

Devrukh Shikshan Prasarak Mandal's
**Nya.Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce & Vid.
Dadasaheb Pitre Science College Devrukh.**

[Autonomous College]

SYLLABUS

Sr. No.	Heading	Particulars
1	Title of Course	B.Voc. Sustainable Agriculture First Year
2	Eligibility for Admission	10+2 (of recognized board)
3	Passing Marks	40%
4	Ordinances/Regulations (if any)	-
5	No. of Years/Semesters	Three years/ Six semester
6	Level	U.G.
7	Pattern	Semester
8	Status	New Syllabus
9	To be implemented from Academic year	2020-21

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Syllabus for F.Y. B.Voc.

Program: B. Voc. Sustainable Agriculture

Course: F.Y. B.Voc. Sustainable Agriculture

(Credit Based Grading and Semester System with effect from
the academic year 2020-2021)

B.Voc Programme

The University Grants Commission (UGC) had launched a scheme for skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B.Voc) degree with multiple entry and exit points. The B.Voc program is focused on providing undergraduate studies which would also incorporate specific job roles along with broad based general education. This would enable the graduates completing B.Voc to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge. The duration of the B. Voc courses will be six semesters in three Academic Sessions. At the end of each Semester, the candidates shall be required to present themselves for examination. The student who completes first semester successfully and is opting out from further education in B.Voc program, will be conferred Certificate in respective subject/trade. The student who completes first year i.e. first two semesters successfully and is opting out from further education in B.Voc program, will be conferred Diploma in respective subject/trade. Similarly, the student who completes first two years i.e. four semesters successfully and is opting out from further education will be conferred Advanced Diploma. The degree of B.Voc shall be conferred on the candidate who pursues the prescribed course of study for six semesters. The B. Voc degree is equivalent to BA/B.Sc degree for higher studies and employment.

Objectives of the Course

Many factors like, available infrastructure, capital and power, availability of resources, transport network, climate favoring to the high potential of industrial growth in Kokan region. The consistent growth of several Pharmaceutical, Chemical, Agrochemical, Food and Petrochemical industries has created several job avenues to the skilled graduates. The major hurdles for these industries are lack of adequately skilled and Good Laboratory Practice (GLP) oriented workforces.

This course is designed to fulfill the skilled workforce requirement of Research & Development and testing laboratories in various industries.

The course covers following objectives:-

- To propagate the ideas, practices and policies that constitutes the concept of sustainable agriculture.
- To provide the skill of different processes for Sustainable Agriculture
- To impart knowledge and proficiency in Organic farming, Certification process and marketing of organically raised agricultural produces
- To empower the students with an economically viable, socially supportive and ecologically sound education for agricultural sustainability.
- To provide education that emphasizes topography, soil characteristics, climate, pests, local availability of inputs and the individual grower's goals.
- Develop communication and soft skills between farmers and suppliers.
- Promote self-employment and income generation.
- Develop awareness about environment, soil and resources conservation for sustainable development.

Course Outcomes

- To enable the students to acquire knowledge on importance of agriculture and various processes of farming.
- To study the fundamentals of agronomy and classification of field crops.
- To study fundamentals of horticulture, gardening
- To learn preparation of various organic manures and using it for sustainable agriculture
- To study various processes of integrated farming practices

PROGRAMME STRUCTURE

The BVoc Programme shall include General Education components and Skill Components.

The credit distribution for the programme is shown below.

Normal Calendar Duration	Skill Component Credits	General Education Credits	Total Credits
One semester	18	12	30
Two Semesters	36	24	60
Four Semesters	72	48	120
Six Semesters	108	72	180

Year/Semester	NSQF Certification Level	Vocational Qualification	Title of Programme
First Year (Sem. I)	4	Certificate Course (Duration 6 Months)	Certificate course in Sustainable Agriculture
First Year (Sem. II)	5	Diploma (Duration 1 Year)	Diploma in Sustainable Agriculture
Second Year (Sem. III and IV)	6	Advanced Diploma (Duration two years)	Advanced Diploma in Sustainable Agriculture
Third Year	7	B. Voc. (Sustainable Agriculture)	B. Voc. in Sustainable Agriculture

(Course Code details: SA-Sustainable Agriculture,

G-General Education,

S- Skill Component

1- First Semester,

1S-First Skill Paper,

2S- Second Skill Paper,

1G- First General Paper

2G- Second General Paper

I- Internship/training/Project/Dissertation.

BACHELOR OF VOCATION

Sustainable Agriculture (to be implemented from 2020-21)

Semester-I

Code	Paper	Credits	Lectures	L/Wk
General Component				
SAG11	Organic Farming: Concept, Components, Processes, Certification	3	45	3
SAG12	Organic Farming: Nutrient Management	3	45	3
SAG13	Basic Principles of Food Processing	3	45	3
SAG14	Computer Fundamentals for Office Automation	3	45	3
Skill Component				
SAS11	Organic Farming: Concept, Components, Processes, Certification (Practical)	4	120	8
SAS12	Organic Farming: Nutrient Management (Practical)	4	120	8
SAS13	Basic Principles of Food Processing (Practical)	4	120	8
SAS14	Computer Fundamentals for Office Automation (Practical)	4	120	8
SAS15	Fine Arts/Yoga/NCC/ Basics of Mathematics (Practical)	2	60	4

Semester-II

Code	Paper	Credits	Lectures	L/Wk
General Component				
SAG21	Fundamentals of Agronomy	3	45	3
SAG22	Fundamentals of Horticulture	3	45	3
SAG23	Introduction to Gardening	3	45	3
SAG24	Communication Skill	3	45	3
Skill Component				
SAS21	Fundamentals of Agronomy (Practical)	4	120	8
SAS22	Fundamentals of Horticulture (Practical)	4	120	8
SAS23	Introduction to Gardening (Practical)	4	120	8
SAS24	Communication Skill (Practical)	4	120	8
SAS24	Fine Arts/Yoga/NCC/ Basics of Mathematics (Practical)	2	60	4

B. Voc. Sustainable Agriculture
SEMESTER I General Component

Paper I : Organic Farming: Concept, Components, Processes, Certification

Code: SAG11

Credits: 3

Lectures: 45

Objectives

- To acquaint with Components, Processes of Organic Farming, Organic Certification process

Module 1

Importance of agriculture in India, Definition of Organic Farming, It's importance in today's era, History, Ancient agriculture, Green revolution, Hazardous effects of chemical fertilizers and pesticides, Concept of Organic Farming, Principles of Organic Farming, Objectives of Organic Farming (as per IFOAM), Characteristics of Good Organic Farmer, Conventional vs Organic Farming, Advantages and Disadvantages of Organic Farming

Module 2

Various Organic Farming Models-Natural Farming, Fukuoka-Japan, Parma Culture etc., Organic Farming: Global scenario and Opportunities, Organic farming in India: Current Status and Challenges, Govt. Schemes promoting Organic farming, Export of Organic Food from India

Module 3

Components of Organic Farming, Pest and Disease Management in Organic Farming: Strategies- Avoidance Techniques, Managing the Growth Environment, Direct Treatment, Various Herbal pesticides, Plants used, Procedure, benefits, Weed Management in Organic Farming, Organic Crop Management, Biodiversity Conservation in Organic Farming, Crop planning and rotation design in organic system, Organic Farming and Climate Change, Relation of Soil, Organic Food and Human and Environmental Health

Module 4

India Organic certification, NSOP and APEDA, Principle of Standards, Products for Use in Fertilizing and Soil Conditioning, Products for Plant Pest and Disease Control, Process of Organic certification, Certification Agencies, Field Inspection, Success stories of Organic farmers

Paper II Organic Farming: Nutrient Management

Code: SAG12

Credits: 3

Lectures: 45

Objectives

- To acquaint with Nutrient Management of Organic Farming

Module 1

Components of Nutrient Management in Organic Farming, Pedological and Edaphological concept and components of soil. Soil ecology, Soil microbiology, Improvement in soil profile, Properties of soil (Physical, Chemical, Biological) and their significance. Soil air, Soil water, Water Holding Capacity, Soil colloids

Module 2

Soil Testing, Collection of soil sample for soil testing, Parameters, Instruments for soil testing and sample collection, Application, Water Testing, Parameters, Instruments, Problems of soils, Saline and Alkali Soils, Biological Reclamation, Management of Saline soils, Macronutrients for plants, Micronutrients for plants, Various Soil amendments, Sources, Effects, Nutrients

Farm Yard Manure (FYM): Process, Nutrients, Factors affecting nutrient quality of FYM, Uses, Green Manuring: Plants suitable as Green Manures, Nutrient Contents, Characteristics of Good Green Manure, Uses, Benefits

Module 3

Composting: Process, Essential requirements, Secret to healthy compost, Four phases of composting, Microorganisms in composting, Don'ts in composting

Types of Composting: Bangalore Method, Indore Method, Coimbatore Method, NADEP Method of Composting

Vermicompost Technology: Material for vermicomposting, Earthworm Species, Methods Process of vermicomposting, Precautions, Nutritional Value, Uses of vermicompost

Vermiwash: Process for Preparation of Vermiwash, Nutrients, Uses

Module 4

Liquid Organic Fertilizers: Microorganisms in Liquid Organic Fertilizers, Nutrient content Jivamrit: Ingredients, Procedure, Applications, Benefits

Beejamrita: Ingredients, Procedure, Application, Effects, Benefits

Panchgavya: Ingredients, Procedure, Chemical composition, Applications, Benefits

Reference Books for paper I and II:

1. Ananthkrishnan, T.N. (ed.) 1992. Emerging Trends in Biological Control of Phytophagous insects. Oxford & IBH, New Delhi.
2. Chhonkar, P.K. and Dwivedi, B.S. 2004. Organic farming and its implications on India's food security. Fertil. News 49(11): 15-18, 21-28, 31 & 38.
3. Gaur, A.C. 1982. A Manual of Rural Composting. FAO/UNDP Regional Project Document, FAO, Rome.
4. Howard, A. 1940. An Agricultural Testament. Oxford University, London. Lampin, N. 1990. Organic Farming. Farming Press Books, Ipswich, U.K.
5. Palaniappan, S.P and Anandurai, K. 1999. Organic Farming- Theory and Practice, Scientific Pub., Jodhpur.

6. Reddy, M.V. (ed.) 1995. Soil organism and Litter decomposition in the Tropics. Oxford & IBH, New Delhi.
7. Singh, S.P. (ed.) 1994. Technology for Production of Natural Enemies, Project Directorate of Biological Control, Bangalore.
8. Trewavas, A. 2004. A critical assessment of organic farming and food assertions with
9. Trivedi, R.N. 1993. A Text Book of Environmental Sciences, Anmol Pub., New Delhi.
10. Veeresh, G.K., Shivashankar, K. and Singlachar, M.A. 1997. Organic Farming and Sustainable Agriculture, Association for Promotion of Organic Farming, Bangalore.
11. Woomer, P.L. and Swift, M.J. 1994. The Biological Management of Tropical Soil Fertility, S.B.F. & Wiley.
12. Organic Farming for Sustainable Agriculture by Dahama A. K. Agrobios Publication.
13. Organic Farming in India, Problems and Prospects by Thapa, U. and Tripathi, P.
14. Trends in Organic Farming in India by Agrobios Publication
15. Recent Developments in Organic farming by Gulati and Barik

Paper III Basic Principles of Food Processing

Code: SAG13

Credits: 3

Lectures: 45

Objectives

- To provide a basic sequence of steps to produce an acceptable and quality food product from raw materials.
- Study of scientific and technological advancements in food processing.

Module 1- Classification of Food, Fundamentals of Food Processing

Definition of food, Classification of foods- based on origin, pH, nutritive value, Organic food, Nutraceuticals. Steps involved in converting a raw harvested food materials to a preserved product with sound quality- harvesting, storage, manufacturing, preservation, packaging, distribution and marketing, Chemical, enzymatic, physical and biological deterioration, implications and prevention.

Module 2- Post Harvest Management, Processing of Ethnic Foods, Tomato and Pineapple

Banana products- banana puree, banana chips

Jamun (black plum/jambhul)- pulp extract, dried products

Potato wafers, Corn flakes, Pop corn.

Processing of Tomato: Tomato juice, canned whole tomatoes, tomato ketchup, tomato jams, tomato puree, tomato powder.

Pineapple products- juice, jam, jelly, canning,

Module 3- Processing of Mango

Mango and mango products- raw unripe mango products: brined mango slices, dried green mango slices and powder (Amchur), canned mango slices in syrup, canned or frozen mango pulp, mango juice or mango nectar, mango jam, mango squash, mango juice powder, mango freeze dried products, mango syrup.

Module 4-Processing of Vegetables

Processing of okra (ladies finger), potatoes, onions, carrots, green peas, wild vegetables, drying techniques vegetables of procuring, transportation, storage, processing, packaging and ware housing.

Reference Books:

1. Brian E. Grimwood, Coconut Palm Products: Their Processing in Developing Countries, 1979.
2. Hui, Y H and Associate Editors; Hand Book of Food Products Manufacturing Vol I, Wiley- Interscience, New Jersey 2007.
3. Hui, Y H and Associate Editors; Hand Book of Food Products Manufacturing Vol II, wiley- Interscience, New Jersey 2007.
4. Manay, N.S, Shadaksharaswamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
5. Potter, N. N, Hotchkiss, J. H. Food Science. CBS Publishers, New Delhi. 2000.
6. Srilakshmi, B. Food Science (3rd edition), New Age International (P) Limited Publishers, New Delhi, 2003.
7. Siddappa and Bhatia, Fruits and Vegetable Processing Technology
8. Lea, R. A. W, Fruit juice processing and packaging

Paper IV Computer Fundamentals for Office Automation

Code: SAG14

Credits: 3

Lectures: 45

Objectives

- To provide basic knowledge of Office Automation Tools of Computer.

Module 1- Introduction to MS Word

Introduction to word, the word window, Create a new document, Save, open and print document, Editing document, Formatting a Document, Insert elements to word document, Changing Layout of document, Working with Tables, Spelling and grammar check, Auto correct.

Module 2- Spread Sheet Using MS Excel

Sheet Introduction, editing and formatting of cells and rows, Print Preview and Page Layout, Formula bar, Cell Referencing - Relative, Absolute, Mixed Useful functions from Function Library, What if Analysis, Calculative Examples like salary sheet, mark sheet etc., Conditional formatting, Data sorting and Filter, Types of different chart and editing charts.

Module 3- Presentation Using MS Power Point

Introduction to Power point, Inserting new slide, Different layout of slide, Inserting date, slide number, movie, sound, object, header and footer, Designing slide, Theme and background, Custom animation, Slide transition, Rehearse timings, Slide show, Setup slide show, Hide slide, Different views of slide, Use of slide master, Printing hand out, slide.

Module 4- Internet

Introduction to Internet, Use of Internet, Applications of Internet, World wide web (web page, web site, web client and web server), Web browsers, Search engines, Email, Blogs and forums, Social media and chatting, Bookmarks, Internet Search, Basic search, Tips and Tricks for search, How to download and upload?

Reference Books

1. Windows-98 6 in 1 Practice Hall Publications.
2. ABC of Word 97 by BPB Publication.
3. ABC of Excel by BPB Publication.
3. Computer Fundamentals P.K. Sinha by BPB Publication.
4. Internet-An Introduction, TATA McGraw Hill Publication.

B. Voc. Sustainable Agriculture
SEMESTER I Skill Component

Paper I Organic Farming: Concept, Components, Processes, Certification (Practical)

Code: SAS11

Credits: 4

Hours: 120

Objectives

- To study of Concept, Components, Processes of Organic Farming

Practicals

- Visit to an organic farm to study various components and utilization
- Survey on problems and opportunities in Organic Farming
- Study on various Govt. Schemes promoting Organic farming
- Study Pest and Disease Management in Organic Farming
- Study Weed Management in Organic Farming
- Visit to study Integrated Farming System
- Study on Organic Crop Management
- Study on Livestock Management in Organic Farming
- Study on Biodiversity in Organic Farming
- Study of Crop planning and rotation design in organic system
- Plant protection through bio-agents and traps.
- Plant protection using pheromones.

Paper II Organic Farming: Nutrient Management (Practical)

Code: SAS12

Credits: 4

Hours: 120

Objectives

- To study of skills of various processes of nutrient management of Organic Farming

Practicals

- Study of microbiology of soil
- Study of Soil profile
- Estimation of Water Holding Capacity of soil
- Measures for Reclamation of Saline and Alkali Soils
- Collection of soil sample for soil testing
- Analysis of soil by using soil testing kit
- Analysis of water/ Water Testing
- Preparation of enriched farm yard manure.
- Preparation of compost by NADEP Method
- Preparation of compost by Bangalore Method
- Preparation of Vermicompost
- Raising green manure crops and cover crops
- Preparation of Vermiwash
- Preparation of Panchgavya
- Preparation of Jivamrita
- Preparation of Beejamrita
- Apply for Organic Certification
- Visit to study Packaging and Marketing of Organic Products

Paper III Basic Principles of Food Processing

Code: SAS13

Credits: 4

Hours: 120

Objectives

- To study the manufacture of various food products
- To familiarize the students with processing of fruits and vegetables

Practicals

- Preparation of potato chips
- Preparation of pulp extract of Jamun
- Dried products of Jamun
- Preparation of banana chips
- Preparation of banana puree
- Processing of pineapple jam
- Processing of pineapple jelly
- Pineapple juice canning
- Manufacture of tomato puree
- Manufacture of tomato sauce
- Manufacture of tomato ketchup
- Processing of mango squash
- Preparation of mango jam
- Preparation of dried green mango slices and powder
- Drying of vegetables
- Grading and Packaging of fruit and vegetable products

Paper IV Computer Fundamentals for Office Automation (Practical)

Code: SAS14

Credits: 4

Hours: 120

Objectives

- To give skill to use Microsoft Office

Practicals

- Create a new document, save, open and print document in MS Word.
- Editing and formatting of a word document.
- Insert elements to a word document *viz.* Insert and delete page break, Insert page numbers, Insert symbols, Insert Shapes, Clip art, Insert picture, resize and reposition a picture),
- Change Layout of a word document *viz.* adjust page margin and page size, Change page orientation, Set and change indentation, Insert and clear tabs.
- Inserting and formatting of a table in a word document *viz.* Insert a table, Navigate and select text in a table, Resize parts of a table, Align text in a table, Format a table, Insert and delete columns and rows, Borders and shading, Merge table cells),
- Use of Spelling and grammar check and auto correct options in MS word.
- Create a spread sheet and format rows and columns *viz.* selecting row, column, cell, Inserting and deleting row, column and cell, hide and unhide row & column, changing height and width of row and column.
- Use of formula bar for various applications
- Calculative Examples of spread sheet like salary sheet, mark sheet, sorting and filtering of data.
- Create different types of charts and editing of charts in spread sheet.
- Create a new Power point presentation - Inserting new slide, different layout of slide, inserting date, slide number, movie, sound, object, header and footer,
- Designing of slides in power point - Theme and background, Custom animation, Slide transition, Rehearse timings,
- Use of Slide show, setup slide show, hide slide, different views of slide, use of slide master, printing hand out in power point.
- Use of Internet – different web browsers, search engines.
- Use of Email, Blogs and forums, Social media and chatting.
- Bookmarking, Internet Search, Basic and advanced search.
- Downloading and uploading of the documents.

Paper V: Fine Arts/Yoga/NCC/ Basics of Mathematics I

Code: SAS15

Credits: 2

Hours: 60

Practical's based on Fine Arts/Yoga/NCC/ Basics of Mathematics

B. Voc. Sustainable Agriculture
SEMESTER II General Component

Paper I : Fundamentals of Agronomy

Code: SAG21

Credits: 3

Lectures: 45

Objectives:

- To enable the students to acquire knowledge on importance of agriculture and various types of farming.
- To study the fundamentals of agronomy and classification of field crops.

Module 1

Agronomy, scope, role of Agronomist and relationship of Agronomy with other sciences. Sustainable agriculture, Subsistence agriculture, Commercial agriculture, Extensive and intensive agriculture, Peasant farming, Urban agriculture, Agribusiness, Agricultural seasons in India, Rainfed and irrigated agriculture. Agricultural classification of crops, Agronomic classification of crops, Botanical classification of crops, Major farming systems and Cropping Intensity, Methods of sowing/planting - planting geometry and its effect on growth and yield.

Module 2

Tillage, objects of tillage, types of tillage, tillage implements and factors affecting tillage, Effect of tillage on soil and crop growth. Tillage, characteristics and ideal tillage, Modern concepts of tillage, minimum, zero and stubble mulch tillage, importance of puddling.

Module 3

Seed, characteristics of quality seed, seed treatment and its objectives seed dormancy, causes of seed dormancy and multiplication, stages of seed. Methods of sowing seed and sowing implements. Effect of plant population on growth and yield, Planting geometry viz., solid, paired and skipped row planting

Module 4

Methods and time of application of manures, fertilizers and green manuring. Nutrient use efficiency, meaning and factors affecting nutrient use efficiency. Growth and development, its definition, growth curve and factors affecting growth and development. Crop harvesting, signs of maturity in different field crops, Physiological and crop maturity, Methods of threshing crops, Cleaning, Drying and Storage of field crops.

Reference Books:

1. Balasubramanian, P and Palaniappan, S.P. 2001. *Principles and Practices of Agronomy* AgroBios(India)Ltd., Jodhpur.
2. Cox, G.W and Atkins, M.D. 1979. *Agricultural Ecology : An Analysis of World Food Production Systems*. W.H. Freeman and Company, San Francisco
3. De, G.C.1989.*Fundamentals of Agronomy*. Oxford & IBH Publishing Co., New Delhi.
4. Grigg, D.B. 1974. *The Agricultural Systems of the World: An Evolutionary Approach*. Cambridge University Press, Cambridge.
5. Harlan, J.R. 1992. *Crops and Man*. American Society of Agronomy & Crop Science Society of America, Madison, WI.
6. Havlin, J. L., Beaton, J. D., Tisdale, S.L., and Nelsohn, W.L. 2006. *Soil Fertility and*

- Fertilizers: An Introduction to Nutrient Management* (7 ed.). Pearson Education, Delhi.
7. ICAR.2006. *Hand book of Agriculture*, ICAR, New Delhi.
 8. Janick, J., Schery, R.W., Woods, F.W., and Ruttan, V.W. 1974. *Plant Science: An Introduction to World Crops*. W.H. Freeman and Company, San Francisco.
 9. Noor Mohammed.1992. Origin, diffusion and development of agriculture. In: Noor Mohammed (ed.), *New Dimensions in agricultural geography: Vol.1.Historical Dimensions of agriculture*. Concept publishing Co., New Delhi.pp29-75.
 10. Reddy.T.Y and Reddy, G.H.S.1995.*Principles of Agronomy*, Kalyani Publishers, Ludhiana.
 11. Chatterjee, B.N. and Maiti, S.1985.*Principles and Practices of Rice Growing*. Oxford & IBH Publishing Co., New Delhi.
 12. Chhidda Singh, Modern techniques of raising field crops. Oxford and IBH Publishing Co. Ltd., Bangalore.
 13. Gopal Chandra De. 1980., *Fundamentals of Agronomy*. Oxford and IBH Publishing Co. Ltd., Bangalore.
 14. Palaniappan, S.P., *Cropping Systems in the tropics – Principles and Practices*.Willey Eastern Ltd., New Delhi.
 15. Panda, S.C., 2006.*Agronomy* Agribios Publication, New Delhi.
 16. Sankaran, S and Subbiah Mudliyar, V.T., 1991. *Principles of Agronomy*. The Bangalore Printing and Publishing Co. Ltd., Bangalore.
 17. Vaidya, V.G., Sahasrabuddhe, K.R. and Khuspe, V.S. *Crop production and field experimentation*. Continental Prakashan, Vijaynagar, Pune.

Paper II: Fundamentals of Horticulture

Code: SAG22

Credits: 3

Lectures: 45

Objectives

- To acquaint with importance, division and classification of horticultural crops.
- To understand the basic principles and types of plant propagation.

Module 1

Horticulture - definition, importance, division and classification of horticultural crops. Importance of horticulture. Orchard planning, layout, planting systems - management practices. Tree forms and functions - Training and pruning in horticultural crops - principles and methods, techniques of training and pruning, fruit thinning.

Module 2

Phases of growth and development - vegetative/ reproductive balance; Flowering in plants - bearing habit and its classification- factors associated with flowering and fruit set. Fruit set and development - structure and process concerned with setting. Fruit drop - factors affecting and control measures - unfruitfulness - internal and external factors. Seedlessness in horticultural crops; significance and induction.

Module 3

Plant propagation - definition and basic concepts, sexual and asexual types - advantages and disadvantages. Media, containers, potting, re potting and pre planting treatments. Asexual propagation - propagation by cuttings, types of cuttings, factors affecting rooting of cuttings. Propagation by layering - types of layering. Propagation by grafting - methods of grafting - development of graft unions, separation and after care. Stock-scion relationship - Graft incompatibility - factors affecting incompatibility. Propagation by budding, methods of budding - A comparative study between grafting and budding.

Module 4

Nursery - site selection, layout - components of a nursery - production unit, sales unit, display area, management and maintenance, propagation unit - close planted progeny orchards. Plant propagating structures- greenhouse, glasshouse, hot bed, cold frame, lath house, net house, mist chamber.

Reference books:

1. Bose, TK., Mitra, SK. and Sadhu, K. 1986. *Propagation of tropical and subtropical horticultural crops*. Naya Prokash, Calcutta.
2. Denixon, RI. 1979. *Principles of Horticulture*. Mac Millan, New York.
3. Edmond, JB., Sen, TD, Andrews, TS and Halfacre, RG. 1977. *Fundamentals of Horticulture*. Tata McGraw Hill, New Delhi.
4. Hartmann, HT. and Kester, DE. 1986. *Plant propagation - Principles and practices*. Prentice-Hall, New Delhi.
5. Leopold, A.C. and Kriedeman, P.E. 1975. *Plant Growth and Development*. Tata McGrawHill Publishing Co. Ltd., New Delhi.
6. Chadha, K. L. 2003. *Handbook of Horticulture*, ICAR, New Delhi. Choudhury, B. 1983. *Vegetables*. National Book Trust, New Delhi.
7. Das, P. C. 1993. *Vegetable crops in India*. Kalyani Publishers
8. Gopalakrishnan, T. R. 2007. *Vegetable Crops*. New India Publishing Agency, New Delhi.

Paper III: Introduction to Gardening**Code: SAG23****Credits: 3****Lectures: 45****Objectives:**

- To acquaint with basics of gardening.

Module 1

Introduction to Gardening, Garden Implements and Accessories, Area, Measurements, Volumes, Layout - Planning, Different Designs. Containers - Earthen containers, pots, polybags, cement pots, ceramic pots. Types of Gardening - Formal, informal

Module 2

Landscape gardening, Features of Gardens - Gate, lawn, shrubbery, flower beds, borders, paths, hedges, edges, steps, statues, fountains, bird paths, streams, pools, water falls, rockery, arches, pergolas, hanging pots, bird paths, tea house.

Module 3

Principles and Practices of landscape design for home gardens and public parks. Ornamental Gardening - Scope; importance; nursery management; lawns, layout of lawn, grasses; lawn and its maintenance. Design and layout of gardens for home, school, college, public buildings, parks, villages and kitchen garden.

Module 4

Identification of ornamental plants, seasonal annuals, edges, hedges, shrubs, creepers, trees, vines (commercial nursery)

Green Houses-shade houses, uses, application in horticulture. Pruning and training - objective and methods. Principles of making bonsai.

Reference Books:

1. Bose, T.K. Mukherjee, D. 2004. Gardening in India. Oxford & IBH Publishers.
2. K.V. Peter. 2009. Ornamental plants. New India publishing agency, Pitampura, New Delhi.
3. Arora, J.S. 2006. Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana
4. Bimaldas Chowdhury and Balai Lal Jana. 2014. Flowering Garden trees. Pointer publishers, Jaipur. India.
5. Bose, Chowdhury and Sharma. 1991. Tropical Garden Plants in colour .Horticulture and allied publishers, 3D Madhab Chatterjee street Kolkata.
6. Chadha, K.L. and Chaudhary, B. 1986. Ornamental Horticulture in India. Publication and Information division. ICAR, New Delhi.
7. Randhawa, G.S. Amitabha Mukhopadhyay, 2004. Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi.
8. Richard Bird. 2002. Flowering trees and shrubs. Printed in Singapore by Star Standard Industries pvt. Ltd.

Paper IV: Communication Skill**Code: SAG24****Credits: 3****Lectures: 45****Objectives**

- To familiarize with different business communication methods

Module 1

The concept of communication, The objectives of communication, Channels of communication, Methods of communication, Media and modes, Barriers to communication Listening skills (breaking the barriers)

Module 2

Communication basics, Art of speaking, Art of writing, Art of discussing and presenting, Group presentation, Interim assessment and doubt clearing

Module 3

Art of persuasion and influence, Facing and rejection and non-conversion, Art of having a sales conversation, Integrated session with banking and insurance, Collection letters

Module 4

Art of giving feedback, Customer service skills, Power of belief, Interview skills, Mock interviews

Reference Books:

1. Alien, R.K.(1970) Organisational Management through Communication.
2. Ashley,A(1992) A Handbook Of Commercial Correspondence, Oxford University Press.
3. Bahl,J.C. and Nagamia,S.M. (1974) Modern Business Correspondence and Minute Writing.
4. Balan,K.R. and Rayudu C.S. (1996) Effective Communication, Beacon New Delhi.
5. Ghanekar,A(1996) Communication Skills for Effective Management. Everest Publishing House, Pune.
6. Benjamin, James (1993) Business and Professional Communication Concepts and Practices, Harper Collins College Publishers, New York.
7. Bovee Courtland,L and Thrill, John V(1989) Business Communication, Today McGraw Hill, New York, Taxman Publication.
8. Eyre, E.C. (1985) Effective Communication Made Simple, Rupa and Co.Calcutta.
9. Ecouse Barry, (1999), Competitive Communication: A Rhetoric for Modern Business, OUP.

**B. Voc. Sustainable Agriculture
SEMESTER II Skill Component**

Paper I Fundamentals of Agronomy - Practical

Code: SAS21

Credits: 4

Hours: 120

Objectives

- To familiarize with cultivation aspects of crops.

Practicals

- Identification of seeds and crop plants at different growth stages.
- Identification of different tillage implements.
- Identification of cereals and millets, pulses, and tuber crops
- Different methods of sowing; direct seeding: broadcasting, dibbling and drilling
transplantation
- Study of agro climatic zones of Maharashtra and India.
- Operational tillage viz., primary, secondary, inter-tillage, sowing, harvesting,
harvesting implements
- Calculation of Plant Population, Seed rate, fertilizer and herbicide dose for different
field crops.
- Determination of purity and germination percentage of seed, Methods of seed
germination.
- Study of viability test and practice of seed treatments in different field crops.
- Identification of manures -organic manures: bulky and concentrated manures
- Fertilizers: Straight, complex and mixed fertilizers - identification and preparation.
- Fertilizer recommendation and calculation for major cereals and pulses
- Practice of methods of fertilizer applications- broadcasting, placement, foliar
application and fertigation
- Yield estimation of crops- biological yield and economical yield

Paper II: Fundamentals of Horticulture -Practical

Code: SAS22

Credits: 4

Hours: 120

Objectives

- To develop skill in propagation and cultivation aspects of horticultural crops.

Practicals

- Identification of garden tools
- Identification of horticultural crops
- Familiarization to Different planting systems and layout
- Propagation methods - sexual propagation -seed viability tests, dormancy breaking methods.
- Preparation of seed bed/nursery bed
- Propagation structures - mist chamber, green house, hot beds etc.
- Propagation by cuttings.
- Propagation by layering - types of layering.
- Propagation by grafting - methods of grafting
- Propagation by budding, methods of budding
- Layout of Nursery
- Layout and planting of orchard plants
- Training and pruning of fruit trees
- Transplanting and care of vegetable seedlings
- Preparation of potting mixture, potting and repotting
- Visits to commercial nurseries
- Visits to commercial orchard

Paper III: Introduction to Gardening -Practical

Code: SAS23

Credits: 4

Hours: 120

Objectives:

- To acquaint with skills of gardening.

Practical

- Study Garden tools and implements
- Study of containers - earthen containers, pots, polybags, cement pots and ceramic pots
- Preparation of nursery beds and sowing of seeds
- Layout of land for lawn and Preparation of land for lawn
- Designing of home gardens
- Planting of shrubbery, hedges and edges
- Identification and growing of indoor plants of their basic requirements
- Practice in making bonsai
- Raising of root stocks for grafting and budding
- Visit to commercial nursery in the locality
- Preparation of potting mixture, potting and repotting
- Layout of model kitchen garden
- Planning and designing of different of gardens

Paper IV Communication Skill -Practical

Code: SAS24

Credits: 4

Hours: 120

Objectives

- To acquaint with business communication skill

Practicals

- Media, modes and barriers to communication – case study
- listening skills – listening audio - video
- the art of speaking, writing and presenting – creating various documents and speech competitions
- group discussion skills – organizing group discussions
- sales conversation
- Creating model of feedback
- interview skills - organization of mock interviews

Paper V: Fine Arts/Yoga/NCC/ Basics of Mathematics I

Code: SAS15

Credits: 2

Hours: 60

Practical's based on Fine Arts/Yoga/NCC/ Basics of Mathematics