

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 prac

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- Dr 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-II

Code	Paper	Credits	Lectures	L/Wk
General Component				
BUSAT21	Fundamentals of Agronomy	3	45	3
BUSAT122	Fundamentals of Horticulture	3	45	3
BUSAT23	Introduction to Gardening	3	45	3
BUSAT24	Communication Skill	3	45	3
Skill Component				
BUSAP21	Fundamentals of Agronomy(Practical)	4	120	8
BUSAP22	Fundamentals of Horticulture(Practical)	4	120	8
BUSAP23	Introduction to Gardening(Practical)	4	120	8
BUSAP24	Communication Skill(Practical)	4	120	8
BUSAP25	NCC/Yoga/ Fine arts/Basics of Mathematics	2	60	4
	II			

B. Voc. Sustainable Agriculture
SEMESTER II General Component
Paper I : Fundamentals of Agronomy

Code: BUSAT 21

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. Balasubramaniyan, 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 Nelsothn, 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 corps. 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, 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: BUSAT22

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.
7. Vegetables. National Book Trust, New Delhi.
8. Das, P. C. 1993. Vegetable crops in India. Kalyani Publishers
9. Gopalakrishnan, T. R. 2007. Vegetable Crops. New India Publishing Agency, New Delhi.
10. Hazra, P. and Som, M. G. 1999. Technology for vegetable Production and Improvement. Naya Prokash, Calcutta
11. Peter, K. V. 1998. Genetics and Breeding of vegetables. ICAR, New Delhi.
12. Sham Singh and others, Fruit Culture in India
13. Kunte and Yawalkar, Principles of Horticulture and fruit growing
14. Shanmugvelu, K.G., Production Technology of Fruit Crops

Paper III: Introduction to Gardening

Code: BUSAT23

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, trees, 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: BUSAT 24

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.

B. Voc. Sustainable Agriculture

SEMESTER II Skill Component

Paper I Fundamentals of Agronomy - Practical

Code: BUSAP 21

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: BUSAP22

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: BUSAP23

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: BUSAP24

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 NCC/Yoga/ Fine arts/Basics of Mathematics I

Code: SAS25

Credits: 2

Hours: 60