

# SHIVAJI UNIVERSITY, KOLHAPUR



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(2014) with CGPA 3.16

**Faculty of Interdisciplinary Studies**

**Structure, Scheme and Syllabus for**

**Bachelor of Vocation (B. Voc.)**

**Agriculture**

**Part I- Sem. I & II**

(Subject to the modifications that will be made from time to time)  
Syllabus to be implemented from June 2018 onwards.

**SHIVAJI UNIVERSITY, KOLHAPUR**  
**STRUCTURE AND SYLLABUS OF B.VOC.**

**Bachelor of Vocation (B.Voc.) – Agriculture**

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

**YEAR OF IMPLEMENTATION** : Syllabus will be implemented from August 2018

**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 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> semester of B. Voc. there will be internal assessment of practical record, related reports 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 4<sup>th</sup> and 6<sup>th</sup> 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 equalmarks.
  - ii. Students will have to solve any fivequestions.
- 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	Distribution ofMarks		Credits	
					Theory	Practical	Theory	Practical
1	I	Business Communication – I	Theory /Practical	50	40	10	3	2
2	II	Soil Science - I	Theory /Practical	50	40	10	3	2
3	III	Fundamentals of Agronomy	Theory	50	50	--	3	
4	IV	Weed Management	Theory	50	50	--	3	
5	V	Fundamentals of Horticulture	Theory	50	50	--	3	
6	VI	Laboratory Work : Fundamentals of Agronomy	Practical		--	50		3
7	VII	Laboratory Work: Weed Management	Practical		--	50		3
8	VIII	Laboratory Work : Fundamentals of Horticulture	Practical		--	50		3
9	IX	Project	-		--	50		2

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

Sr. No.	Paper No.	Title	Theory /Practical /Project	Marks	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	X	Business Communication - II	Theory /Practical	50	40	10	3	2
2	XI	Soil Science - II	Theory /Practical	50	40	10	3	2
3	XII	Agricultural Metrology	Theory	50	50	--	3	
4	XIII	Pomology	Theory	50	50	--	3	
5	XIV	Entomology and Pathology	Theory	50	50	--	3	
6	XV	Laboratory Work : Agricultural Metrology	Practical		--	50		3
7	XVI	Laboratory Work: Pomology	Practical		--	50		3
8	XVII	Laboratory Work : Entomology and Pathology	Practical		--	50		3
9	XVIII	Study Tour	-		--	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	Soil Science - I	4	2	6
3	III	Fundamentals of Agronomy	4	-	4
4	IV	Weed Management	4	-	4
5	V	Fundamentals of Horticulture	4	-	4
6	VI	Laboratory Work : Fundamentals of Agronomy	-	4	4
7	VII	Laboratory Work: Weed Management	-	4	4
8	VIII	Laboratory Work : Fundamentals of Horticulture	-	4	4
9	IX	Project	-	-	-
		Total --	<b>20</b>	<b>16</b>	<b>36</b>

**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	Soil Science - II	4	2	6
3	XII	Agricultural Metrology	4	-	4
4	XIII	Pomology	4	-	4
5	XIV	Entomology and Pathology	4	-	4
6	XV	Laboratory Work : Agricultural Metrology	-	4	4
7	XVI	Laboratory Work: Pomology	-	4	4
8	XVII	Laboratory Work : Entomology and Pathology	-	4	4
9	XVIII	Study Tour	-	-	-
Total-			<b>20</b>	<b>16</b>	<b>36</b>

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

**Eligibility for Faculty** : 1) M. Sc.(Agri., Horti, Agri. Economics, Plant Pathology, Agri. Engineering, Agri. Extension) with NET / SET/Ph.D.  
2) M. A (English) with NET/SET for Business Communication

**Eligibility for:**

**Laboratory Assistant** B.Sc.(Agri)/ Diploma in Agriculture

**Staffing Pattern:**

**Teaching:**

- a) In 1<sup>st</sup> Year of B. Voc. - 1 Full Time and 1 Part Time Lecturer and 1 CHB Lecturer for Business Communication
- b) In 2<sup>nd</sup> Year of B. Voc. – Total requirement of faculty (Inclusive of 1<sup>st</sup> Year) will be 3 Full time and 1 CHB Lecturer for Financial Accounting 1 CHB Lecturer for Business Communication
- c) In 3<sup>rd</sup> Year of B. Voc. – Total requirement of faculty (Inclusive of 1<sup>st</sup> & 2<sup>nd</sup> Year) will be 4 Full time and 1 part time and 1 CHB Lecturer for Business Communication,

**Lab Assistant:** For 1<sup>st</sup> Year of B. Voc. - 1 Parttime

For 2<sup>nd</sup> and 3<sup>rd</sup> Year (Inclusive of 1<sup>st</sup> Year) of B. Voc. – 1 Full Time

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**SHIVAJI UNIVERSITY, KOLAPUR**

**B. Voc. Part – I**

**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

**Units Prescribed for Theory:**

40 Marks.

**Unit 1: Use of English in Business Environment Topics:**

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

**Unit 2: Writing a Letter of Application and CV/Resume**

**Topics:**

Structure of a letter of application for various posts CV/

Resume and its essentials

**Unit 3: Presenting Information/Data**

**Topics:**

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

**Unit 4: Interview Technique**

**Topics:**

Dos and don'ts of an interview

Preparing for an interview

Presenting documents

Language used in an interview

**Practical: Based on the theory units**

10 Marks.

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

Rai,Urmila&S.M.Rai.*BusinessCommunication*.HimalayaPublishingHouse,2007.Pra  
dhan,N.S.*BusinessCommunication*.Mumbai:HimalayaPublishingHouse,2005.  
Pardeshi,P.C.*ManagerialCommunication*.Pune:NiraliPrakashan,2008.

**Pattern of a Question Paper**  
**B. Voc. Part-I**  
**Business Communication-I**  
**Semester-I Paper:I**

**Time:2hours**

**Total Marks:40**

- |     |  |    |
|-----|--|----|
| Q.1 | Do as directed. Question items on <b>Unit 1</b> to be asked.<br>(10 out of 12)                           | 10 |
| Q.2 | Write a letter of application.<br>OR<br>Draft a CV/ Resume for a particular post.                        | 10 |
| Q.3 | Present given information or data using a table/chart/pie diagram, etc<br>(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.

**Semester I - Paper – II**  
**Soil Science - I**

Work Load-6  
Theory – 4 Lectures/Week  
Practical –2Lectures/Week/Batch

Total Marks –50  
Theory - 40Marks  
Practical – 10Marks

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**Objectives :**

- To enable students to-
  - 1) To understand the formation of soil.
  - 2) To know the various properties of soil.

**Course content :**

**Theory-**

**Unit I – Rocks and Minerals**

Soil as natural body  
Soil genesis: Soil forming rocks and minerals,

**Unit II – Weathering**

Weathering,  
Process and factors of soil formation,  
Soil profile,  
Components of soil

**Unit III – Properties of Soil**

Soil physical properties, Soil texture, structure, density and porosity, Soil color, consistence and plasticity,  
Soil reaction- pH, soil acidity and alkalinity, buffering, effect, of pH on nutrient availability,  
Soil colloids-inorganic and organic, silicates clays, constitution and properties,  
Soil organic matter, composition, properties and its influence on soil properties,  
humic substances- nature and properties,

**Unit IV – Soil Organisms**

Soil organisms,  
Macro and micro organisms, their beneficial and harmful effects,

**Practicals:**

- ❖ Study of soil profile in field.
- ❖ Study of soil sampling tools
- ❖ Collection of representative soil sample, its processing and storage .
- ❖ Study of soil forming rocks and minerals.
- ❖ Determination of soil texture by feel and Bouyoucos methods
- ❖ Determination of soil pH and electrical conductivity.



- ❖ Determination of soil colour.
- ❖ Estimation of organic matter content of soil.

**References :**

1. A Text Book of Soil Science – Indian Society of Soil Science
2. ICAR.2006. *Hand book of Agriculture*, ICAR, New Delhi.

**Scheme of Internal Practical Evaluation**

**10 marks**

- 1) Submission of Recordbook
- 2) Viva-Voce

5marks

5marks

**B. Voc. Part – I**  
**Agriculture**  
**Semester I**  
**Paper No. III :Fundamentals of Agronomy**

Work Load–4

Total Marks –50

Theory – 4 Lectures / Week

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**Objectives:**

To enable student –

- 1) to acquire knowledge of Agronomy.
- 2) to know the importance of seed, plant nutrients and irrigation to crops.

**Course content :**

**Theory-**

**Unit I – Introduction of Agronomy**

Agronomy and its scope,

**Unit II – Seed and Tillage**

Seeds and sowing,  
Tillage, crop density

**Unit III – Plant Nutrients and Fertilizers**

Crop nutrition,  
Manures and fertilizers,  
Nutrient use efficiency,

**Unit IV – Irrigation and Drainage**

Water resources,  
Soil -plant- water relationship,  
Crop water requirement, irrigation- scheduling criteria and methods,  
Quality of irrigation water, logging,  
Drainage.

**References:**

1. De, G.C.1989.*Fundamentals of Agronomy*. Oxford & IBH Publishing Co., New Delhi.
2. ICAR.2006. *Hand book of Agriculture*, ICAR, New Delhi.
3. Reddy.T.Y and Reddy, G.H.S.1995.*Principles of Agronomy*, Kalyani Publishers, Ludhiana.
4. Manures and Fertilizers- K. S. Yawalkar, J. P. Agrawal and S. Bokde

**B. Voc. Part – I**  
**Agriculture**  
**Semester I**  
**Paper No. IV: Weed Management**

Work Load-4

Total Marks –50

Theory – 4 Lectures / Week

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**Objectives:**

To enable students –

- 1) To study the weeds and acquaint with management.
- 2) To know the crop rotation and signs of maturity of crops.

**Course content :**

**Theory-**

**Unit I – General Information of Weed**

Weeds- importance, classification, damages caused by weeds,

**Unit II - Weed Management**

Crop weed competition, concept of weed management and methods, herbicides- classification

**Unit III – Crop Management**

Crop rotation and its principals, crop management technologies in problematic areas, after care of crops,

**Unit IV – Harvesting**

Harvesting and threshing of crops.

**References**

1. 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.
2. ICAR.2006. *Hand book of Agriculture*, ICAR, New Delhi.
3. De, G.C.1989.*Fundamentals of Agronomy*. Oxford & IBH Publishing Co., New Delhi.
4. Balasubramaniyan, P and Palaniappan, S.P. 2001. *Principles and Practices of Agronomy* AgroBios(India )Ltd., Jodhpur.

**B. Voc. Part – I**  
**Agriculture**  
**Semester I**  
**Paper No. V :Fundamentals of Horticulture**

Total Marks – 50

Work Load - 4

Theory – 4 Lectures / Week

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**Objectives:**

To enable students –

- 1) To understand orchard management.
- 2) To know the various operations carried out in orchard.
- 3) To study the medicinal and aromatic plants.

**Course content :**

**Theory**

**Unit I – Scope and Importance**

Horticulture- its definition and branches, Importance and scope, Selection of site for fruit growing, Horticultural and Botanical classification, Fruit Zones of Maharashtra,

**Unit II – Orchard Management**

Types of Orchards, Weed Management in Orchard, Different Steps in Planning and Layout of Orchard,

**Unit III - Important Horticultural Practices**

Training, Pruning, Bending, Notching, Girdling, Ringing, Juvenility and Flower bud differentiation, unfruitfulness, pollination, pollinizers, fertilization and Parthenocarpy,

**Unit IV – Medicinal and Aromatic Plants**

Medicinal (Aloe, Belladonna) and Aromatic plants (Davana, Lemon Grass).  
Importance of plant growth regulators in horticulture

**References :**

1. Denixon, RI. 1979. *Principles of Horticulture*. Mac Millan, New York.
2. Hartmann, HT. and Kester, DE.1986.*Plant propagation - Principles and practices*.Prentice-Hall, New Delhi.
3. Chadha, K. L. 2003. Handbook of Horticulture, ICAR, New Delhi.Choudhury, B.1983. Vegetables. National Book Trust, New Delhi.

**B. Voc. Part – I**  
**Agriculture**  
**Semester I**

**Paper No. VI: Laboratory work ( Fundamentals of Agronomy)**

Work Load-4

Total Marks –50

Practical – 4 Lectures/Week/Batch

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**Practicals :**

- ❖ Identification of crops, seeds, fertilizers, pesticides, and tillage implements.
- ❖ Study of agro-climatic zones of India.
- ❖ Identification of weeds in crops
- ❖ Methods of herbicide and fertilizer application.
- ❖ Study of yield contributing characters and yield estimation.
- ❖ Seed germination and viabilities test.
- ❖ Numerical exercise on fertilizer requirement.
- ❖ Plant population.

**Scheme of practical evaluation**

<b>Internalpracticalevaluation</b>	<b>50marks</b>
i) Submission of practicalrecordbook	20marks
ii) Submission ofvisitreport	15marks
iii) Viva–Voce	15marks

**B. Voc. Part – I**  
**Agriculture**  
**Semester I**

**Paper No. VII: Laboratory Work ( Weed Management)**

Work Load-4

Total Marks –50

Practical – 4 Lectures/Week/Batch

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**Practicals :**

- ❖ Herbicides and water requirement
- ❖ Use of tillage implements- reversible plough, one way plough, harrow, leveler, seed drill
- ❖ Study of soil moisture measuring devices.
- ❖ Measurement of irrigation water.
- ❖ Cares take while applying herbicides
- ❖ Collecting common farm weeds.

**Scheme of practical evaluation**

<b>Internalpracticalevaluation</b>	<b>50marks</b>
i) Submission of practicalrecordbook	20marks
ii) Submission ofvisitreport	15marks
iii) Viva–Voce	15marks

**B. Voc. Part – I**  
**Agriculture**  
**Semester I**

**Paper No. VIII : Laboratory Work ( Fundamentals of Horticulture)**

Work Load-4

Total Marks –50

Practical – 4 Lectures/Week/Batch

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**Practicals :**

- ❖ Identification of garden tools.
- ❖ Identification of horticultural crops.
- ❖ Preparation of seed bed/nursery bed.
- ❖ Practice of sexual and asexual methods of propagation including micro- propagation.
- ❖ Study of Irrigation Methods to Horticultural Crops.
- ❖ Opening and filling of pit.
- ❖ Layout and planting of orchard
- ❖ Fertilizer application in different crops.
- ❖ Preparation of G.A. for Grapes.
- ❖ Visits to commercial orchard

**Scheme of practical evaluation**

<b>Internalpracticalevaluation</b>	<b>50marks</b>
i) Submission of practicalrecordbook	20marks
ii) Submission ofvisitreport	15marks
iii) Viva–Voce	15marks

SHIVAJI UNIVERSITY, KOLAPUR

B. Voc. Part – I

Agriculture

Semester–II

Paper: X Business Communication-II

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

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**Units Prescribed for Theory:**

**Unit 1: Group Discussion**

**Topics:**

Preparing for a Group Discussion  
Initiating a Discussion  
Eliciting Opinions, Views, etc.  
Expressing Agreement/Disagreement  
Making Suggestions; Accepting and Declining Suggestions  
Summing up.

**Unit 2: Business Correspondence**

**Topics:**

Writing Memos, e-mails, complaints, inquiries, etc.  
Inviting Quotations  
Placing Orders, Tenders, etc.

**Unit 3: English for Negotiation**

**Topics:**

Business Negotiations  
Agenda for Negotiation  
Stages of Negotiation

**Unit 4: English for Marketing**

**Topics:**

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 units**

**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, Anjane & Bhavana Adhikari. *Business Communication*. New Delhi: Tata McGraw Hill.  
 Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi: Student Aid Publication, 2008.  
 Tickoo, Champa & Jaya Sasikumar. *Writing with a Purpose*. New York: OUP, 1979.  
 Whitehead, Jeffrey & 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**

<b>Time: 2 hours</b>	<b>Total Marks: 40</b>
Q. 1 Fill in the blanks in the following Group Discussion. (On <b>Unit 5</b> ) (10 out of 12)	10
Q. 2 Attempt <b>ANY ONE</b> of the following ( <b>A</b> or <b>B</b> ): (On <b>Unit 6</b> )	10
Q. 3 Fill in the blanks with appropriate responses: (On <b>Unit 7</b> )	10
Q. 4 Attempt <b>ANY ONE</b> of the following ( <b>A</b> or <b>B</b> ): (On <b>Unit 8</b> ) (10 out of 12)	10
<b>Practical Evaluation:</b>	<b>10 Marks</b>
Oral and Presentation based on the units prescribed.	

**Semester II –  
Paper – XI : Soil Science -II**

Work Load-6

Total Marks –50

Theory – 4 Lectures/Week

Theory - 40Marks

Practical –2Lectures/Week/Batch

Practical – 10Marks

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**Objectives:**

- To enable students-
  - 1) To study the manures and fertilizers.
  - 2) To study the soil fertility and productivity.

**Course Content:**

**Theory -**

**Unit I – Manures**

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures, Green / leaf manuring. Fertilizer recommendation approaches. integrated nutrient management.

**Unit II – Fertilizers**

Chemical fertilizers, classification, composition and properties of major complex fertilizers nano fertilizers, soil amendments, fertilizer storage, fertilizer control order,

**Unit III – Soil fertility and productivity**

Soil fertility and soil productivity,

**Unit IV – Plant Nutrients**

Role, deficiency and toxicity symptoms of essential plant nutrients,

**Practical-**

- ❖ Introduction of analytical instruments and their principals.
- ❖ Calibration and applications of calorimetric and flame photometer
- ❖ Estimation of soil organic carbon
- ❖ Estimation of alkaline hydrolysable N in soils,
- ❖ Estimation of soil extractable "P" in soils.
- ❖ Estimation of exchangeable 'K', in Soils.

**References:**

1. A Text Book of Soil Science – Endian Society of Soil Science
2. ICAR.2006. *Hand book of Agriculture*, ICAR, New Delhi.

**Scheme of Internal Practical Evaluation**

1. Submission of Record book
2. Viva-Voce

**10 marks**

5marks

5marks

**B. Voc. Part – I**  
**Agriculture**  
**Semester II**  
**Paper No. XII :Agricultural Metrology**

Work Load–4

Total Marks –50

Theory – 4 Lectures / Week

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**Objectives:**

To enable student –

1. To acquire knowledge of weather element
2. To study the weather forecasting.
3. To study the effect of weather elements on crop growth.

**Course content:**

**Unit I Meaning of Meteorology**

Meaning and scope of agricultural meteorology, earth atmosphere- its composition, extent and structure, atmospheric weather variables,

**Unit II – Components of Weather**

temperature, formation of dew, fog, mist, frost, cloud, Precipitation, agriculture weather hazards- drought, floods, frost.

**Unit III – Weather Forecast**

Agriculture and weather relations, weather forecasting - types of weather forecast and their uses, Climate change, global warming, causes of climate change and its impact on regional and national agriculture.

**Unit IV – Impact of Weather Elements on Crops**

Effect of climatic factors on crop growth.

**Reference:**

1. De, G.C.1989.*Fundamentals of Agronomy*. Oxford & IBH Publishing Co., New Delhi.
2. ICAR.2006. *Hand book of Agriculture*, ICAR, New Delhi.
3. Reddy.T.Y and Reddy, G.H.S.1995.*Principles of Agronomy*, Kalyani Publishers, Ludhiana.
4. Manures and Fertilizers- K. S. Yawalkar, J. P. Agrawal and S. Bokde
5. Cox, G.W and Atkins, M.D. 1979. *Agricultural Ecology: An Analysis of World Food Production Systems*. W.H. Freeman and Company, San Francisco
6. Grigg, D.B. 1974. *The Agricultural Systems of the World: An Evolutionary Approach*. Cambridge University Press, Cambridge.

**B. Voc. Part – I**  
**Agriculture**  
**Semester II**  
**Paper No. XIII :Pomology**

Work Load-4  
Theory – 4 Lectures / Week

Total Marks –50

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**Objectives:**

To enable students –

- 1) To study the cultivation practices of fruit crops.
- 2) To study the propagation methods in fruit crops.

**Course Content:**

**Unit I – Scope and Importance of Fruits**

Importance and scope of fruit and plantation crop industry in India,  
Importance of root stocks,

**Unit II – Cultivation of Major Fruit Crops**

Production technologies for cultivation of major fruits-mango, banana, citrus  
crops, grape, guava, papaya, sapota, custard apple, awala

**Unit III - Study of minor fruits-**

Ber, pomegranate, jackfruit, strawberry, tamarind. Plantation crops-coconut,  
cashew,

**Unit IV – Propagation**

Plant propagation-methods and propagating structures, Cultivation of teak,  
Shevari, Nursery – Importance and Propagation Methods.

**Reference:**

1. Denixon, RI. 1979. *Principles of Horticulture*. Mac Millan, New York.
2. Hartmann, HT. and Kester, DE.1986.*Plant propagation - Principles and practices*.Prentice-Hall, New Delhi.
3. Chadha, K. L. 2003. Handbook of Horticulture, ICAR, New Delhi.Choudhury, B.1983. Vegetables. National Book Trust, New Delhi.
4. Bose, TK., Mitra, SK. and Sadhu, K. 1986.*Propagation of tropical and subtropical horticultural crops*.NayaProkash, Calcutta.

B. Voc. Part – I  
**Agriculture**  
Semester II  
**Paper No. XIV :Entomology and Pathology**

Work Load – 4Total  
Theory – 4 Lectures / Week

Marks – 50

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**Objectives:**

To enable students –

1. To study the insect pest and their control.
2. To study the causes of diseases.

**Course Content:**

**Unit I – Fundamental of Entomology**

History of entomology in India. structure of head, thorax and abdomen, mouth parts. Types of larvae and pupae.

**Unit II – IPM**

Categories of pests. concept of IPM. practices, scope and limitations of IPM, classification of insecticides, toxicity of insecticides and formulations of insecticides. chemical control importance. Recent methods of pest control, repellents, anti feed ants hormones

**Unit III - Fundamental of Plant Pathology**

Introductions: Importance of plant diseases, scope and objectives of plant pathology, pathogenesis,. Causes/ factors affecting disease development. Classification of plant diseases.

**Unit IV – Causes of Diseases**

Important plant pathogenic organisms, different groups : fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, virioids, algae, protozoa, phanerogamic, parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to a biotic causes.

Fungi: general characters, definition of fungus, somatriic structures types of fungal thalli, fungal tissue, reproduction ( asexual, sexual)

Bacteria and mollicutes: general morphological characters, basic methods of classification and reproduction.

viruses: nature structure, replication and transmission, study of phanerogamic plant parasitites.

Nematodes: symptoms and nature of damage caused by plant nematodes.

**References:**

1. Mani, M. S. 1968. General Entomology. Oxford and IBH Publishing Company, New Delhi.
2. Pedigo, L. P. 1999. Entomology and Pest Management. Third Edition. Prentice Hall, New Jersey, USA.
3. Dhaliwal, G. S. and Ramesh Arora. 1998. Principles of Insect Pest Management. Kalyani Publishers, New Delhi.
4. Principles of Plant Pathology – R.S. Singh

**B. Voc. Part – I**  
**Agriculture**  
**Semester II-Paper**

**No. XV Laboratory work (Agricultural Metrology)**

Work Load-4

Total Marks –50

Practical – 4 Lectures/Week/Batch

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**Practicals:**

- ❖ Instruments and weather data recording
- ❖ Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis.
- ❖ Measurement of soil temperature and computation of soil heat flux.
- ❖ Measurement of wind speed and wind direction, preparation of wind rose.
- ❖ Measurement, tabulation and analysis of rain.
- ❖ Measurement of humidity.
- ❖ Visit of Agro meteorological observatory

**Scheme of practical evaluation**

<b>Internal practical examination</b>	<b>50marks</b>
i) Preparation of any one from the given	15marks
ii) Submission of practical record book	15marks
iii) Submission of visit report	10marks
iv) Viva-Voce	10marks

**B. Voc. Part – I**  
**Agriculture**  
**Semester II**

**Paper No. XVI Laboratory Work ( Pomology)**

Work Load-4  
Practical – 4 Lectures/Week/Batch

Total Marks –50

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**Practicals:**

- ❖ Seed propagation.
- ❖ Propagation methods for fruit and plantation crops.
- ❖ Identification of fruit.
- ❖ Visits to commercial nurseries.
- ❖ Study of cuttings,
- ❖ Stone grafting,
- ❖ Air layering,
- ❖ Tongue layering,
- ❖ Approach grafting.
- ❖ Budding Methods.

**Scheme of practical evaluation**

**Internal practical examination**

**50marks**

- |  |         |
|--|---------|
| i) Preparation of any one from the given | 15marks |
| ii) Submission of practical record book  | 15marks |
| iii) Submission of visit report          | 10marks |
| iv) Viva–Voce                            | 10marks |

**B. Voc. Part – I**  
**Agriculture**  
**Semester II**

**Paper No. XVII Laboratory Work ( Entomology and Pathology)**

Work Load-4

Total Marks –50

Practical – 4 Lectures/Week/Batch

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**Practicals:**

- ❖ Methods of collection and preservation of insects including immature stages.
- ❖ External features of grasshoppers/blister beetle.
- ❖ Types of insect larvae and pupae
- ❖ Dissection of insects ( Grasshopper)
- ❖ Insecticides and their formulations.
- ❖ Collection and preservation of disease specimen.
- ❖ General study of different structure of fungi.
- ❖ Study of symptoms of various plant disease.
- ❖ Study of fungicides and their formulations.

**Scheme of practical evaluation**

<b>Internal practical examination</b>	<b>50marks</b>
i) Preparation of any one from the given	15marks
ii) Submission of practical record book	15marks
iii) Submission of visit report	10marks
iv) Viva–Voce	10marks