6. To know Study of morphology, anatomy and microscopic features of grape(Microscopy)

7. To understand the Determination of pH, total and volatile acidity of grapes

8. Determination of total soluble solids of grape by hand refractometer

9. To learn Determination of reducing sugar of grape juice by Fehling method

10. To know Determination of total carbohydrates by Anthrone method.

11. To learn Estimation of proteins, tannins, ethanol, anthocyanins and metals from grapes and wine.

12. To understand the Analysis of wine components as per IS specifications by IS 7585:1995.

13. To know Determination of total and volatile acids of the grape / wort / wine IS7585:1995

14. To learn Determination of volatile acidity from wine by anion exchange column method.

**Course – III**

1. To know Analytical tests for identification of wine sediments: Potassium bitartarate,

 Calcium tartarate, copper case, yeast and bacteria cells

2. To learn Wine fermentation: standardization of yeast Inoculum and nutrient medium for wine

 Production.

3. To understand the Sensory assessment of berry Identification of pests and diseases of grapes.

4. To learn Selection of pesticides, timing, safe and efficient use.

5. To know Identification of wine grape variety and rootstock by visual observations.

6. To understand the Berry sampling, methods and prediction of harvest date.

7. To understand the Study of point quadrate method for canopy management.

8. To learn Study of fruitful bud for determination of pruning method.

9. Preparation of vineyard score card and evaluation of vineyard.

10. To understand the To know Comparison of total and volatile acidity of grape, wort, and wine

11. To learn Detection of phage contamination in wine

12. To know Periodic estimation of alcohol from must and wine and graphical representation.

**T. Y. B. Sc. WINE TECHNOLOGY Semester I**

**WT-331: PROJECT 1.VITICULTURE ESTABLISHMENT**

-To know the format for dissertation.

-To understand the how write paper

-To collect the photograph of various operation.

- Visit the vineyard and understand the working.

 **WT-332: BASIC CHEMICAL ENGINEERING PRINCIPLES**

-To understand Basic Fluid flow and fluid mechanics, Properties of liquids, Measurement of

 Viscosity, handling systems for Newtonian liquids.

- To know Mechanical Energy Balance, Pump Selection and Performance, Flow Measurement.

-To learn Liquid filtration, filter media, classification of liquid filtration, formation of filter cake.

- To understand Membrane filters, ultrafiltration microfiltration Sizing of filtration equipment.

-To learn Heat Transfer and Thermal Processing, heating and cooling of liquids, Plate heat.

-To learn Energy for Wine Processing, Steam generation, Electric Power utilization.

**WT333: WINERY EQUIPMENTS AND UTILITIES**

**-** To understand Utilities,Electric supply, humidifiers, Air-conditioning, humidifiers,

 Dehumidifiers, Chilling system, Gas Supply, Lighting, Catwalks and man ways, Computers.

- To learnEquipments, Process equipments, Cleaning, Hygiene and Sanitation equipments.

-To know Material handling equipments, Functions, types, and uses of Pallet jacks, Forklifts,

 Man lifts, Barrel racks, Loading/Unloading bay/ platforms, Wine transfer pumps.

- To learnPackaging equipments Functions, types, and uses of bottling machines.

- To understandSpecial Lab equipments, sparkling wine making equipments.

**WT334: PRE - & POST FERMENTATION PROCESSING IN WINERY**

**-** To understand Grapes sampling: Random berry sampling, whole cluster sampling.

- To learnGrapes handling: Receiving fruit at winery, use of dry ice.

- To know Pressing Destemming Sanitizing methods, cleaning the presses, hoses, tanks and all

 Equipment.

- To understand Selection of yeasts & consumables, Fermentation process Barrel

 Fermentation, aging.

- To know Malo-lactic fermentation, Post fermentation racking, Blending, Fining and filtration

- To learn Packaging, choice of bottles, shape and color, labels and capsules, screw cap.

- To know Temperatures of bulk wine storage, bottled wine storage.

**WT335: CONTRIBUTION OF WINE TO HUMAN HEALTH**

**-**Study the major wine antioxidants.

-Learn the different functions of wine antioxidants in human beings.

-Study the anti-degenerative diseases.

-Understand the synergism of alcohol and antioxidant in wine.

**WT-336: WINERY BYPRODUCTS AND WASTE MANAGEMENT**

**-** To knowByproducts from wine production, Grape seed oil, seed tannins.

- Learn the Methods of extraction and uses, Rochelle salt and natural color, products from winery

 Wastes.

- To understandWaste management and their characteristics.

- To know principle in Waste treatment, physicochemical methods of treatment.

- To learn Biological methods of treatment, integrated approach to waste treatment.

**WT-341: PROJECT 2: WINERY ESTABLISHMENT**

-To carry out the project in the format for dissertation.

-Visit the winery and understand the working.

-To collect the photograph of various operation.

-Prepare the project report under the suitable guide.

**WT 342: FRUIT AND FORTIFIED WINES**

**-**Understand the concept of Fruit wine.

-Study the method of preparation of fruit wine Ex. Banana wine, Orange wine, Guava wine & Strawberry

 Wine.

-Understand the concept of Fortification.

-Study the concept of carbonate & non carbonated beverages.

-Understand the concept of fortified wines with example.

**WT 343: WINE DEFECTS: IDENTIFICATION AND RECTIFICATION**

**-** Understand the Oxidation, acetaldehyde, acetic acid, ethyl acetate.

- To know Sulfur compounds, sulfur oxides, hydrogen sulfide, mercaptans.

- To learn cork traint, heat damage, light strike, lady bird taint.

- Study the acids in wine, volatile acidity (acetic acid), tartaric, malic, citric, lactic and succinic.

-To Understand the Wine aging factors and influences, Study of various practical techniques to

 solve defects.

- To learn grape aroma flavor characteristics, Additives allowed in making wine.

**WT-344-Wine Laws, Management and Taxation**

-To know about historical background of wine laws.

-To study about various wine laws.

-To study about the Patents and secret process.

- To Understand the purchase large amounts of wine & store it in their own warehouses.

- To knowLaws governing Wine sales, taxation of wine, shipping.

**WT345: WINE MARKET AND MARKETING**

**-** Understand the Marketing

- To know The Global Wine market – Leading producers and regions, Top markets.

- To learn Principles, logistics, and strategies of wine marketing and sales.

- Understanding the market and finding a niche, and developing a successful plan.

- To know Case studies of real world examples from both wine and business experts.

- To learn Indian wine market – Study of facts and figures.

**WT-346: TERM PAPERS AND SEMINARS, TWO EACH RELEVANT TO CURRICULUM**

**-**Conduct theseminar on related topic.

-Give idea about the presentation skill, posture and gesture.

-Test the knowledge of student in subject area.

-prepare the presentation and report regarding the seminar.

**WT-301 Practical based on SENSORY EVALUATION OF WINE**

To know The organization of wine evaluation: the space, equipment, temperature, order of

 serving the wines.

 To Understand the Wine evaluators selection based on their capacities and motivation and their

 Fundamental education for sensory evaluation and scoring.

To learn Sensory testing: sensory thresholds, acquaintance with the basic tastes,

 Recognition of basic tastes, classification based on taste, smell, clarity and color,

 Sight, touch, feeling and memory.

 To know Expression of senses perception (vocabulary); the types and methods of

 Evaluation.

To Understand the Performing and methods of sensory assessment (pair, three-angel, duo-trio

 test, the differentiation test, ranking test hedonic rating test and description analysis

To learn The sensory evaluation by aroma wheel (varietal aroma, flavour and woodageing)

 To know Analysis of substances responsible for astringency, bitterness and color of the

 wine.

 To Understand the The influence of major technological properties during grape processing,

 winemaking and nursing.

 To learn The study of sensory quality along with the wine origin and differentiation

 between the "technological wines" and "terroir wines"

 To know Basics of wine and food pairing bases on sweetness, acidity, texture, tannin levels,

 oiliness and spice characteristics.

**WT-302 Practical based on MICROBIOLOGY AND WINE MAKING**

1. To Understand the Phase Contrast Microscopy.

2. To know Different isolation and selective media for microorganisms.

3. To Understand the Estimation of population density.

4. To learn Identification of wine spoilage organisms: phenotypic, biochemical and molecular

 Methods.

5. To know Microbial profiling of wine.

**WT-303-Practicals Based on Chemical Engineering**

1. To know Measurement of properties of liquids using specific gravity bottle, Hand Held refractometer.

2. To Understand measure the viscosity of liquids using capillary tube viscometer.

3. To learn measure flow of liquids using Rotameter, Pitot tube, Venturimeter, Magnetic. Flow meter

4. To study filters and various types of filtration methods.

5. Practical calculation of refrigeration loads for wine storage.