

SHIVAJI UNIVERSITY, KOLHAPUR



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(2021) with CGPA 3.52

Faculty of Interdisciplinary Studies

Structure, Scheme and Syllabus for

Bachelor of Vocation (B. Voc.)

Sustainable Agriculture

Part I- Sem. I & II

(Subject to the modifications that will be made from time to time)

Syllabus to be implemented from June, 2022-23 onwards.

As Per National Education Policy 2020

SHIVAJI UNIVERSITY, KOLHAPUR
STRUCTURE AND SYLLABUS OF B.VOC.
Bachelor of Vocation (B.Voc.) Sustainable Agriculture

TITLE :B. Voc.(Sustainable Agriculture)
Syllabus (Semester Pattern)
Under Faculty of Interdisciplinary Studies

YEAR OF IMPLEMENTATION : Syllabus will be implemented from August, 2022

DURATION : B. Voc. Part I, II and III (Three Years)
B. Voc. Part I - Diploma (One Year)
B. Voc. Part II - Advanced Diploma(Second Year)
B. Voc. Part III – Degree (Third Year)

PATTERN OF EXAMINATION : Semester Pattern

- **Theory Examination**– At the end of semester as per Shivaji University Rules
- **Practical Examination**–i) In the 1st, 3rd and 5th semester of B.Voc. there will Be internal assessment of practical record, related report submission and project reports at the end of semester.
ii) In the second semester of B. Voc. I, there Will be internal practical examination at the end of semester.
iii) In the 4th and 6th semester of B. Voc. there Will be external practical examination at the end of semester.

MEDIUM OF INSTRUCTION : English

STRUCTURE OF COURSE : B. Voc. Part – I, II and III
Two Semester Per Year
Two General Papers per year / semester Three
Vocational Papers per Year / Semester Three
Practical papers per Year / Semester
One Project / Industry Visit/ Study Tour / Survey

SCHEME OF EXAMINATION

A) THEORY

- The theory examination shall be at the end of the each semester.
- All the general theory papers shall carry 40 marks and all vocational theory papers shall carry 50 marks.
- Evaluation of the performance of the students in theory shall be on the basis of semester examination as mentioned above.

- Question paper will be set in the view of entire syllabus preferably covering each unit of the syllabus.
- **Nature of question paper for Theory examination** (Excluding Business Communication Paper)–
 - i. There will be seven questions carrying equal marks.
 - ii. Students will have to solve any five questions.
 - Q. No. 1 : Short answer type question with internal choice
(Two out of Three)
 - Q. No. 2 to Q. No. 6 : Long answer type questions
 - Q. No. 7 : Short Notes with internal choice
(Two out of Three)

B) PRACTICAL

Evaluation of the performance of the students in practical shall be on the basis of semester examination (Internal assessment at the end of Semester I, II and III and V and external examination at the end of Semester IV and VI as mentioned separately in each paper.

Standard of Passing :

As per the guidelines and rules for B. Voc. (Attached Separately – Annexure I)

Structure of the Course

B. Voc. – I (Diploma) Semester – I

Sr. No	Paper No.	Title	Theory /Practical /Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	I	Business Communication – I	Theory /Practical	50	40	10	3	2
2	II	Principles of Food Processing –I	Theory /Practical	50	40	10	3	2
3	III	Fundamentals of Agronomy- I	Theory	50	50	--	3	
4	IV	Fundamentals of Horticulture – I	Theory	50	50	--	3	
5	V	Fundamentals of Entomology and Insectology – I	Theory	50	50	--	3	
6	VI	Laboratory Work Fundamentals of Agronomy- I	Practical	50	--	50		3
7	VII	Laboratory Work Fundamentals of Horticulture – I	Practical	50	--	50		3
8	VIII	Laboratory Work Fundamentals of Entomology and Insectology – I	Practical	50	--	50		3
9	IX	Project	-	50	--	50		2

B. Voc. – I (Diploma) Semester – II

Sr. No.	Paper No.	Title	Theory /Practical /Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	X	Business Communication - II	Theory /Practical	50	40	10	3	2
2	XI	Principles of Food Processing –II	Theory /Practical	50	40	10	3	2
3	XII	Fundamentals of Agronomy- II	Theory	50	50	--	3	
4	XIII	Fundamentals of Horticulture – II	Theory	50	50	--	3	
5	XIV	Fundamentals of Entomology and Insectology – II	Theory	50	50	--	3	
6	XV	Laboratory Work Fundamentals of Agronomy- II	Practical	50	-	50		3
7	XVI	Laboratory Work Fundamentals of Horticulture – II	Practical	50	-	50		3
8	XVII	Laboratory Work Fundamentals of Entomology and Insectology – II	Practical	50	-	50		3
9	XVIII	Project/Industrial Visit / Study Tour	-	50	-	50		2

Scheme of Teaching : B. Voc. – Part I (Diploma) Semester – I

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	I	Business Communication – I	4	2	6
2	II	Principles of Food Processing –I	4	2	6
3	III	Fundamentals of Agronomy- I	4	-	4
4	IV	Fundamentals of Horticulture – I	4	-	4
5	V	Fundamentals of Entomology and Insectology – I	4	-	4
6	VI	Fundamentals of Agronomy- I	-	4	4
7	VII	Fundamentals of Horticulture – I	-	4	4
8	VIII	Fundamentals of Entomology and Insectology – I	-	4	4
9	IX	Project	-	-	-
		Total --	20	16	36

B. Voc. – Part I (Diploma) Semester – II

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	X	Business Communication – II	4	2	6
2	XI	Principles of Food Processing –II	4	2	6
3	XII	Fundamentals of Agronomy- II	4	-	4
4	XIII	Fundamentals of Horticulture – II	4	-	4
5	XIV	Fundamentals of Entomology and Insectology – II	4	-	4
6	XV	Fundamentals of Agronomy- II	-	4	4
7	XVI	Fundamentals of Horticulture – II	-	4	4
8	XVII	Fundamentals of Entomology and Insectology – II	-	4	4
9	XVIII	Project	-	-	-
		Total-	20	16	36

Eligibility for Admission : 10 + 2 from any faculty or equivalent Diploma /Advanced Diploma in any related stream.

Eligibility for Faculty: 1) M. Sc. (Agri./Agro Chemicals and Pest Management/Horticulture/Food Processing/ Food Science and Technology/ Food Science and Quality Control) with NET /SET/Ph.D.

2) M. A (English) with NET/SET for Business Communication

Eligibility for Laboratory Assistant: B.Sc.(Agri./Agro Chemicals and Pest Management/Horticulture/Food Processing/ Food Science and Technology/ Food Science and Quality Control)/ Diploma in Agri.

- **Staffing Pattern**

Teaching:

- a) In 1st Year of B. Voc. - 1 Full Time and 2 Visiting Lecturers for Sustainable Agriculture and 1 CHB Lecturer for Business Communication

Lab Assistant: For 1st Year of B. Voc. - 1 Part time

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B. Voc. Part – I

Sustainable Agriculture

Paper – I: Business Communication-I

Total Workload: 06 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week
Practical: 02 lectures per week per batch of 20 students Mark: 40

Business Vocabulary: Vocabulary for banking, marketing and for maintaining public relations

What is a sentence? Elements of a sentence Types of sentence: Simple, compound, complex

Unit2: Writing a Letter of Application and CV/Resume

Structure of a letter of application for various posts CV/ Resume and its essentials

Unit 3:Presenting Information/Data

Presenting information /data using graphics like tables, pie charts, tree diagrams, bar diagrams, graphs, flowcharts

Unit 4:Interview Technique

Dos and don'ts of an interview Preparing for an interview Presenting documents Language used in an interview

Practical: Based on the theory units

Marks: 10

Reference Books:

- Sethi, Anjane & Bhavana Adhikari. *Business Communication*. New Delhi: Tata McGraw Hill
- Tickoo, Champa & Jaya Sasikumar. *Writing with a Purpose*. New York: OUP, 1979.
- Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi: Student Aid Publication, 2008.
- Herekar, Praksh. *Business Communication*. Pune: Mehta Publications, 2007.
- Herekar, Praksh. *Principles of Business Communication*. Pune: Mehta Publications, 2003.

Pattern of a Question Paper

B. Voc. Part-I

Business Communication-I

Semester-I Paper:I

Time: 2 hours

Total Marks: 40

Q.1	Do as directed. Question items on Unit 1 To be asked.	(10 out of 12)	10
Q.2	Write a letter of application.		10
	OR		
	Draft a CV/ Resume for a particular post.		
Q.3	Present a given information or data using a table/chart/pie diagram, etc (Any one diagram to be drawn.)		10
Q.4	Fill in the blanks in the given interview.		10

Practical Evaluation:

10 Marks

Oral and Presentation based on the units prescribed.

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B. Voc. Part – I

Sustainable Agriculture

Paper – II: Principles of Food Processing I

Total Workload: 06 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Practical: 02 lectures per week per batch of 20 students

Total Marks : 50 Marks (Theory 40 + Practical 10)

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.

UNIT- 1- Classification of Food

Definition of food, classification of foods- based on origin, pH, nutritive value, functions of food, Health food, ethnic food, organic food, functional food, nutraceuticals.

UNIT- 2-Fundamentals of Food Processing

Steps involved in converting a raw harvested food materials to a preserved product with sound quality- harvesting, storage, manufacturing, preservation, packaging, distribution and marketing.

UNIT- 3- Post Harvest Management

Chemical, enzymatic, physical and biological deterioration, implications and prevention.

UNIT- 4- Foods and its Processing

Banana products- banana puree, banana chips, banana powder, Banana figs, banana flour; Tapioca products- Tapioca chips, tapioca powder.

Text 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.

Principles of Food Processing I (Practical)

Marks: 10

Objectives

- To study the manufacture of various food products
 1. Preparation of mayonnaise
 2. Preparation of peanut butter
 3. Preparation of potato chips
 4. Preparation of banana chips
 5. Preparation of tapioca chips

Text Books:

1. Manay, N.S, Shadaksharaswamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
2. Potter, N. N, Hotchkiss, J. H. Food Science. CBS Publishers, New Delhi. 2000.
3. Srilakshmi, B. Food Science (3rd edition), New Age International (P) Limited Publishers, New Delhi, 2003.

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B. Voc. Part – I

Sustainable Agriculture

Paper – III: Fundamentals of Agronomy I

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

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.

UNIT- 1

Importance of agriculture in India, Hunger and food security, Agronomy, Sustainable agriculture, Subsistence agriculture, Commercial agriculture, Extensive and intensive agriculture, Agricultural seasons in India, Rainfed and irrigated agriculture.

UNIT- 2

Agricultural classification of crops, Agronomic classification of crops, Botanical classification of crops, Major farming systems Maharashtra and Cropping Intensity, Methods of sowing/planting - planting geometry and its effect on growth and yield.

UNIT- 3

Soil and climatic requirements, varieties, cultural practices, special systems of cultivation, harvesting and processing of major cereals and millets, pulses, tubercrops, rice, maize, finger millet, etc

UNIT- 4

Soil productivity and fertility. - Crop nutrition - nutrients -classification - Nutrient sources-organic manures. Nutrient recycling through manures and fertilizers - organic manures. Fertilizers and its use- management of fertilizers .Biological nitrogen fixation, Green manure crops and cover crops .

Text 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 Nelson, 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.

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B. Voc. Part – I

Sustainable Agriculture

Paper – IV: Fundamentals of Horticulture I

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

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

UNIT- 1

Horticulture - definition, classification of horticultural crops. Importance of horticulture in India. Orchard planning, layout, planting systems. Training and pruning in horticultural crops - principles and methods, techniques of training and pruning, fruit thinning.

UNIT- 2

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.

UNIT- 3

Propagation by grafting - methods of grafting - development of graft unions, separation and after care. Stock-scion relationship. Propagation by budding, methods of budding - A comparative study between grafting and budding.

UNIT- 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, shed net, mist chamber.

Text 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.
9. Hazra, P. and Som, M. G. 1999. Technology for vegetable Production and Improvement.NayaProkash, Calcutta
10. Peter, K. V. 1998. Genetics and Breeding of vegetables. ICAR, New Delhi.

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B. Voc. Part – I

Sustainable Agriculture

Paper – V: Fundamentals of Entomology and Insect Ecology

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To familiarize with insect pests and to understand about the Insect ecology

UNIT- 1

History of Entomology. Classification of phylum Arthropoda. Relationship of class Insecta with other classes of Arthropoda. Morphology –Grasshopper/Plant bug, structure and functions of insect cuticle, Moulting. Body segmentation. Structure of Head, thorax and abdomen .Structure and modifications of insect mouth parts. Types of insect larvae and pupae.

UNIT- 2

Agriculturally importance Insect orders - Lepidoptera, coleoptera, hemiptera, diptera and hymenoptera.

UNIT- 3

Insect Ecology- introduction. Environment and its components. Population dynamics-effect of abiotic factors- temperature, moisture, humidity, Rainfall, light, atmospheric pressure and air currents. Effect of biotic factors - food, natural enemies.

UNIT-4

Identification, symptoms of damage caused by pests of Rice, Coconut, BananaBrinjal, Bittergourd and cowpea. Nematode Pests of crops, Common Pests of stored food products/grains. Pest monitoring - Pest surveillance and pest forecasting. Assessment of pest population and damage.

Text books:

1. Mani, M. S. 1968. General Entomology. Oxford and IBH Publishing Company, New Delhi.
2. Nayar, K. K., Ananthkrishnan T. N. and David.B.V. 1976. General and Applied Entomology, Tata McGraw Hill Publishing Company Limited, New Delhi, 589p.
3. Pedigo, L. P. 1999. Entomology and Pest Management.Third Edition. Prentice Hall, New Jersey, USA.
4. Richards, O.W. and Davies, R. G. 1977.Imm's General Text Book of Entomology, Vol.1&2, Chapman and Hall Publication, London.
5. Srivastava, P. D. and Singh, R. P. 1997.An Introduction to Entomology, Concept Publishing Company, New Delhi.
6. Dhaliwal, G. S. and Ramesh Arora. 1998. Principles of Insect Pest Management. Kalyani14 Publishers, New Delhi.

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B. Voc. Part – I

Sustainable Agriculture

Paper – VI: Lab Work of Fundamentals of Agronomy – (Practical)

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To familiarize with cultivation aspects of cereals and millets and pulses.
- 1. Identification of cereals and millets, pulses, and tuber crops.
- 2. Different methods of sowing; direct seeding: broadcasting, dibbling and drilling-transplantation.
- 3. Seedtreatment - Rhizobium inoculation of leguminous crops.
- 4. Identification of manures -organic manures: bulky and concentrated manures
Fertilizers: Straight, complex and mixed fertilizers – identification
- 5. Fertilizer recommendation and calculation for major cereals and pulses.
- 6. Practice of methods of fertilizer applications- broadcasting, placement, foliar application and fertigation.

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B. Voc. Part – I

Sustainable Agriculture

Paper – VII: Lab Work of Fundamentals of Horticulture –(Practical)

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To develop skill in propagation and cultivation aspects of horticultural crops.
- 1. Familiarization to different planting systems and layout
- 2. Propagation structures - mist chamber, green house, etc.
- 3. Propagation by cutting.
- 4. Propagation by layering - types of layering
- 5. Propagation by grafting - methods of grafting
- 6. Propagation by budding - methods of budding

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B. Voc. Part – I

Sustainable Agriculture

Paper – VIII: Lab Work of Fundamentals of Entomology and Insect Ecology-(Practical)

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To develop skill in different IPM practices in insect pest management and to familiarize with insect morphology

- 1. Types of insect mouthparts.
- 2. Structure and modifications of insect antennae.
- 3. Structure and modifications of insect legs
- 4. Types of insect larvae and pupae.
- 5. Identification of different types of insect damages on crop plants
- 6. Identification, symptoms of damage, collection and preservation of pests of Rice, Coconut, Banana, Brinjal, Bittergourd and cowpea.
- 7. Identification of Pests of stored food grain/products
- 8. Sampling techniques for the estimation of insect population in selected crops

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B. Voc. Part – I

Sustainable Agriculture

Paper – IX: Project/ Field Work/ Crop Museum

Total Marks : 50 Marks,

Some Specimen of Modified Crop Varieties of Sorghum, Millet, Beans, Chilies etc. Should be collected and data of the relevant species including cultivation and harvesting techniques are to collected and displayed with proper scientific preservation and knowledge. This work should be completed within a span of year.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Semester–II

Business Communication-II

Paper: X

Distribution of Workload:

Theory: 04 lectures per week

Practical: 02 lectures per week per batch of 20 students

For Theory: Mark: 40

Unit1: Group Discussion

Preparing for a Group Discussion Initiating a Discussion

Eliciting Opinions, Views, etc. Expressing Agreement/ Disagreement

Making Suggestions; Accepting and Declining Suggestions Summingup.

Unit 2:Business Correspondence

Writing Memos, e-mails, complaints, inquiries, etc. Inviting

Quotations Placing Orders, Tenders, etc.

Unit 3:English for Negotiation

Business Negotiations Agenda for Negotiation Stages of Negotiation

Unit 4:English for Marketing

Describing/Explaining a Product/Service Promotion of a Product

Dealing/ bargaining with Customers

Marketing a Product/Service :Using Pamphlets, Hoardings,

Advertisement, Public Function/Festival

Practical: Based on the theory

Marks: 10

Reference Books:

Herekar, Praksh. *Business Communication*. Pune: Mehta Publications, 2007.

Herekar, Praksh. *Principals of Business Communication*. Pune:Mehta Publications,2003.

John, David. *Group Discussions*. New Delhi: Arihant Publications.

Kumar, Varinder. *Business Communication*. New Delhi: Kalyani Publishers, 2000.

Pardeshi, P.C. *Managerial Communication*. Pune: Nirali Prakashan,2008.

Pradhan, N. S. *Business Communication*. Mumbai: Himalaya Publishing House, 2005

Rai, Urmila & S. M. Rai. *Business Communication*. Mumbai: Himalaya Publishing House, 2007.

Sethi, Anjanee & Bhavana Adhikari. *Business Communication*. New Delhi: Tata McGraw Hill.

Sonie, Subhash C.*Mastering the Art of Effective Business Communication*. NewDelhi: Student Aid Publication, 2008.

Tickoo, Champa & Jaya Sasikumar. *Writing with a Purpose*. New York: OUP, 1979.

Whitehead, Jeoffrey & David H. Whitehead. *Business Correspondence*. Allahabad: Wheeler Publishing, 1996.

Pattern of a Question Paper

**B. Voc. Part-I
Business Communication-II
Semester-II
Paper:X**

Time:2 hours

Total Marks:40

- | | | |
|------|--|----|
| Q. 1 | Fill in the blanks in the following Group Discussion.
(On Unit 5) (10 out 12) | 10 |
| Q. 2 | Attempt ANY ONE of the following (A or B):
(On Unit 6) | 10 |
| Q. 3 | Fill in the blanks with appropriate responses:
(On Unit 7) | 10 |
| Q. 4 | Attempt ANY ONE of the following (A or B):
(On Unit 8) (10 out 12) | 10 |

Practical Evaluation:

10 Marks

Oral and Presentation based on the units prescribed.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Semester–II

Principles of Food Processing II

Paper:XI

Distribution of Workload:

Theory: 04 lectures per week

Practical: 02 lectures per week per batch of 20 students

Total Marks : 50 Marks

Prescribed for Theory: Marks : 40

Objectives

- To provide a basic understanding of processing of fruits and vegetables.

UNIT- 1 Introduction

Ripening and quality of fruits, harvesting and transportation, cold storage of fruits, selection and preparation of fruits for processing, enzyme inactivation, packing and processing.

UNIT- 2 Processing of juice, jam and jelly

Fruit juice manufacture, Canning of fruit juices, freezing of fruit pulps. Aseptic processing of fruit juices. Packaging of aseptically processed juices and pulps. Concentrated fruit juices. Manufacture of jams. Theory of jelly formation, ingredients. Machinery. Jellies,

UNIT- 3 Processing of tomato, apple and orange

Tomato juice, tomato ketchup, tomato jams, Apple and apple product- Clarified apple juice, Orange products- orange juice, concentrated orange juice, orange squash, orange jams.

UNIT- 4 Processing of vegetables

Processing of Okra (ladies finger), potatoes, onions, carrots, green peas, procuring, transportation, storage, processing, packaging and ware housing.

Text books:

1. Siddappa and Bhatia, Fruits and Vegetable Processing Technology
2. Lea, R. A. W, Fruit juice processing and packaging
3. Hui, Y. H. Processing of fruits
4. Cash J. N. Processing of vegetables
5. Jongen, W. Fruit and vegetable processing

Principles of Food Processing (Practical)

Marks :10

Objectives

- To familiarize the students with processing of fruits and vegetables
 1. Processing of mango squash
 2. Processing of pineapple jam
 3. Manufacture of tomato sauce
 4. Manufacture of tomato ketchup

1. Siddappa and Bhatia, Fruits and Vegetable Processing Technology
2. Lea, R. A. W, Fruit juice processing and packaging
3. Jongen, W. Fruit and vegetable processing

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B. Voc. Part – I

Sustainable Agriculture

Semester–II

Paper – XII: Plantation Crops, Spices and Fruits

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To acquaint with the cultivation aspects of Plantation crops, spices and fruit crops.

UNIT- 1

Plantation crops, Introduction - importance - area, production - origin, distribution - botany, varieties - climate, soil, site selection - propagation, production of quality planting materials and hybrids - nursery management - layout, planting, aftercare - irrigation, manuring - stage of harvest, harvesting, yield and uses of :-Coconut and Rubber.

UNIT- 2

Plantation crops, Importance - area, production - origin, distribution - botany, varieties - climate, soil, site selection - propagation, production of quality planting materials and hybrids. Nursery management - layout, planting, aftercare - irrigation, manuring - stage of harvest, harvesting, yield and uses of Cashew and Coffee.

UNIT- 3

Spices, Definition - Classification - importance to the state. Origin - distribution - area, production .varieties - climate, soil - propagation, nursery management - site selection, layout, planting - crop management including manuring, irrigation, shade regulation, harvesting, yield of the following crops: Pepper, ginger, and nutmeg.

UNIT- 4

Fruits, Importance and scope of commercial fruit production - Global scenario of fruit production and export - Present status of fruit production in the state and in the country. Crop management practices - selection and preparation of planting materials, field preparation and planting, manuring, irrigation; weed management, harvesting, grading, packing, storage and ripening techniques. Industrial and export potential- of Crops- Banana and Mango.

Text books:

1. Chadha, K.L.2001. Hand Book of Horticulture,ICAR, New Delhi.
2. Kumar.N, Abdul Khader.J.B.M.Rangaswami.P. and Irulappan., 1993. Introduction to spices20
3. Menon.K.P.V. and Pandalai.K.M. 1960. The coconut Palm - a monograph. Indian Central Coconut Committee, Ernakulam.

4. Purseglove. J.W., Brown, E.G.Green, C.L. and Robbins, S.R.G.1981.SpicesVol-I & II.
5. Pruthi.J.S. 1993.Major Spices of India, Crop Management - Post Harvest Technology, ICAR, New Delhi.
6. Pruthi, J.S.2001 Minor Spices and Condiments-Crop Management and Post HarvestTechnology, ICAR, New Delhi, India.
7. Amar Singh, 1986. Fruit Physiology and Production.Kalyani Publishers, New Delhi.
8. Bose, T.K, Mitra,S.K. and Sanyal, D. 2002. Fruits: Tropical and Subtropical. Vol. I & II, Nayaprakash publications, Calcutta.
9. Hayes,W.B. 1957. Fruit Growing in India.Kitabitan, Allahabad.
10. Kumar, N. 1997 (6th Edition).Introduction to Horticulture.Rajhalakshmi Publications, Nagercoil
11. Mitra,S.K, Bose,T.K and Rathore, D.S. 1991. Temperate Fruits. Horticulture and Allied Publishers , Calcutta.
12. Naik,K.C. 1949. South Indian Fruits and Their Culture.Varadachari Co., Madras.
13. Samson, J.A. 1980. Tropical Fruits.Longman group, London.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Semester–II

Paper – XIII: Fundamentals of Plant Breeding and Seed Technology

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To familiarize with the fundamentals of plant breeding.
- To familiarize with the basics of seed technology.

UNIT- 1: Principles of plant breeding

Aims, objectives and importance of Plant Breeding; Modes of reproduction, Sexual, Asexual, Apomixis and their classification; Modes of pollination, genetic consequences, differences between self and cross pollinated crops; Methods of breeding - introduction and acclimatization. Selection, Mass selection, Johansson's pure line theory, Hybridization, Aims and objectives, types of hybridization; Breeding objectives and concepts of breeding in self pollinated , cross pollinated and vegetatively propagated crops. Breeding of Cereals – Rice. Pulses- Cow pea. Oil seeds - Ground nut. Vegetables- Tomato. Fruit crops- Mango. Plantation crops - Coconut.

UNIT- 2: Principles of genetics

Mendel's laws of inheritance and exceptions to the laws, Types of gene action, Multiple alleles, Pleiotropism, Penetrance and expressivity; Quantitative traits and Qualitative traits; Multiple factor hypothesis: Cytoplasmic inheritance - important features and difference from chromosomal inheritance; Linkage and crossing over

UNIT- 3: Intellectual property rights

Plant genetic resources- conservation and utilization. Biodiversity Act and its Implications, Exchange of germplasm, Material Transfer Agreement International treaties on plant genetic resources. IPR - definition, concepts, and components. - Plant breeders rights and farmers rights. UPOV, PPV and FR act. Plant variety registration.

UNIT- 4: Principles of Seed Technology

Introduction to Seed Production, Importance of Seed Production, seed-definition-structure of a seed-seed development process, Definition, Characters of good quality seed ,Factors affecting seed quality - ecological influences , packing practices, harvest and post harvest handling, Genetic and agronomic principles of seed production, Seed testing procedures for quality assessment-Physical, Purity, germination and viability test, Principles of establishing a seed testing laboratory,

Post harvest seed management techniques seed extraction-seed processing- drying- cleaning-upgrading-seed blending, Dormancy of seed, role of growth regulators in restoring seed viability, physical agents for increased seed germination, seed vigour etc. Seed treatment, Importance of seed treatment, types of seed treatment, equipment used for seed treatment, Seed packing and seed storage. Different classes of seeds- Production of nucleus, breeder's seed, foundation and certified seed production, Indian seed Act.2000.

Text books:

1. Albert F-Hill and O.P. Sharma, 1996.Economic Botany. Tata McGraw - Hill Publishing Company Ltd., New Delhi
2. Chalam, G.V., J. Venkateswarlu. 1966. Agricultural Botany in India-Vol. 1. Asia pulishing house, Bombay, New Delhi
3. Daniel Sundararaj, D and G. Thulasidas, 1993. Botany of field crops. Macmillan India Ltd., New Delhi
4. Allard, R.W. 1960. Principles of Plant Breeding.John Wiley & Sons INC. USA. Toppan Co. Ltd. Japan
5. 4. Choudhari, T.C. 1982. Introduction to Plant Breeding. Oxford A& IBH Publishing Co., New Delhi
6. 5. Elliot. 1958. Plant Breeding &Cytogenetics. Mc Grow Hill. New York
7. Sharma, J.R. 1989. Principles and Practice of Plant Breeding. Tata McGraw - Hill Publishing Company Limited, New Delhi.
8. Singh, B.D. 2001. Fundamentals of Genetics.Kalyani Publishers. New Delhi. Ludhiana
9. Singh, B.D. 2003. Plant Breeding Principles and Methods.Kalyani Publishers.New Delhi/ Ludhiana.
7. Agrawal, R.L. 1995. *Seed Technology*. Oxford, IBH Publishing Co., New Delhi.
8. Bose, T. K. and Som, M. G. 1990. Vegetable crops in India.NayaProkash, Calcutta.
9. Das, P. C.1993. Vegetable crops in India.Kalyani Publishers
10. Dahiya, B.S and Rai, K.N., 1997. *Seed Technology*, Published by Kalyani Publishers, Chennai.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Semester–II

Paper – XIV: Fundamentals of Agricultural Engineering

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To familiarize with fundamentals of water management.
- To acquaint with various soil conservation methods.

UNIT- 1

Irrigation: definition and objectives. Role of water in soil and plants- Irrigated agriculture vs. Rainfed agriculture, dry farming and dryland farming- definition. **UNIT- 2**

Evapo-transpiration, potential evapo-transpiration and consumptive use, Reference crop evapo-transpiration (ET_o) - Crop co-efficient (K_c) - K_c values for different crops. Methods of determining water requirement-effective rainfall. Methods of irrigation and their engineering aspects - surface irrigation, sprinkler, drip - Agronomic techniques to improve water use efficiency- factors affecting water use efficiency.

UNIT- 3

Soil erosion- nature and extent of erosion; types- soil erosion by water- different forms- Soil conservation vs. water conservation - agronomic measures- mechanical measures-Role of grasses and pastures in soil conservations; Wind breaks and shelter belts.

UNIT- 4

Water harvesting techniques – in- situ and ex- situ water harvesting methods - Farm ponds, percolation ponds or wells, check basin, minor irrigation tanks.

Text books:

1. Dhruvanarayana, V.V. 1993. *Soil and Water Conservation Research in India*. ICAR, New Delhi.
2. Gurmel Singh, C. Venkataraman, G., Sastry, B. and Joshi, P. 1990. *Manual of Soil and Water Conservation Practices*. Oxford and IBH Publishing Co., New Delhi.
3. Hansen, V.Eh., Israelsen, O.W., and Stringham, G.E. 1979. *Irrigation Principles and Practices* (4 Ed.). John Wiley and Sons, New York.

4. Lenka, D. 2001. *Irrigation and Drainage*. Kalyani Publishers, New-Delhi.
5. Mal, B. C. 2002. *Introduction to Soil and Water Conservation Engineering*, Kalyani Publishers, New-Delhi.
6. Michael, A.M and Ojha, T.P. 2005. *Principles of Agricultural Engineering- Vol.II*. Jain Brothers, New Delhi.
7. Michael, A.M. 1988. *Irrigation Theory and Practice*. Vikas Publishing House Pvt. Ltd., New Delhi.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Paper – XV: Lab Work of Plantation Crops, Spices and Fruits- (Practical)

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To acquire skill on cultivation aspects of Plantation crops, spices and fruit crops

Plantation Crops

- Coconut: Nursery techniques, Seedling selection, Production of quality planting materials and mother palm selection.
- Familiarization with varieties, Moisture conservation methods in coconut plantations.
- Layout and planting, care and management of plantations.
- Tapping systems in rubber.
- Training and pruning in Coffee.

Spices

- Morphology, nursery techniques, planting in main field, cultural operations and harvesting of pepper, ginger ,nutmeg

Fruits (Banana and Mango.)

- Familiarization with important varieties. Practice in propagation, selection of good planting materials, field preparation and planting, manuring and use of growth regulators. Studies on major pests, diseases and nutritional disorders. Studies on maturity indices and storage.
- Visit to research stations, farmers' field, marketing outlets and processing units.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

**Paper – XVI: Lab Work of Fundamentals of Plant Breeding and
Seed Technology- (Practical)**

Total Workload: 04 lectures per week of 60 mins.

Distribution of Workload:

Theory: 04 lectures per week

Total Marks : 50 Marks

Objectives

- To familiarize with the botanical aspects of field crops.
- To develop skill in various aspects of seed production.

Plant breeding

1. Introduction to field crops and agricultural classification of field crops.
2. Observing general morphology of roots, stem , leaves, inflorescence, flowers
3. Family characters and Botany and economic parts of the crop plants
4. Preparation and use of fixatives and stains for light microscopy
5. Preparation of micro slides
6. Identification of various stages of cell division
7. Floral morphology, selfing, emasculation and crossing technique

Seed Technology

8. Seed sampling principles and procedures
9. Physical purity analysis of seeds
10. Seed Testing: Germination analysis and viability analysis of seeds
11. Seed dormancy and breaking methods
12. Seed extraction techniques
13. Visit to seed production plots
14. Visit to seed processing plants
15. Visit to seed testing laboratories.

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Paper – XVII: Lab Work Fundamentals of Agricultural Engineering-Practical

Total Workload: 04 lectures per week of 60 mins.

Mark: 50

Objectives

- To familiarize with fundamentals of water management measures
 - To acquaint with various soil conservation methods
1. Basic calculations for water management
 2. Determination of soil moisture by thermo-gravimetric method and volumetric methods
 3. Methods of irrigation - border strip, check basin, ring, and corrugation furrow
 4. Drip and sprinkler irrigation, components, design aspects -Erection and operation of drip and sprinkler irrigation system;
 5. Cost estimation of drip irrigation system; fertigation, injection and flushing of laterals;

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Sustainable Agriculture

Paper –XVIII: Project/ Field Work/ Crop Museum

Total Marks : 50 Marks

Some Specimens of Modified Crop Varieties of Sorghum, Millet, Beans, Chilies etc. Should be collected and data of the relevant species including cultivation and harvesting techniques are to collected and displayed with proper scientific preservation and knowledge. This work should be completed within a span of year.