Savitribai Phule Pune University

(Formerly University of Pune)

Three Year B.Sc. Degree Program in Restructuring pattern

(Faculty of Science & Technology)

S.Y.B.Sc. (Restructuring pattern)

Choice Based Credit System Syllabus

To be implemented from Academic Year 2020-2021

Title of the Course: B.Sc. (Restructuring pattern)

Preamble:

BSc Restructuring program is designed to serve the requirements of Choice Based Credit System as per the guidelines of University Grants Commission. In the proposed structure, due consideration is given to restructured courses along with the conventional courses (Regular Pattern).

The continuous assessment of Choice Based Credit System will facilitate systematic and through learning towards better understanding of the subject. The well planned curricula from 1st year to 3rd year comprising of six semesters will definitely motivate the students for inculcating enough skills required for becoming a successful entrepreneur as well as a researcher.

Objectives:

- To foster value based education
- To enrich project based learning and create foundation for research
- To train the students in skill oriented courses
- To increase and improve self confidence, effective communication skills, perfect and proper presentation skill through personality development courses

Course Outcomes:

- Through this pattern, skilled and technical human resources will be made available.
- It will develop self confident and knowledgeable personnel's.
- The course will motivate students in the field of research as well as guide to become a successful entrepreneur.
- It will develop self awareness to enrich decision making ability among the students.
- Personal development will increase the clarity and effectiveness in knowing themselves and their strengths.

Restructuring Pattern

Structure of Choice Based Credit System for Undergraduate Science Restructuring Pattern 2019-20.

	Discipline Specific Core Courses (CC)		**Ability Enhancement Compulsory Courses (AECC)**		**Discipline Specific Elective Courses (DSEC)**		**Skill Enhancement Courses (SEC)**		**Total Credit**
Sem -ester	**Course**	**Theory 1 + Theory 2 + Practical Credit**	**Course**	**Theory + Practical Credit**	**Course**	**Theory 1 + Theory 2 + Practical Credit**	**Course**	**Theory + Practical Credit**	
FYBSc I	CC-I **('B' Component)**	2+2+1.5= 5.5	-	-	-	-	-	-	**22**
	CC-II **('B' Component)**	2+2+1.5= 5.5	-	-	-	-	-	-	
	CC-III **('B' Component)**	2+2+1.5= 5.5	-	-	-	-	-	-	
	CC-IV (Part-A) **('A' Component: Foundation Course-I)**	2+1.5= 3.5	-	-	-	-	-	-	
	CC-IV (Part-B) **'E'Component: Personality Development-** (1) National Service Scheme-I, (2) National Cadet Corps-I, (3) Population Education-I, (4) Family planning and health education-I, (5) Sports-I.	2	-	-	-	-	-	-	
FYBSc II	CC-V **('B' Component)**	2+2+1.5= 5.5	-	-	-	-	-	-	**22**
	CC-VI **('B' Component)**	2+2+1.5= 5.5	-	-	-	-	-	-	

	CC-VII **('B' Component)**	2+2+1.5= 5.5	-	-	-	-	-	-	
	CC-VIII (Part-A) **('A' Component: Foundation Course-II)**	2+1.5= 3.5	-	-	-	-	-	-	
	CC-VIII (Part-B) **'E'Component: Personality Development-** (1) National Service Scheme-II, (2) National Cadet Corps-II, (3) Population Education-II, (4) Family planning and health education-II, (5) Sports-II.	2	-	-	-	-	-	-	
SYBSc III	CC-IX **('B' Component)**	2+2+2= 6	AECC-I (Environment)	2+0=2	-	-	-	-	**22**
	CC-X **('B' Component)**	2+2+2= 6	AECC-I (Language Communication)	2+0=2	-	-	-	-	
	CC-XI **('C' Component: Part A)** (1) Pharmaceutical Chemistry-I, (2) Energy Studies-I, (3) Horticulture and its management-I, (4) Applied entomology-I, (5) Dairy Science-I.	2+2=4	-	-	-	-	-	-	
	CC-XI **('D' Component: Part-B)** (1) Soap Manufacturing-I,	2	-	-	-	-	-	-	

	(2) Radio Repairing-I, (3) Nursery Development-I, (4) Medical Lab Technician-I, (5) Milk and Milk Products-I.								
SYBSc IV	CC-XII **('B' Component)**	2+2+2= 6	AECC-III (Environment)	2+0=2	-	-	-	-	**22**
	CC-XIII **('B' Component)**	2+2+2= 6	AECC-IV (Language Communication)	2+0=2	-	-	-	-	
	CC-XIV **('C' Component: Part A)** (1) Pharmaceutical Chemistry-II, (2) Energy Studies-II, (3) Horticulture and its management-II, (4) Applied entomology-II, (5) Dairy Science-II.	2+2=4	-	-	-	-	-	-	
	CC-XI V **('D' Component: Part-B)** (1) Soap Manufacturing-II, (2) Radio Repairing-II, (3) Nursery Development-II, (4) Medical Lab Technician-II, (5) Milk and Milk Products-II.	2	-	-	-	-	-	-	
TYBSc V	-	-	-	-	DSEC-I	2+2+2=6	SEC-I	2+0=2	**22**
					DSEC-II	2+2+2=6	SEC-II	2+0=2	
					DSEC-III: **('C' Component:**	2+2=4	-	-	

					Part A) (1) Pharmaceutical Chemistry-I, (2) Energy Studies-I, (3) Horticulture and its management-I, (4) Applied entomology-I, (5) Dairy Science-I.				
					('C' Component: Part B) Project Based on; (1) Pharmaceutical Chemistry, (2) Energy Studies, (3) Horticulture and its management, (4) Applied entomology,	2+0=2			

					(5) Dairy Science				
TYBSc VI	-	-	-	-	DSEC-IV	2+2+2=6	SEC-III	2+0=2	**22**
					DSEC-V	2+2+2=6	SEC-IV	2+0=2	
					DSEC-VI **('C' Component: Part A)** (1) Pharmaceutical Chemistry-II, (2) Energy Studies-II, (3) Horticulture and its management-II, (4) Applied entomology-II, (5) Dairy Science-II.	2+2=4	-	-	
					('C' Component: Part B) Project Based on;	2+0=2			

					(1) Pharmaceutical Chemistry, (2) Energy Studies, (3) Horticulture and its management, (4) Applied entomology, (5) Dairy Science				
								Total Credit	**132**

- In S.Y.B.Sc. Restructuring pattern student offer two regular courses and two restructuring course.
- Over all credit remain same in regular and restructuring patterns.

Examination Pattern = Internal Exam: 15 Marks
External Exam (Semester End Exam): 35 Marks
Total : 50 Marks.

Savitribai Phule Pune University
Restructuring Pattern 2020-21
Science Faculty

Structure of S. Y. B. Sc. Restructuring pattern
'C' Component (Applied course)

Semester	Paper Code	Paper	Core course (Course Code)	Paper Title	Credits
					Theory
III	RE-C-PC-231	I	**CC-XI (Part-A)** 'C' Component (Student opt any one subject).	Pharmaceutical Chemistry- I	02
	RE-C-ES-232	I		Energy Studies-I,	02
	RE-C-HM-233	I		Horticulture and Its Management -I	02
	RE-C-AE-234	I		Applied Entomology-I,	02
	RE-C-DS-235	I		Dairy Science -I	02
	RE-C-Pract-236	I	Practical for above Theory paper opted by the student	Practical Paper –I	02
IV	RE-C-PC-241	II	**CC-XIV (Part-A)** 'C' Component (Student opt any one subject).	Pharmaceutical Chemistry- II	02
	RE-C-ES-242	II		Energy Studies-II,	02
	RE-C-HM-243	II		Horticulture and Its Management -II	02
	RE-C-AE-244	II		Applied Entomology-II,	02
	RE-C-DS-245	II		Dairy Science -II	02
	RE-C-Pract-246	II	Practical for above Theory paper opted by the student	Practical Paper –I I	02

- In S.Y.B.Sc. Restructuring pattern student offer two regular courses and two restructuring course 'C' and 'D' Component.
- Over all credit remain same in regular and restructuring patterns.

Examination Pattern = Internal Exam: 15 Marks
External Exam (Semester End Exam): 35 Marks
Total : 50 Marks.

Savitribai Phule Pune University

Restructure Pattern 2020-21

Science Faculty

Structure of S. Y. B. Sc. Restructuring pattern
'D' Component (Skill Oriented Course)

Semester	Paper Code	Paper	Core course (Course Code)	Paper Title	Credits		
					Theory	Practical	Total
III	RE-D-SM-231	I	**CC-XI (Part-B)** 'D' Component (Student opt any one subject).	Soap manufacturing - I	1	1	2
	RE-D-RR-232	I		Radio Repairing - I	1	1	2
	RE-D-ND-233	I		Nursery Development -I	1	1	2
	RE-D-MLT-234	I		Medical Lab Technique - I	1	1	2
	RE-D-MMP-235	I		Milk and Milk Product - I	1	1	2
IV	RE-D-SM-241	II	**CC-XIV (Part-B)** 'D' Component (Student opt any one subject).	Soap manufacturing - II	1	1	2
	RE-D-RR-242	II		Radio Repairing - II	1	1	2
	RE-D-ND-243	II		Nursery Development -II	1	1	2
	RE-D-MLT-244	II		Medical Lab Technique - II	1	1	2
	RE-D-MMP-245	II		Milk and Milk Product - II	1	1	2

Theory and Practical Exam included in Examination at a time. No separate Exam for Theory & practical

Examination Pattern = Internal Exam: 15 Marks
External Exam (Semester End Exam): 35 Marks
Total Marks = 50 Marks

SEMESTER-III

CC-XI (Part-A)
Course code - RE-C-PC-231
Paper Title: Pharmaceutical Chemistry - I (Paper -1)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Course Objectives

1. To provide in depth knowledge of scientific and pharmaceutical chemistry.
2. To train students in skills related to research, education, pharmaceutical and market.
3. To develop the good qualities of integrity, responsibility and self confidence.
4. To familiarize with current and recent scientific and research development in the field of pharmaceutical industry.
5. To enrich knowledge through hand on activities and study tour.
6. To instill safety practices and regulations.

Course Outcomes.

1. After completion of program, students will be able to have in-depth knowledge of basic concepts in pharmaceutical chemistry.
2. Student will learn about process and get knowledge of pharmaceuticals that help in further education.
3. Students will become responsible and achieve self confident.
4. Students will be able to apply the knowledge of pharmaceutical science in real life situations to solve the problems.
5. Students develop aptitude of doing research through undertaking small projects and report writing.
6. Students use safety practices and regulations inside the pharmaceutical industry.

Theory. (Credit.02)

1. Introduction to Pharmaceutical Chemistry **1 Credit**

a) Introduction and Scope of various field of pharmaceutical science including, pharmaceutical chemistry, pharmaceutics, , Pharmacognosy, pharmacology, important aspects of pharmaceutical chemistry, brief history of pharmacy, pharmacopeia names, meaning & contents, monograph in Indian Pharmacopeia. (5)

b) Drug and Dosage forms:

c) Drug- Definition, ideal condition of drugs, classification of drug, sources of drug, routes of drug administration- Oral, Parenteral, sublingual, inhalation, and External, their merits & demerits. (8)

Types of dosage forms – I. Solid -tablets capsule, suppositories, pills.
II. Semisolid – An ointment, paste, jellies & creams.
III. Liquid- clear liquid, suspensions, Emulsions, Lotion.
IV. Parenteral- solid, Liquid its merits & demerits.

d) Introduction and brief account of absorption, distribution, metabolism and excretion, Physiochemical properties affecting activities of drugs. (2)

2. Prescription, Pharmaceutical Aids, Diseases and Herbal Medicines 1 Credit

a) Prescription and Pharmaceutical Aids:
Prescription: Definition, parts of prescription, types of prescription. Pharmaceutical aids- e.g. preservatives, antioxidants, emulsifying agents, stabilizing & suspending agents, and coloring and flavorings agents, sweetening agents with suitable examples of different compounds. (5)

b) Some Common Diseases and Their Treatment:
Introduction, air borne diseases, insect borne diseases, water borne diseases their control and treatment. (5)

c) Herbal medicines:
Introduction, Local medicinal Plants: *Azadirachta indica* (neem), *Cymbopogon citratus* (lemon grass), *Osmium sanctum* (tulsi), *Curcuma longa* (turmeric): active constituents and their uses. (5)

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-236
Practical Paper–I Based on RE-C-PC-231 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Preparation and assay of boric acid.	2
2.	Preparation and assay of magnesium sulphate.	2
3.	Preparation and assay of copper sulphate.	2
4.	Preparation and assay of aluminum hydroxide gel.	2
5.	Preparation of calamine lotion.	2
6.	Preparation of ointments.	2
7.	Preparation of buffer solutions.	2
8.	Preparation of tooth powder.	2
9.	Demonstration of preparation of tablets.	2
10.	Study tour to pharmaceutical industry and report writing	2

Note:

1. A student has to perform at list six experiments in each semester and study tour and report writing.
2. In lieu of study tour students will have to perform two more practicals.

SEMESTER-IV

CC- XIV (Part-A)
Course code - RE-C-PC-241
Paper Title: Pharmaceutical Chemistry - I (Paper -1)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Theory (Credits.02)

1. Impurities in Pharmaceutical Substances

Impurities commonly found in medicinal preparation, sources of Impurities, effect of impurities and limit test for chlorides, sulphate, Iron and heavy metals. (4)

2. Study of Inorganic Pharmaceutical Compounds

Study of inorganic pharmaceutical compounds with respect to their preparation, important chemical and physical properties, principle of assay and uses.

I. Gastro-Intestinal agents: (4)
   a) Acidifying agents: Dilute Hydrochloric acid.
   b) Antacid: - Aluminum hydroxide gels, Sodium bicarbonate, Milk of magnesia, Magnesium trisilicates.
   c) Protective & adsorbents: -Kaolin, Bismuth sub carbonate.

II. Topical agents: (4)
   a) Protective: Talc, Zinc oxide, Calamine, Titanium dioxide.
   b) Antimicrobial: Boric acid, Potassium permanganate, Iodine, Chlorinated lime, Yellow mercuric oxide.
   c) Astringents: Alum, Zinc sulphate, Copper sulphate, Selenium sulphate.

III. Expectorants: Ammonium chloride, Potassium iodide, Antimony potassium tartarate. (4)

IV. Dental product: Sodium, fluoride, and calcium carbonate. (4)

V. Respiratory stimulants: Ammonium chloride.

VI. Antidote: Sodium nitrite, Potassium permanganate, Sodium thiosulphate. (4)

VII. Electrolyte replenishers: Sodium chlorides, Sodium citrate, potassium chlorides, Calcium gluconate. (4)

VIII. Hematinics: Ferrous sulphate, Ferrous gluconate, Ferrous Fumarate, Ferric ammonium nitrate. (2)

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-246
Practical Paper–II Based on RE-C-PC-241 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Limit test for Chloride and Sulphate.	2
2.	Limit test for Iron.	2
3.	Preparation and assay of Ferrous Sulphate.	2
4.	Preparation and assay of ammoniated mercury.	2
5.	Preparation and assay of Lead acetate.	2
6.	Preparation and assay of milk of magneisa.	2
7.	Preparation electrolyte powder.	2
8.	Preparation of dextrose and calcium gluconate injection.	2
9.	Preparation and assay of aspirin.	2
10.	Preparation lugol's, strong and weak iodine solution.	2

Note:

1. A student has to perform at list six experiments in each semester and study tour and report writing.
2. In lieu of study tour students will have to perform two more practicals.

REFERENCE BOOKS:

1. *Inorganic Medicinal Chemistry Block & Roche*
2. *Inorganic Pharmaceutical Chemistry M.L.Schroff*
3. *Pharmaceutical Chemistry Inorganic G. R. Chatwal*
4. *Practical Pharmaceutics R.S. Gaud and G.D. Gupta*
5. *Inorganic Pharmaceutical and Medicinal Chemistry J.S.Quadry*
6. *Indian Pharmacopeia (Vol.I/II)*

SEMESTER-III

CC-XI (Part-A)
Course code - RE-C-ES-232
Paper Title: Energy Studies - I (Paper -1)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Course Objectives :

CO1. To Introduce Energy scenario in India along with the energy sources.
CO2.To study all types of energy sources and their impact on Environment.
CO 3.To study and aware various units of energy and their interconversions.
CO 4. To aware the problems to be faced in Energy conversions .
CO 5. To study Energy crisis and its solution.

Program Outcomes: On completion of this course, the students will be able to

PO1. Learn about the Indian Energy Scenario, Energy cycle on earth etc
PO2. Understand the types of energy and energy conversion mechanisms
PO3. Learn the energy consumption ,energy crisis and its solution.
PO4. Learn about the energy and environment, air pollution, climate changes and its impacts on sustainable development.

Theory: (Credit. 02)

1. Energy forms, Units and Conversion.

a) Energy - definition , different forms of energy- Potential Energy, Kinetic Energy, Mechanical Energy, Heat Energy, Electrical Energy, Chemical Energy, Magnetic Energy, Gravitational Energy (brief discussion of each form), work, power and energy ,Various units of energy- calorie, joule, erg, BTU, kWh, Horse Power, electron Volt, inter conversion of energy units, (7)

b) Law of conservation of energy, Laws of thermodynamics, conversion of potential energy to electrical energy, conversion of chemical energy into heat and electricity, Mechanical energy into electrical, electrical into mechanical and heat energies. Concept of fuel value and fuel values of various fuels. (8)

2. Energy Sources. (1 Credit)

Classification of energy sources-conventional and non conventional (15)

Conventional energy sources - Fossil Fuels (coal ,crude oil ,natural gas), formation of different stages of coal and their composition, composition and distillation of crude oil , Nuclear energy, Hydro power, merits and demerits of conventional energy sources, energy crisis, energy and pollution, global warming, future /nonconventional

energy sources- solar, wind, biomass, tidal, geothermal, ocean thermal energy, wave energy, Hydrogen (brief discussion of each).

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-236
Practical Paper–I Based on RE-C-ES-232 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Determination of fuel value of wood.	2
2.	Determination of fuel value of charcoal/Cow dung.	2
3.	Preparation of Leclanche cell and determination of O/P power at different concentrations.	2
4.	Preparation of Daniel cell and determination of .O/P power at different concentrations.	2
5.	Calibration of thermocouple as thermometer and Determination of inversion temperature	2
6.	Determination of efficiency of conventional chullaha.	2
7.	Determination of efficiency of improved chullaha	2
8.	Wind power	2

A) Field Visit /Study Tour :-
Science center / hydropower station / small scale industry / energy park.

Note:-

1. A student should complete at least six practicals and field visit.
2. In lieu of field visit, a student has to perform two more practicals.

Reference Books:-

1. Non conventional energy Resources :B.H. Khan (Tata McGraw-Hill Co.)
2. Solar Energy :S.P. Sukhatme (Tata McGraw-HillCo.)
3. Solar Energy Utilization : G.D Rai (Khana Publishers)
4. Encyclopedia of Energy 2 ndEdition : (Tata McGraw-HillCo.)
5. Energy resources :Andrew I. Simon (Pergamon Press)
6. Solar Energy : H.P. Garg
7. Solar Energy :G.N. Tiwari (Narosa publishing house)
8. Nuclear Physics:D.C.Tayal (Himalaya publication)
9. Energy Resources: Demand and conservation: Chaman Kashkari
10. Alternative energy sources: James P. Hartnet (Academic Press, Newyork)

SEMESTER-IV

CC: XIV (Part-A)
Course code - RE-C-ES-242
Paper Title: Energy Studies - II (Paper -II)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Theory (Credit. 02)

1. Renewable Energy Resources:- **(15)**

Solar, Wind, Biomass, Tidal, Geothermal, Ocean thermal energy, Wave energy,(Brief discussion on availability and technologies used to get energy from these resources), present utilization and their future potential, Structure and characteristics of the Sun, origin of solar energy, solar constant, solar insulation, air mass, availability of solar energy on the earth, spectral distribution of terrestrial and extra terrestrial solar radiation,. nature of solar radiation(beam, diffuse and global),attenuation of solar radiation in atmosphere(absorption &scattering), advantages and disadvantages of solar energy.

2. Photo thermal applications of solar energy **(15)**

Principles of photo thermal conversion, modes of utilization of solar energy- a) photothermal, b) photovoltaic, c) photochemical, solar collectors and their classification, non concentrating type solar collector- flat plate collector, Photo thermal applications of solar energy-Liquid heating flat plate collector, box type solar cooker, solar distillation, cabinet solar dryer, concentrating type solar collectors (Brief discussion and classification).

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-246
Practical Paper–II Based on RE-C-ES-242 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Study of Box type solar cooker.	2
2.	Study of cabinet solar dryer.	2
3.	Study of liquid heating flat plate collector.	2
4.	Study of air heating flat plate collector.	2
5.	Study of solar still	2
6.	Study of Non Selective coatings (selectivity ratio)	2
7.	Study of Conversion of electrical energy into heat energy.	2
8.	Measurement of consumption of electrical energy by kilo watt hour (kW -h) meter.	2

Field Visit/ Study tour:-

Visit to: co generation power plant / Energy audit of laboratory / Energy survey of village/ photothermal power station.

Note:- 1. A student should complete at least 6 practicals and field visit/ study tour.
2. In lieu of field visit/ study tour, two additional practicals must be completed.

Reference Books:

1. Solar energy : S.P. Agrawal
2. Non Conventional Energy Resources : B.H. Khan (McGraw-Hill Co.)
3. Solar Energy : S.P. Sukhatme (Tata McGraw-HillCo.)
4. Solar Energy Utilization : G.D Rai (Khana Publishers)
5. Encyclopedia of Energy ,2nd Edition : (McGraw-HillCo.)
6. Energy Resources : Andrew I Simon (Pergamon Press)
7. Solar Energy : H.P. Garg
8. Solar Energy : G.N. Tiwari (Narosa publishing house)
9.Energy Technology:S.Rao,,B.B.Parulekar(Khanna Publishers)-third edition

SEMESTER-III

CC-XI (Part-A)
Course code - RE-C-HM-233
Paper Title: Horticulture and Its Management - I (Paper -1)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Theory. (Credit. 02)

1. Introduction and Principles of Horticulture: (1)
2. Definition, Importance and Scope of Horticulture, Maharashtra and India. (2)
3. Branches of Horticulture- Pomology, Olericulture, Floriculture, Post Harvest Technology, landscape gardening, Plasticulture, Biotechnology (Plant tissue culture). (3)
4. Nutritive value of horticultural crops. (2)
5. Soil, Climate management. (3)
   i) Types of soil – Physical and Chemical Characteristics of soil.
   ii) Brief account of soil found in India with the help of map and Climatic requirement of horticultural crops.
6. Selection of site for horticultural crops. (2)
7. Different s systems of planting orchards - Square, Rectangular, Hexagonal, Quinces, Contour and High density population - their merits and demerits (3)
8. Plant propagation- Definition, types (Cutting, Layering, Grafting, Budding) (4)
9. Water management for Horticulture Plants. (2)
   i) System of Irrigation, Drip, sprinkler, Micro sprinkler.
   ii) Surface irrigation- Flood, Ridges and Furrows, broad ridge and Furrow and basin method.
10. Training and Pruning. (2)
11. Nutritional requirement. (2)
    i) Major and Minor nutrients.
    ii) Chemical fertilizer and bio-fertilizer.
    iii) Manures Compost (F.Y.M).
12. Weed Management. (2)
    i) By cultural methods,
    ii) Chemical control.

13. Special Horticultural practices- Training, Pruning, Girdling, Ringing, Bending, Notching

(2)

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-236
Practical Paper–I Based on RE-C-HM-233 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Classification and Identification of Horticultural crops.	2
2.	Study of tools and implements in horticulture.	2
3.	Layout of different planting systems.	2
4.	Digging of pits for fruit plants.	2
5.	Propagation methods. a. Air Layering, b. Simple layering (Guava). c. Inarch or Approach grafting (Mango, Chikku) d. Suckers Banana	2
6.	Preparation of fertilizer mixtures.(Biofertilizer, Organic and Chemical)	2
7.	Identification and management of nutritional disorders in fruit crops.	2
8.	Preparation and application methods of growth regulators	2
9.	Preparation of Bordeaux mixture and paste	2
10.	Visit to progressive farms. (Agriculture Universities, Agri. Institution, Industry)	2

***Note: -** 1. Student has to perform at list six practicals and study tour/field visit.
2. In lieu of study tour a student will have perform 2 more practicals

Reference Books:

1. Fundamentals of Horticulture, Edmond, J.B., Sen., T.L., Andrews, F.S and Halfacre R.G, 1963. Tata McGraw Hill Publishing Co., New Delhi.
2. Introduction to Horticulture, Kumar, N. 1990. Rajyalakshmi Publications, Nagarcoil, Tamilnadu.
3. Basic Horticulture, Jitendra Sing, 2002. Kalyani Publishers, Hyderabad.
4. Fundamentals of Fruit Production, Garner V R, Bradford F C and Hooker Jr. H D, 1957. McGraw Hill Book Co., New York.
5 Plant Propagation. Principles and Practices, Hartman, HT and Kester, D.E.1976, Prentice Hall of India Pvt. Ltd. Bombay.
6. Plant Propagation. Sadhu, M.K. 1996. New Age International Publishers, New Delhi.Propagation of Fruit Crops, Mukherjee, S.K. and Majumdar, P.K.1973. ICAR,New Delhi.
7 Propagation of Tropical Fruit Trees, Ganner, R.J. and Choudari, S.A. 1972. Oxford & IBH Publishing Co., New Delhi.
8. Propagation of Horticultural Crops: Principles and Practices, Sarma, R.R. 2002. Kalyani Publishers, New Delhi

SEMESTER-IV

CC- XIV (Part-A)
Course code - RE-C-HM-243
Paper Title: Horticulture and Its Management -II (Paper -II)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Theory (Credits. 02)

1. Pomology.: (4)
   i) Importance and scope for fruit growing.
   ii) Export and import potential of fruits in India.
   iii) Importance of fruit in human diet.
2. Cultivation of following fruit crops with references Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, mannuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests, storage and marketing of the following fruit crops: (24)
   i) Grapes
   ii) Mango
   iii) Citrus (Mosambi, K.Lime. Orange).
   iv) Pomegranate.
   v) Custard apple.
   vi) Sapota (Chikku).
   vii) Papaya.
   viii) Guava
3. Government policies / Schemes for promoting fruit crops cultivation. (2)

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-246
Practical Paper–II Based on RE-C-HM-243 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Identification of fruit crops and their varieties	1
2.	Demonstration. a. Pruning in Grapes. b. Bahar treatment in Pomegranate, Guava, Citrus.	2
3.	Methods of fertilizer application for fruit crops according to recommended doses. a. Ring method. b. Foliar spray c. Drip through ventury	2
4.	Identification of Important pest and disease of fruit crops. i. Pest. a. Fruit borer (pomegranate). b. Mango Hopper (Mango). c. Fruit fly (Guava).	2

	d. Mille bug (Custard). e. Termites (Grapes) ii. Disease. a. Downy Mildew (Grapes) b. Cankering (Citrus). c. Powdery mildew. (Mango). d. Yellow vein mosaic (Papaya)	
5.	Harvesting grading and packaging of fruit to be demonstration.	2
6.	Study of methods of precooling, storage and transport of fruits.	2
7.	Preparation of Jam Jelly	2
8.	Preparation of squashes and pickles.	2
9.	Visit to a fruit market/commercial orchids	2
10.	Visit to Research institute/ Universities/ Industries/KVK should be arranged	2

***Note: -** 1. Student has to perform at list six practicals and study tour/field visit.
2. In lieu of study tour a student will have perform 2 more practicals

References.

1. Text book on Pomology (Fundamentals of fruit growing), Chattopadhyay, T.K.1997. Kalyani Publishers, Hyderabad.
2. Citriculture, Rajput, C.B.S. and Srihari Babu, R. 1958. Kalyani Publishers, New Delhi.
3. Arid Fruit Culture, Chundawat, B.S. 1990. Oxford and IBH, New Delhi.
4. Principles and Practice of Postharvest Technology, Pandey, P.H. 1998. Kalyani Publisher, Ludhiana.
5. Postharvest Technology of Horticultural Crops, Sudheer, K.P. 2007. New India Publishing Agency, New Delhi.
6. Fruit and Vegetable Preservation Principles Practice, Srivastava, R.P. and Sanjeev Kumar 1998. International Book Distribution Co., Lucknow .
7. Preservation of Fruits and Vegetables. Girdharilal, G. S., Siddappa and Tandon, G.L. 1998. ICAR, New Delhi
8. .A Handbook on Postharvest Management of Fruits & Vegetables, P.Jacob John 2008. Baya publishing House, Delhi.
9. Postharvest–An Introduction to the Physiology & Handling of Fruits & Vegetables, R.B.H. Wills, W.B.Mc Glassan, D. Graham, T.H. Lee & E.G. Hall.
10. CBS Publishers & Distributors, New Delhi .

SEMESTER-III

CC-XI (Part-A)
Course code - RE-C-AE-234
Paper Title: Applied Entomology - I (Paper -1)
('C' Component: Applied Course) (Credit.2Th +2 Pract= 04)

Course Objectives and Out Comes

- Appreciate the importance of insect
- Understand the need of good management practices
- Learn the taxonomy, biology and control of insect pest
- Identify major orders and families of insect
- Acquire skill for collecting and preserving of insect for scientific study

Theory (Credit .02)

1. Introduction **[02]**

1.1 Definition

1.2 Branches of entomology: Agricultural, Medical, Forest, Forensic and Industrial entomology

2. Taxonomy **[05]**

2.1. Broad Classification of insect with example.

2.2. Apterygota: Distinguishing character with example.

2.3. Pterygotes: Endopterygote and Exopterygote, distinguishing character with example.

3. Body Organization **[12]**

3.1. Head: Study of insect head and its appendage.

3.1.1 Antennae: Basic structure and its types with example.

3.1.2 Mouth parts of a generalized insect for example Grasshopper.

3.2. Thorax

3.2.1. Segmentation and Sclerites.

3.2.2. Legs: Typical structure of leg and its modification.

3.2.3. Wing: Structure of generalized wing including its region and venation .Wing modification with example.

3.3Abdomen and its Appendages

4. Study of Cockroach **[08]**

4.1 Systematic position, Habit, Habitat, Distribution and External morphology.

4.2. Digestive System.

4.3. Reproductive System.

5. Insect Metamorphosis **[03]**

5.1. Definition and its types with example.

5.2 Type of insect eggs, larvae and pupae.

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-236
Practical Paper–I Based on RE-C-AE-234 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Methods of collection, preservation and identification of insect	D
2.	Study of External morphology of cockroach	D
3.	Temporary mounting of mouthparts, antenna, legs, cornea of cockroach	E
4.	Study of Digestive System of cockroach	E
5.	Study of Reproductive System of cockroach	E
6.	Study of different type of antennae	D
7.	Study of different types of Mouth parts in insect	D
8.	Study of different type of wings	D
9.	Study of life cycle of hemimetabolous and Holometabolous insect	D
10.	A field visit/tour to observe the different insect stages and report writing.	

***Note: -** 1. Student has to perform at list six practicals and study tour/field visit.
2. In lieu of study tour a student will have perform 2 more practicals.

Reference books

1. General and applied entomology by little.
2. A text book of general and applied entomology by Nair.
3. Arthropod by Kotpal
4. A general text book of entomology by Imms.
5. A text book of entomology by Ross.
6. Atext book of entomology by B.V David, T.N Anantha Krishnan.

SEMESTER-VI

CC-XIV (Part-A)
Course code - RE-C-AE-244
Paper Title: Applied Entomology - II (Paper -II)
('C' Component: Applied Course) (Credit.2Th+2Pract= 04)

Theory (Credit.02)

1. Introduction to economic importance of insect with reference to product, pollination, scavengers and food value. [03]
2. Lac insect: Systematics, Habit, Habitat, External morphology, life cycle, host plant. Harvesting, processing and use of Lac. [06]
3. Insect of medical importance: Mosquito (anopheles) and house fly inclusive of Systematics position, habits, habitat, morphological characters and role in transmission of disease and control measures. [12]
4. Study of predator and parasitic insect with two examples of each. [04]
5. Insect pest control: Type of control measures (Physical, Chemical and Biological) [05]

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-246
Practical Paper–II Based on RE-C-AE-244 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Study of beneficial insects: Honey bee, Silkworm and Locusts	D
2.	Study of life cycle of Lac insect	D
3.	Study of morphology and life cycle of mosquito	D
4.	Study of morphology and life cycle of house fly	D
5.	Study of control measures of house fly and mosquito	D
6.	Study of insect predators: Lady Bird beetle and Praying manits	D
7.	Study of insect parasites: Bed bug and Head louse	D
8.	Study of control measures of insect pest	D
9.	Effect of plant extract on mosquito larvae to determine LD_{50} value	D
10.	A field visit to observe the agriculture pest control measure and report writing	

***Note: -** 1. Student has to perform at list six practicals and study tour/field visit.
2. In lieu of study tour a student will have perform 2 more practicals.

Reference books

1. Destructive and useful insect by Metcalf and Flint
2. General and applied entomology by little.
3. A text book of general and applied entomology by Nair.
4. Arthropod by Kotpal
5. A general text book of entomology by Imms.
6. A text book of entomology by Ross.
7. A text book of entomology by B.V David, T.N Anantha Krishnan.
8. A text book of applied entomology Vol.-II by K.P.Srivastava

SEMESTER-III

CC-XI (Part-A)
Course code-RE-C-DS-235
Paper Title: Dairy Science-I (Paper-I)
('C' Component: Applied Course) (Credit: 2Th+2Pract= 04)

Objectives: 1) To give applied Knowledge to the students
2) Introduction to Cattle breeds
3) Present Status of Dairy animal in India and World

Theory (Credit-I) :

1. Introduction to Animal Husbandry. **04L**

a) Present position of Livestock and Poultry in India and World.
b) Scope and Limitation for Livestock and Poultry farming in India.
c) Common terms used in Animal Husbandry.
d) Importance of animal products in human nutrition..
(Nutritive value of milk, egg, meat and Fish).

2. Cattle Breeds **07L**

a) Classification of Cattle Breeds
b) Milch purpose breeds: - Sahiwal, Red Sindhi,Tharparkar & Gir.
c) Dual purpose – Deoni & Kankrej.
d) Draft purpose – Khillar,Dangi,Red kandhari & Gaolao.
e) Exotic breeds – Holstein Friesian, Jersey & Brown Swiss.
f) Cross breeds of Maharashtra – Phule Triveni & Holdeo.

3. Buffalo breeds **04L**

a) Classification of buffalo breeds.
b) Murrah, Surti, Nagpuri, Pandharpuri, Jaffarabadi,Marathwadi and Mehsana.

Theory (Credit-II) :

4. Introduction to Diseases. **04L**

a) Definition
b) Mastitis
c) Foot and Mouth Disease
d) Rinder pest
e) Brucellosis
f) Blackquarter

5. Routine Management practices. **07L**

a) Identification of animal
b) Dehorning.
c) Castration.
d) Milking.
e) Grooming, Culling, and Drying off.
f) Deworming, spraying, dipping & vaccination.
g) Record keeping.

6. Anatomy and Physiology of Udder **04L**

a) Growth and development of Udder

b) External and Internal Structure of udder

c) Physiology of udder (Milk let down i.e. milk Secretion/milk ejection and Holding up of milk)

d) Role of Hormones in milk Secretion

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-236
Practical Paper–I Based on RE-C-DS-235 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	Identification of Body parts of Cow.	2
2.	To study Dehorning of calf	2
3.	Identification marking to animal	2
4.	To study Vaccination of de worming schedule.	2
5.	Study of Detection of sub clinical mastitis in cow	2
6.	To study Foot and Mouth Disease (FMD) in Cow	2
7.	To study the Methods of milking	2
8.	To Study Classification of Cow breeds	2
9.	To Study Classification of Buffalo breeds	2
10.	To Study Preparation of Animal product for human nutrition (Biriyani Egg /Chicken/Meat/Fish fry)	2
11.	Cattle farm /Dairy Industry/ Exhibition visit is compulsory for the students and submit the visit report at the time of practical examination	2

***Note: -** 1. Student has to perform at list six practicals and study tour/field visit.
2. In lieu of study tour a student will have perform 2 more practicals

List of Books:

1. Animal Husbandry - by G.C. Banarjee
2. Animal Nutrition - by G.C. Banarjee
3. Handbook of Dairy Science - by I.C.A.R.
4. Handbook of Agriculture - by I.C.A.R.
5. Text book of Animal Science Technology - H.S.C. Board

SEMESTER-IV

CC-XIV (Part-A)
Course code-RE-C-DS-245
Paper Title: Dairy Science-II (Paper-II)
('C' Component: Applied Course) (Credit: 2Th+2Pract= 04)

Objectives: 1) To give applied Knowledge to the students
2) Introduction to Cattle breeds
3) To study Housing systems of Dairy animal in India
4) Introduction to Breeding Practices

Theory (Credit-I)

1. Housing of Dairy Animals. 03L

a) Objectives of housing.
b) Selection of site for dairy farm.
c) System of housing (i-loose housing. ii-stanchion barn. a) Tail to Tail b) Head to Head.

2. Feeds and feeding 06L

a) Classification of feed stuffs (Roughages, Concentrates, Feed Additives and Feed Supplement)
b) Preservation of Fodder-Silage and hay making Hay making
c) Thumb rule for cattle feeding

3. Cultivation of Fodder crops 06L

a)Definition of Fodder
b) Lucerne
c) Maize
d) Jowar
e) Gajraj
f) Berseem

Credit-II:

4. Ration balancing 03L

a) Types of Ration.
b) Desirable Characteristics of good Ration

5. Sheep and Goat breeds 06L

a) Introduction
b) Classification of Sheep and Goat breeds
c) Indian Sheep and Goat breeds
d) Exotic Sheep and Goat breeds

6. Animal Breeding and Selection 06L

a) Introduction
b) Systems of Breeding (Inbreeding and Out breeding)

c) Methods of Crossbreeding (Two and Three breed crossing, Back Crossing and Rotational Crossing)
d) Conservation of local Germ plasm.

S.Y.B.Sc. Practical (Semester III) RE-C-Pract-246
Practical Paper–II Based on RE-C-DS-245 : (Credit. 02)

Sr. No.	Name of Practical	No. of Practical
1.	To Study of Roughages, Concentrates, Feed Additives and Feed Supplement	2
2.	To study cattle housing	2
3.	To study Thumb rule for cattle feeding.	2
4.	To study Cultivation of Lucern & Maize/ Jowar/ Gajraj / Cow pea	2
5.	To study Cultivation of Jowar & Gajraj / Cow pea	2
6.	To study Systems of Breeding (Inbreeding and Out breeding)	2
7.	Study of Hay making	2
8.	To study Preparation of silage	2
9.	To Study Classification of Sheep breeds	2
10.	To Study Classification of Goat breeds	2
11.	To Study Ration balancing	2
12.	Goat/Sheep farm /Govt./Private Dairy Industry/ Exhibition /Breeding research centre visit is compulsory for the students and submit the visit report at the time of practical examination	2

List of Books:

1. Animal Husbandry - by G.C. Banarjee
2. Animal Nutrition - by G.C. Banarjee
3. Handbook of Dairy Science - by I.C.A.R.
4. Handbook of Agriculture - by I.C.A.R.
5. Text book of Animal Science Technology - H.S.C. Board

Savitribai Phule Pune University
Restructure Pattern 2020-21
Science Faculty

Structure of S. Y. B. Sc. Restructuring pattern
'D' Component (Skill Oriented Course)

Semester	Paper Code	Paper	Core course (Course Code)	Paper Title	Credits		
					Theory	Practical	Total
III	RE-D-SM-231	I	**CC-XI (Part-B)** 'D' Component (Student opt any one subject).	Soap manufacturing - I	1	1	2
	RE-D-RR-232	I		Radio Repairing - I	1	1	2
	RE-D-ND-233	I		Nursery Development -I	1	1	2
	RE-D-MLT-234	I		Medical Lab Technique - I	1	1	2
	RE-D-MMP-235	I		Milk and Milk Product - I	1	1	2
IV	RE-D-SM-241	II	**CC-XIV (Part-B)** 'D' Component (Student opt any one subject).	Soap manufacturing - II	1	1	2
	RE-D-RR-242	II		Radio Repairing - II	1	1	2
	RE-D-ND-243	II		Nursery Development -II	1	1	2
	RE-D-MLT-244	II		Medical Lab Technique - II	1	1	2
	RE-D-MMP-245	II		Milk and Milk Product - II	1	1	2

*** Theory and Practical Exam will be conducted at a same time. No separate Exam for Theory & practical.**

Examination Pattern = Internal Exam: 15 Marks
External Exam (Semester End Exam): 35 Marks
Total Marks = 50 Marks

SEMESTER-III

CC-XI (Part-B)
Course code - RE-D-SM-231
Paper Title: Soap Manufacturing - I (Paper -1)
('C' Component: Skill Oriented Course) (Credit. 1Th +1 Pract= 02)

Course Objectives.

1. To provide basic knowledge of scientific and industrial aspects in soap manufacturing.
2. To create foundation for research and development in industry.
3. To instill the good qualities of integrity, responsibility and self confidence.
4. To increase employability skills among the students beyond a graduate's academic knowledge.
5. To develop ethical values and good working practices.
6. To familiarize with current and recent scientific and development in the soap and detergents.

Course Outcomes.

1. Students will get depth knowledge of basic concepts in soap manufacturing.
2. After completing the program, students will have developed interdisciplinary approach and can start small scale industry
3. Students become responsible and self confident
4. Students acquire employability skills with a graduate's academic knowledge
5. Students aware about the safety practices and regulations inside the industry
6. Students may apply the knowledge in real life situations.

Theory (Credit. 01)

Soap, Detergent and Cosmetics. **(4 L)**

a) Introduction of soap and detergent:
Historical background, definition, soap and detergent classification, types and its mechanism, saponification reaction, difference between Hard soap and Soft soap.

b) Alignment of soap and detergents: **(4 L)**
Cleaning action of soap and detergent, composition, hard and soft acid-base concept in soap and detergents. Hardness of soap and detergents, surfactants, type of surfactant, action of soap and detergents, industrial important of Ca and Mg stearate.

c) Cosmetics: **(3 L)**
Introduction and definition, raw material for cosmetics and emulsifiers, liquid components (oil, waxes, fats), Humectant, colours, dyes and pigments preservatives and anti-oxidants.

d) Introduction to shampoo: **(4 L)**
Introduction, principle, raw materials, water, detergent, foam booster, thickeners, conditioning agents, preservatives, modifier, special additives, manufacturing process, mixing, cooling, compounding, quality control check, foam stability and filling

Practicals: (Credit. 01)

Sr. No.	Name of Practical	No. of Practical
1.	Preparation and determination of concentration of lye's (NaOH and KOH)	2
2.	Determination of alkali content in soap	2
3.	Determination and comparison of saponification value of oil	2
4.	Laboratory scale preparation of laundry soap	2
5.	Preparation of liquid soap	2
6.	Preparation of transparent soap	2
7.	Preparation of shampoo	2

NOTE:

1 A student has to perform at list four experiments in each semester and study tour / field visit and report writing is compulsory.
2 In lieu of study tour/field visit, students will have to perform two more practicals.

SEMESTER-IV

CC- XIV (Part-B)
Course code - RE-D-SM-241
Paper Title: Soap Manufacturing -II (Paper -II)
('C' Component: Skill Oriented Course) (Credit. 1Th +1 Pract= 02)

Theory. (Credit. 01)

Raw Materials and Manufacturing Process of Soap and Detergents

a) Introduction, principle, raw material, soap-lyes, fats, oils(Triglycerides)(its different sources)Other additives- common salt, builder, fillers, anti-oxidants, colours, dyes, optical brightners **(5 L)**

b) Raw materials for detergents:
Introduction, dodecylbenzene, sulfonating agent, neutralizing agent, soda ash, costic soda, ammonia,builders-foam, regulators, anti-redeposition, oxygen releasing compound, chelating agents, hydrotopes, silicates, enzymes, sodium sulphate, sodium hypochlorite, NaCl, magnessium sulphate, insoluble inorganic fillers, optical brightning agent, perfumes, colors and dyes **(5 L)**

c) Manufacturing process of soap:
Cold, semi boiled and full boiled, plant and machinery for small scale soap,industry soap pan, crucher frames, stamping machine, milling machine and mixing machine.
Manufacturing process of detergents - manufacturing process of dry detergent-blender process, agglomeration process, slurry method. **(5 L)**

Practicals: (Credit. 01)

Sr. No.	Name of Practical	No. of Practical
1.	Determination and comparison of acid value of coconut oil and jasmine oil	2
2.	Determination and comparison of acid value of soybeans oil and ground nut oil	2
3.	laboratory scale preparation of liquid detergent	2
4.	laboratory scale preparation of bath soap	2
5.	Preparation of different shaving soap	2
6.	Laboratory scale preparation of face wash	2
7.	Study tour to soap and detergent industry and report writing.	2

NOTE:

1. A student has to perform at list four experiments in each semester and study tour / field visit and report writing is compulsory.
2. In lieu of study tour/field visit, students will have to perform two more practicals.

Reference books:

1) *Hand book of Industrial Chemistry, 7th edition*
2) *Knowlton Jonh and Steven The Hand Book of Cosmetics Sscience and Technology*

3) *The handbook of Soap Manufacture by W.H. Simmons and H.A Appleton*
4) *Soap and Detergents SBP Board of Consultant and Engineers*
5) *Textbook of Chemical Technology, Volume I By S.D. Shukla*
6) *Shrives Chemical Process Industry, 5th edition, George Austin, 1984*

SEMESTER-III

CC-XI (Part-B)
Course code - RE-D- RR-232
Paper Title: Radio Repairing - I (Paper -1)
('C' Component: Skill Oriented Course) (Credit. 1Th +1 Pract= 02)

Course Objectives:

1. To understand the basic working principles of servicing tools and ability to use them
2. To understand Identification of various electronic components
3. To understand the basic principles of various meter like multimeter and CRO
4. To understand basic components of regulated power supply.
5. To understand the concepts of amplifiers and oscillator
6. To acquaint basic knowledge different parts of radio receiver
7. To build and test AM/FM receiver
8. To develop the skill related with fault finding and troubleshooting of radio receiver

Program Outcomes:

1. Learn identification of various electronic components
2. Learn basic principles and effective utilization of various meters/electronic devices
3. Learn the concept of amplifier.
4. Learn the concept of oscillator.
5. Lean basic components of regulated power supply.
6. Learn skills in soldering electronic components.
7. Learn skills related with fault finding and troubleshooting of radio receiver.

Theory. (Credit-1)
Fundamentals of Radio :

1. **Communication system:-** **(3 L)**
   Modes of propagation–Ground wave, space wave, sky wave propagation.
   Classification of radio frequencies, satellite communication, DTH principle.
2. **Electronic Components:-** **(3 L)**
   active and passive components- identification, specification and measurement scheme, study of multimeter and its uses for various measurements and testing, soldering gun, soldering materials, precautions while soldering, printed circuit boards.
3. **Power Supply:-** **(3 L)**
   Transformer (Principle and types), Diode as rectifier(half wave, full wave and bridge), capacitor filter, Zener and IC voltage regulator(78xx/79xx).
4. **Amplifiers and oscillators:-** **(3 L)**
   Amplifier- definition and classification, transistor as an amplifier, oscillator- basic principles and types.
5. **Modulation and Demodulation:-** **(3 L)**
   Need of Modulation, amplitude modulation, frequency modulation and phase modulation,demodulation.

A) List of practicals: (Credit-1)

Sr. No.	Name of Practical	No. of Practical
1.	Identification and study of various active ,passive electronic components and various servicing tools.	2
2.	Study of multimeter (analog & digital)& its applications (measurement of AC/DC current and voltage, resistance, capacitance and testing electronic components).	2
3.	Study of solder gun and soldering& dissoldring practice.	2
4.	Study of full wave/ bridge rectifier with/ without filter.	2
5.	Study of voltage regulater (zener/ IC voltage regulator).	2
6.	Study of single stage transistor amplifier (BJT)	2
7.	Study of transistor characteristics (BJT)-CE mode.	2
8.	Field visit/Study tour	2

Note:- 1) student has to perform at least four practicals and study tour.

2) In lieu of study tour, a student has to perform two more practicals

3) Field visit/Study tour,- TV / AM/FM radio station /community radio center / small scale Electronics industry.

Reference Books:

1. Electronic components and materials -MadhuriJoshi
2. Basic Electronics – Grob
3. Fundamental Electronics – J.D.Ryder
4. Radio Engineering – M.C.Gupta
5. Consumer Electronics – S.D.Jaiswal
6. Basic Electronics and linear circuits – N.N.Bhargava
7. Principles of Electronics –V.K.Mehata
8. Radio and TV Communication -E.P.Terman

SEMESTER-IV

CC- XIV (Part-B)
Course code - RE-D- RR-242
Paper Title: Radio Repairing -II (Paper -II)
('C' Component: Skill Oriented Course) (Credit. 1Th +1 Pract= 02)

Theory. : (Credit-1)

1. Radio receiver: **(4 L)**

Block diagram of radio receiver and function of each block (microphone, preamplifier, mixer, local oscillator, automatic gain control, tuner, volume control, speaker).

2. M. Receiver: **(4 L)**

Study of A.M. receiver, building and testing of various stages in receiver, alignment of various coils, antenna and intermediate frequency transformer(IFT) using manual and electronic method. method of servicing transistor and IC receivers.

3. F.M. Receiver and Fault Finding: **(4 L)**

Block diagram of F.M. Receiver, Working of F.M. receiver, method of servicing F.M. receiver, commonly occurring faults in radio receivers ,trouble shooting and removing faults.

4. Audio/Video Appliances: **(3 L)**

Multimedia, introduction to cell phone communication.

B) List of Practicals: (Credit-1)

Sr. No.	Name of Practical	No. of Practical
1.	Study of A.M /F. M. modulation (modulator.)	2
2.	Study of function generator and uses of CRO.	2
3.	Study of front panel controls of given AM/FM radio receiver.	2
4.	Building and testing of AM/FM radio receiver.	2
5.	Study of common faults in radio receiver and their remedies	2
6.	Fault finding and troubleshooting in radio receiver.	2
7.	Study of DTH alignment and connectivity to TV.	2
8.	Applications of cell phone.	2

Note:- 1)A student has perform at least six practicals and study tour.
2) In lieu of study tour, a student has to perform two more practicals.
3) Field Visit/Study tour- TV/AM/FM radio station /community radio center / small Scale Electronic Industry.

Reference Books:

1. Principles of basic Electronics -Schuler
2. Element of radio servicing -Marus
3. Sound production – Oldson
4. Radio and Television – S.P.Sharma
5. Basic test instruments –Turner
6. Audio and Video system -Sharma
7. Transistor circuit approximation –Malvino
8. Data Manual –Bell Lab.
9. Transistor service manual - K.C.Agrawal

SEMESTER-III

CC-XI (Part-B)
Course code-RE-D-ND-233
Paper Title: Nursery Development -I (Paper-I)
('D' Component: Skill Oriented Course) (Credit: 1Th+1Pract= 02)

Theory (Credit. 01)

1. **Introduction.** **(2 L)**

   a) Definition, Importance and scope.
   b) Types of Nurseries According to Type of Plants Grown (Fruit Plant Nurseries, Vegetable Nurseries, Ornamental Plant Nurseries, Medicinal and Aromatic Plant Nurseries, Forest Plant Nursery, Hi-Tech Nurseries).

2. **Selection of site for Nursery** (Physical and Financial Resources for Nursery) **(4 L)**
   a) Physical Resources for Nursery- Land, Irrigation Facilities, Labour, Electricity , Road and Transport, Mother Plants, Propagation Structures:, Hedges and Compound, Space for Hardening of Nursery Plants,, Store and Office, advertisement and demand in market.
   b) Different Media Combinations for Vegetable Nursery.
   c) Financial Resources for Nursery -Bank Loans, Financial Resources from Government, Financial Resources from Nationalized Banks, Financial Resources from Private Sector.
   d) Mother Plant Selection and Maintenance -Criteria for Selection of Mother Plants, Planting of Mother Plants, Maintenance of Mother Plant,

3. **Nursery Requirements.** **(3 L)**
   a) Study of Garden tools and implements requires for nursery.
   b) Containers: Earthen pots, Pela, Pardi, Khobda, Nand, Plastic pots, Cement pots, wooden box, and polythene bags.
   c) Growth Media and Media Preparation in Nursery - Qualities of an Ideal Rooting Media, Media for Propagation and Growing Nursery Plants – Soil, Sand, Peat, Sphagnum Moss, Vermiculite, Perlite, Pumice, Leaf Mould, Sawdust and Wood Shavings, Coco Peat, Polymers.
   d) Media Preparation for Nursery - Potting & repotting Mixtures and Potting Yard.
   e) Types of Nursery beds: Raised bed, Flat bed and sunken bed.

4. **Plant Propagation method in Nursery.** **(3 L)**
   a) Introduction, Types of propagation.- Sexual, Asexual /Vegetative.
   b) Natural:-Rhizome, Tuber, Runner, Suker.
   c) Artificial:-Cutting, Layering, Grafting and Budding.
   d) Advantages and disadvantages of Sexual and Asexual propagation methods.

5. **Water Quality and Water Management in Nursery**.(Ideal Water Quality for Nursery, Collection of Irrigation Water Sample,) Water Quality Criteria for Irrigation **(3 L)**
   a) Total Soluble Salt concentration (TSS)
   b) Sodium Absorption Ratio (SAR)
   c) Residual Sodium Carbonate (RSC)
   d) Boron Content.

Practicals (Credit- 01)

Sr. No.	Name of Practical	No. of Practical
1.	Study of Garden tools and implements requires for nursery.	2
2.	Preparation of different types of nursery beds (Raised, Flate and sunken)	2
3.	Study of different media used in nursery production.	2
4.	Study of propagation method by Cuttings : Stem and leaf	2
5.	Study of propagation method by Layering: Simple and air layering.	2
6.	Study of propagation method by Budding: 'T' budding.	2
7.	Study of propagation method by Grafting: Inarch and Stone.	2
8.	Visit to any commercial nursery.	2

Note: - 1) A student has performs at least four practicals and study tour.
2) In lieu of study tour, a student has to perform two more practicals.

References.

1. Rahudkar W.B., Bhujbal BG, Madhuri Sonawane, Hemraj Rajput, 2010, YCMOU, Textbook Publication No. AGR 227 Horticulture Nursery Management.

2. Awasthi Dinesh, Jaggi Raman, Padmanand V, 2006. Manual for Entrepreneurs by Entrepreneurship Development Institute of India, Ahmadabad.

3. Randhawa G.S., A.Mukhopadhyay (2001).Floriculture in India. Book published by Allied Publishers Limited, New Delhi.

4. Agricultural Extension Review, Department of Agriculture and Co-operation, Ministry of Agriculture, New Delhi.

5. Journal of Rural Development, NIRD, Rajendra Nagar, Hyderabad

SEMESTER-IV

CC-XIV (Part-B)
Course code-RE-D-ND-243
Paper Title: Nursery Development -II (Paper-II)
('D' Component: Skill Oriented Course) (Credit: 1Th+1Pract= 02)

Theory (Credit.01)

1. **Plant Nutrition and Management in Nursery.** **(3 L)**
   a. Introduction, Plant Nutrients and their Requirement – Macronutrients, Micronutrients,
   b. Nutrient Deficiency Symptoms in Plants - Typical Deficiency Symptoms, Phosphorous (P): Potassium (K), Calcium (Ca), Magnesium (Mg), Sulphur (S), Iron (Fe), Manganese (Mn), Zinc (Zn), Boron (B), Copper (Cu), Molybdenum (Mb), Chlorine (Cl), Nickel (Ni).
   c. Integrated Nutrient Management (INM)- Organic Manures, Inorganic Fertilizers and Biofertilizer.

2. **Fertilizer Management in Nursery.** **(3 L)**
   a) Fertilizers Supplying Various Plant Nutrients - Nitrogenous Fertilizers, Phosphatic Fertilizers, Potassic Fertilizers, Nitrogen and Phosphorous Complex Fertilizers, Nitrogen, Phosphorous and Potassium Complex Fertilizers, Micro Nutrients, Fortified Fertilizers, Manures.
   b) Fertilizers Application in Nursery -Types of Manures, Biofertilizer, Important Points regarding the Nutrition Management in Nursery Plants, Fertilizer Requirement of Different Nursery Plants. - Fertilizer Requirement of Vegetable Nursery Plants, Fertilizer Requirement of Fruit Nursery Plants.

3. **Plant Protections in Nursery**. **(3 L)**
   a. Introduction, Pest Management in Nursery, Disease Management in Nursery,
   b. Integrated Pest Management in Nursery & Bio-pesticide Application in Nursery,
   c. Weeds and Weed Management in Nursery,

4. **Large scale production of Nursery plants** (Horticultural and Important Ornamental plant, Forest plant, and Medicinal plant). **(3 L)**
   a. Fruit plants: Mango, Chikku, Coconut and Pomegranate.
   b. Vegetable plants: Tomato, Brinjal, Chilli and Onion
   c. Ornamental plants, Gerbera, Fern, Rose and Chrysanthemum.
   d. Forest plant: any two.
   e. Medicinal plants: any two.
   f. Modern plant techniques (Bonsai technique, Hanging baskets, Moss sticks).

5. Economics and Government Regulations in Nursery (3 L)

a) Introduction. Capital Investment in Nursery Development. Distributed Nursery Plant Production.

b) Government Regulation and Support for Nursery. Nursery Income, Expenditure, and Profit Analysis. Entrepreneurship Development through Nursery

Practicals. (Credit-01)

Sr. No.	Name of Practical	No. of Practical
1.	Study of different containers use in nursery	2
2.	Study of different type's structure in nursery to be demonstrated.	2
3.	Identification and uses of different fruit, vegetable, Ornamental, Forest and Medicinal plants.	2
4.	Study of Bonsai technique & Potting and repotting.	2
5.	Preparation Moss sticks, Hanging baskets	2
6.	Study of nutrient deficiency symptoms in Plants.	2
7.	Study of different fertilizers used in nursery.	2
8.	Visit to any commercial nursery	2

Note: - 1) A student has perform at least four practicals and study tour.
2) In lieu of study tour, a student has to perform two more practicals.

References.

1. Rahudkar W.B., Bhujbal BG, Madhuri Sonawane, Hemraj Rajput, 2010, YCMOU,
2. Textbook Publication No. AGR 227 Horticulture Nursery Management.
3. Awasthi Dinesh, Jaggi Raman, Padmanand V, 2006. Manual for Entrepreneurs by
4. Entrepreneurship Development Institute of India, Ahmadabad.
5. Randhawa G.S., A.Mukhopadhyay (2001).Floriculture in India. Book published by
6. Allied Publishers Limited, New Delhi.
7. Agricultural Extension Review, Department of Agriculture and Co-operation,
8. Ministry of Agriculture, New Delhi.
9. Journal of Rural Development, NIRD, Rajendra Nagar, Hyderabad

SEMESTER-III

CC-XI (Part-B)
Course code-RE-D-MMP-235
Paper Title: Milk and Milk Product-I (Paper-I)
('D' Component: Skill Oriented Course) (Credit: 1Th+1Pract= 02)

Objectives: 1) To give Skill Oriented Knowledge to the students.
2) To provide Basic Knowledge of Milk Processing.
3) Introduction to Clean and Safe milk production.

Theory (Credit-I):

1. Introduction to Milk **02L**

a) Definition
b) Collection of milk
c) Cooling and Transportation of milk
d) Distribution and Sterilization of milk

2. Sanitation in Clean and Safe milk production **02L**

a) Definition
b) Importance of Sanitation
c) Steps in Clean milk production
d) Safe milk production
e) The sources of milk contamination

3. Dairy microbiology **03L**

a) Introduction of micro-organism
b) Classification of Bacteria (According to morphology/temperature/Gases/Staining/Nutrition/Flagella)
c) Factors affecting growth of bacteria
d) Fermentation of milk products by micro-organism(Desirable and undesirable)

4. Introduction to Dairy Chemistry **03L**

a) Composition of milk
b) Factors affecting composition of milk
c) Food Nutritive value of milk
d) Physico- Chemical properties of milk.
e) Adulteration of milk
f) Preservatives used in milk

5. Marketing of Milk and Milk Products **03L**

a) Market milk

b) Milk pricing system
c) Factors affecting on market price of milk
d) Milk market Organization

6. Introduction to Standards for Milk and Milk product 02L

a) P.F.A Rules (Prevention of Food Adulteration, Act)
b) Indian Standards for milk and milk products.

Practicals (Credit.01)

Sr. No.	Name of Practical	No. of Practical
1.	Determination of fat, S.N.F., T.S. (Solid not fat, Total solids) of milk	2
2.	Determination of Acidity in milk & Detection of Adulterants in milk.	2
3.	Staining of Bacteria from given sample of curd.	2
4.	Cleaning and sterilization of dairy utensils.	2
5.	Cleaning and disinfection of dairy barn and milk room.	2
6.	To Study Milk borne diseases.	2
7.	To Study Marketing of milk and milk products.	2
8.	Visit Milk Collection Centre /Chilling plant/Dairy Industry and submit the visit report.	2

Note: - 1) A student has perform at least four practicals and study tour.
2) In lieu of study tour, a student has to perform two more practicals.

Text Book – Recommended:

1. Outlines of Dairy Technology – Sukmar DE.
2. Milk and properties-Strivatva S.M. 919930 Kalyani publishers. 1/1 Rajendranagar Vadhiana.
3. Milk and milk products – Winton and Winton (1993) Agrobios (India), Agro. House behind Nasrani cinema. Chopsani road Jodhapur.
4. Milk Testing – Davis.J.G. Agribios (India) Agro house behind Nasrani cinema Chopsani road Jodhapur.
5. Chemistry of milk and milk products. Singh V.B. (1965) Asian publishers. New mandi, Muzaffaranagar.
6. Dairy in India. Gupta. W.A. (1997). Kalyani publisher 1/1 Rajendrangar Ludhaina

SEMESTER-IV

CC-XIV (Part-B)

Course code-RE-D-MMP-245

Paper Title: Milk and Milk Product-II (Paper-II)

('D' Component: Skill Oriented course) (Credit: 1+1=2)

Objectives: 1) To give Skill Oriented Knowledge to the students
2) To provide Basic Knowledge of Milk Processing
3) To provide in-depth understanding of advances in theoretical and practical aspects of milk Products

Theory (Credit-I):

1. Introduction **02L**

a) Introduction to Indian dairy products
b) Annual milk production in India
c) Comparison with Western Dairy products

2. Introduction to Ghee(Separated Milk Product) **02L**

a) Definition
b) Composition
c) Method of manufacturing (flow diagram)
d) Cooling & Granulation , storage & keeping quality
e) Grading & uses

3. Concentrated/dehydrated milk products **05L**

a) Kheer,Sheer Khurma/Korma,Basundi, Khurchan, Rabdi and Khoa/ Mawa.
b) Definition
c) Composition
d) food & nutritive value
e) method of manufacturing, yield
f) keeping quality and uses

4. Fermented milk products **03L**

a) Dahi / curd, lassi & Shrikhand
b) Definition
c) Composition
d) Nutritive value,
e) Method of production
f) yield, keeping quality, packaging and storage

5. Coagulated milk products **03L**

a) Chhana and Paneer

b) Definition
c) Composition
d) Nutritive value
e) Method of manufacturing
f) Packaging, storage and Uses

Practicals (Credit.01)

Sr. No.	Name of Practical	No. of Practical
1.	To study Preparation of Rabadi & Basundi	2
2.	To Study Preparation of Channa and Paneer (Panir)	2
3.	To Study Preparation of Kheer /Sheer Khurma (Korma)	2
4.	Preparation of Khoa	2
5.	To Study Preparation of Chakka & Shrikhand	2
6.	To Study Preparation of Dahi (Curd) and Lassi	2
7.	To Study Preparation of chocolate milk & Flavour milk	2
8.	Milk Collection Centre /Chilling plant/Dairy Industry/ Milk products distribution centre Visit is compulsory for the students and submit the visit report at the time of practical examination	2

Note: - 1) A student has perform at least four practicals and study tour.
2) In lieu of study tour, a student has to perform two more practicals.

References:

1. Outlines of Dairy Technology – Sukmar DE.
2. Milk and properties- Strivatva S.M. 919930 Kalyani publishers. 1/1 Rajendranagar Vadhiana.
3. Milk and milk products – Winton and Winton (1993) Agrobios (India), Agro. House behind Nasrani cinema. Chopsani road Jodhapur.
4. Milk Testing – Davis.J.G. Agribios (India) Agro house behind Nasrani cinema Chopsani road Jodhapur.
5. Chemistry of milk and milk products. Singh V.B. (1965) Asian publishers. New mandi, Muzaffaranagar.
6. Dairy in India. Gupta. W.A. (1997). Kalyani publisher 1/1 Rajendrangar Ludhaina.