

 Estd. 1962 "A++" Accredited by NAAC (2021) With CGPA 3.52	SHIVAJI UNIVERSITY, KOLHAPUR 416 004, MAHARASHTRA PHONE : EPABX - 2609000, BOS Section - 0231-2609094, 2609487 Web : www.unishivaji.ac.in Email: bos@unishivaji.ac.in शिवाजी विद्यापीठ, कोल्हापूर, ४१६ ००४, महाराष्ट्र दूरध्वनी - इपीबीएक्स - २०६०९०००, अभ्यासमंडळे विभाग : ०२३१- २६०९०९४, २६०९४८७ वेबसाईट : www.unishivaji.ac.in ईमेल : bos@unishivaji.ac.in	 
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Ref.: SU/BOS /Voc. / 222

Date: 06 - 07- 2026

The Principal,
 All concerned Affiliated Colleges /Institutions,
 Shivaji University, Kolhapur

**Subject : Regarding Syllabi of B. Voc. Part II Programme under the Faculty of
 Inter- Disciplinary Studies as per National Education Policy 2020 (2.0)**

Sir/Madam,

With reference to the subject, mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabi of following B. Voc. Part II Programme under the Faculty of Inter-Disciplinary Studies, as per National Education Policy 2020 (2.0).

1	B. Voc. Food Processing Technology	6	B Voc. Tourism And Service Industry
2	B. Voc Sustainable Agriculture	7	B. Voc. Building Technology & Interior Designing
3	B. Voc. Automobile	8	B. Voc. Printing And Publishing
4	B. Voc. Graphic & Design	9	B. Voc. Nutrition And Dietetics
5	B. Voc. Nursing And Hospital Management	10	B. Voc. Sustainable Agriculture Management

This syllabus (nature of question paper and equivalence etc) shall be implemented from the academic year **2026-2027** onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020 (Online Syllabus).

The question papers on the pre-revised syllabi of above-mentioned programmes will be set for the examinations to be held in October /November 2026 & March/April 2027. These chances are available for repeater students, if any.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully



Dy Registrar

Encl. : as above

Copy to: For information and necessary action

1	The I/C Dean, Faculty of IDS	7	P.G.Admission Section
2	Director, Board of Examination and Evaluation	8	Affiliation T. 1 & T. 2 Section
3	The Chairman, Respective Board of Studies	9	Appointment A & B Section
4	All On Exam Section	10	P.G.Seminar Section
5	Eligibility Section	11	I. T. Cell
6	Computer Centre	12	Internal Quality Assurance Cell (IQAC)

Shivaji University Kolhapur



Established: 1962

Accredited By NAAC with 'A++' Grade with

CGPA 3.52

Revised Syllabus For

Bachelor of Vocation [B. Voc.] (NEP-2.0)

Part-II

(Sustainable Agriculture)

UNDER

Faculty of Interdisciplinary Studies Structure, Scheme and

Revised Syllabus

(To be implemented from academic year 2026-27 onwards).

Shivaji University, Kolhapur
NEP-2020 (2.0): Credit Frame work
B.Voc. II (Sustainable Agriculture)
Academic Year-2026-27

NEP-2020 (2.0): Credit Frame work for UG B.Voc. II (Sustainable Agriculture) Programme under Faculty of Under Faculty of Interdisciplinary Studies

Level	Semester	COURSES		OE	VSC/SEC	AEC/VEC/IKS	OJT/FP/CE P/CC/ RP	Total Credit
		Major	Minor			AEC	CC	
5.0	III	Major –V (2) Major –VI (2) Major Pract.-III (2)	Min.-I (2) Min.-II (2) Min. Pract.-III (2)	OE -III (T/P) (2)	VSC-I P (2) (Major sp.) SEC-I P-(2)	AEC-I ENG. (2)	CC-1 (2)	
	Credits	4 + 2= 6	4 + 2= 6	2	2 + 2 = 4	2	2	22
	IV	Major –VII (2) Major –VIII (2) Major Pract.-IV (2)	Min.-III (2) Min.-IV (2) Min. Pract.-IV (2)	OE-IV (T/P) (2)	SEC-II T/P-(2) (Major Sp.)	AEC-II ENG. (2) VEC-II (2) Environmental studies (2)	CEP-I (2)	
	Credits	4 + 2= 6	4 + 2= 6	2	2	2 + 2 = 4	2	22
2 nd Year Cum. Credits		Total Credits	8 (T) + 4 (P) = 12	2 + 2 = 4	4 + 2 = 6	2 + 4= 6	2 + 2 = 4	44
Exit option: Award of UG Diploma in Major and Minor with 88 credits.								

Note:

OE- Open Elective must be chosen compulsorily from faculty other than that of major.

VSC: Vocational Skill Course (Major related)

SEC: Skill Enhancement Course (Major related)

AEC: Ability Enhancement course

OJT/FP/RP: On job training (Internship/Apprenticeship)/ Field visit (Major related)/Research Project (Major related)

CEP: Community Engagement Program (Major related)

CC: Co-curricular Courses such as Health and Wellness, Sports, Yoga, NSS, NCC, Cultural, Vivek vahini, Fine, Visual, Performing arts.

A] Ordinance and Regulations: (As applicable to Degree Course)

B] Shivaji University, Kolhapur

Revised syllabus for Vocational Program B. Voc. Part– II (Sustainable Agriculture)

1. TITLE: Subject- B. Voc. Part–II (Sustainable Agriculture)

Optional under the Faculty of Vocational Program

2. YEAR OF IMPLEMENTATION: -

Revised Syllabus (As per NEP 2020) will be implemented from June 2023 onwards.

3. PREAMBLE:-

[**Note:** - The Board of Studies should briefly mention foundation, core and applied components of the course/paper. The student should get into the prime objectives and expected level of study with required outcome in terms of basic and advance knowledge at examination level.]

4. GENERAL OBJECTIVES OF THE COURSE:

(As applicable to the Degree concerned)

Objectives:-

1. To impart knowledge of Sustainable Agriculture is the basic objective of education.
2. To develop scientific attitude is the major objective to make the students open minded, critical, curious.
3. To develop skill in practical work, experiments and laboratory materials and equipment's along with the collection and interpretation of scientific data to contribute the science.
4. To understand t scientific terms, concepts, facts, phenomenon and their relationships.
5. To make the students aware of natural resources and environment.
6. To provide practical experience to the students as a part of the course to develop scientific ability to work in the field of research and other fields of their own interest and to make them fit for society.
7. The students are expected to acquire knowledge of plant and related subjects so as to understand natural phenomenon, manipulation of nature and environment in the benefit of human beings.
8. To develop ability for the application of the acquired knowledge to improve agriculture and other related fields to make the country self-reliant and sufficient.
9. To create the interest of the society in the subject and scientific hobbies, exhibitions and other similar activities.

5. DURATION

The course shall be a fulltime course.

6. PATTERN:-

Pattern of examination will be semester.

7. FEE STRUCTURE:-

As per Government / University rules

1. Refer brochure and prospectus of concern affiliated college/institute to Shivaji University, Kolhapur.
2. Other fee will be applicable as per rules and norms of Shivaji University, Kolhapur.

8. ELIGIBILITY FOR ADMISSION:

As per guidelines obtained from Shivaji University, Kolhapur by following rules and regarding reservations by Govt. of Maharashtra

9. MEDIUM OF INSTRUCTION:

The medium of instruction shall be in English.

10. STRUCTURE OF THE COURSE - B.Voc. II (Sustainable Agriculture)

SECOND YEAR (SEMESTER III / IV)

11. SPECIAL INSTRUCTIONS, IF ANY

B.Voc. II
(Sustainable Agriculture)
Semester-III

Titles of Papers for B.Voc. II (Sustainable Agriculture)

Sem.	Course	Paper No.	Title of Paper
III	Major	Major Paper- V	Cereals and Pulses Processing Technology
		Major Paper- VI	Weed Management and Fodder Crop Production
		B.Voc. Major Practical -III	Cereals and Pulses Processing Technology and Weed Management and Fodder Crop Production
	Minor	Minor Paper- V	Fundamental of Soil Science
		Minor Paper- VI	Plant Pathology and Crop Disease Management
		B.Voc. Minor Practical - III	Fundamental of Soil Science and Plant Pathology and Crop Disease Management
	OE	OE-III (P) (2)	Biofertilizer (Jeevamrut) and Biopesticide (Dashparni)
	VSC	VSC-I (P) (2) (Major Specific)	VSE
	SEC	SEC-I (P) (2)	SEC
	AEC-I	AEC-I (2)	English
	CC	CC-I (2)	As specifies in credit frame work

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Major Paper-V: Cereals and Pulses Processing Technology – Theory
Theory: 30 Hours
(Credits: 02)

Unit I: Introduction to Cereals and Pulses (08 Hours)

Definition and classification of cereals and pulses, Importance in human nutrition and food security, Major cereals: wheat, rice, maize, millets, Major pulses: chickpea, pigeon pea, lentil, green gram, black gram, Structure and composition of cereal grains and pulse seeds.

Unit II: Production and Processing of Rice (07 Hours)

Rice structure and composition, Parboiling process, milling methods (traditional and modern), Rice bran and its utilization, By- products puffed rice, flaked rice, popped rice, bran oil, germ oil, husk, straw.

Unit III: Production and Processing of Millets (08 Hours)

Ragi, structure and composition, nutritive value, processing: milling, products flour, snack (Idli) malt, biscuits, Satva, Chick Pea & Soybean corn germ oil, popcorn, corn starch. Jowar, Ragi, Bajra and Varai (Barnard millet): Nutritive value.

Unit IV: Post-Harvest Processing and Its By-Products (07 Hours)

Classification, structure and composition, Harvesting and storage, products: whole gram, flour, Sattu, Snacks wheat flour, Maida, Semolina, Macaroni products and its method of preparation: Macaroni, Spaghetti.

Suggested readings:

1. David Dendy A.V, *Cereals and Cereal Products: Technology and Chemistry*, - 2000
2. Manay, N.S, Shadaksharaswamy, M., *Foods- Facts and Principles*, New Age International Publishers, New Delhi, 2004.
3. Potter, N.N. and Hotchkiss J. H. *Food Science*. CBS publishers and distributors. 1996.
4. Srilakshmi, B. *Food Science*. New Age International Publishers, New Delhi, 2003.
5. Subalakshmi, G and Udipi, S.A. *Food processing and preservation*. New Age International Publishers, New Delhi, 2001.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Major Paper-VI Weed Management and Fodder Crop Production
Theory: 30 Hours
(Credits: 02)

Unit I: Weed Science

(08 Hours)

Definition, classification, importance of weeds, weed biology and ecology, seed dormancy and germination, Crop weed competition and allelopathy. Integrated weed management, ICAR-DWR (Directorate of weed research).

Unit II: Weed Survey, Weed Dynamics and Losses

(07 Hours)

Methods of weed survey and sampling. Data analysis, weed index CPWC (Critical period of Weed competition), AI in weed mapping and control.

Unit III: Fodder Crop Production – Principles and Systems

(08 Hours)

Classification of fodder crops, Land Preparation, irrigation, intercultivation, weed control, Commercial impact of fodder crops.

Unit IV: Production Technology of Fodder Forage

(07 Hours)

Agronomy of major fodder cereals (Jowar, maize), Agronomy of forages (cowpea), Multi-cut fodder crops, hydroponics in fodder production, *Azolla* cultivation.

Suggested readings:

1. Rao V.S. Principles of Weed Science
2. Zimdahl, R.L. Fundamentals of Weed Science
3. Panda, S.C. Forage Crops and Pastures
4. ICAR. Handbook of Agriculture
5. Yaduraju, N.T. & Mishra, J.S. Weed Management in Field Crops
6. Journals: Indian Journal of Weed Science, Forage Research

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Major Practical- and (Based on paper V and VI)

Practical:

Group-I

1. Identification and classification of major cereals and pulses. (any 2 examples each)
2. Morphology of Rice.
3. Study of composition of rice (demonstration of moisture/protein estimation).
4. Preparation of value-added products: puffed rice, flaked rice, popped rice.
5. Identification and botanical study of millets (any 2)

Practical:

Group-II

1. Nutritional Value of Nachani satva.
2. Identification and botanical study of Chick Pea & Soybean.
3. Methods of quantitative weed sampling.
4. Identification of weeds (20 spe.).
5. Study of weed shifts under different cropping systems (case study).
6. Calculation of relative density, relative frequency, and importance value index (IVI).
7. Field visit to observe weed crop interactions.

Suggested readings:

1. David Dendy A.V, etal; *Cereals and Cereal Products: Technology and Chemistry*, - 2000
2. Manay, N.S, Shadaksharaswamy, M., *Foods- Facts and Principles*, New Age International Publishers, New Delhi, 2004.
3. Potter, N.N. and Hotchkiss J. H. *Food Science*. CBS publishers and distributors. 1996.
4. Srilakshmi, B. *Food Science*. New Age International Publishers, New Delhi, 2003.
5. Subalakshmi, G and Udipi, S.A. *Food processing and preservation*. New Age International Publishers, New Delhi, 2001.
6. Rao V.S. *Principles of Weed Science*
7. Zimdahl, R.L. *Fundamentals of Weed Science*
8. Panda, S.C. *Forage Crops and Pastures*
9. ICAR. *Handbook of Agriculture*

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Minor Paper-V Fundamentals of Soil Science
Theory: 30 Hours
(Credits: 02)

Unit I: Introduction to Soil Science (08 Hours)

Definition, soil profile, Components, Soil formation, Factors of soil formation (climate, organisms, parent material, time), Soil biology, Soil fertility management (Compost, organic manure biofertilizers).

Unit II: Soil Physical Properties (07 Hours)

Soil texture and structure, Soil colour and temperature, Soil density (bulk density & particle density), Porosity and permeability, Soil air and its importance.

Unit III: Soil Chemical Properties (08 Hours)

Soil pH and soil reaction, Soil colloids, Soil organic matter and humus, Essential plant nutrients (macro and micronutrients), Soil fertility and soil testing

Unit IV: Soil Biology: Soil Horizons (07 Hours)

Soil microorganisms: (bacteria, fungi, algae) Soil fauna, rhizosphere, soil organic matter, nutrient cycling, Carbon sequestration.

Suggested readings:

1. Brady, N. C., & Weil, R. R. (2016). *The nature and properties of soils* (15th ed.). Pearson Education.
2. Das, D. K. (2014). *Introduction to soil science*. Kalyani Publishers.
3. Biswas, T. D., & Mukherjee, S. K. (2017). *Soil science and agricultural chemistry* (3rd ed.). McMillan Publishers India Ltd.
4. Rajlakshmi, I. (2009). *Elements of soil science*. CBS Publishers & Distributors.
5. Foth, H. D. (1990). *Fundamentals of soil science* (8th ed.). John Wiley & Sons.
6. Havlin, J. L., Tisdale, S. L., Nelson, W. L., & Beaton, J. D. (2014). *Soil fertility and fertilizers: An introduction to nutrient management* (8th Ed.). Pearson.
7. Paul, E. A. (2015). *Soil microbiology, ecology and biochemistry* (4th ed.). Academic Press.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Minor Paper-VI Plant Pathology and Crop Disease management
Theory: 30 Hours
(Credits: 02)

Unit I: Introduction to Plant Pathology (08 Hours)

Concepts of disease, pathogen and host, Disease triangle and disease cycle, Classification of plant diseases, etiology, epidemiology, Koch's Postulates.

Unit II: Disease Diagnosis and Management (07 Hours)

Symptomatology and signs of plant diseases, Methods of disease identification, Disease forecasting. Principles of plant disease management, Cultural methods, Mechanical and physical methods, Biological control methods, Chemical control (Biopesticides, fungicides, bactericides), Integrated Disease Management (IDM)

Unit III: Major Crop Diseases and management (08 Hours)

Diseases of cereals (Rice, Wheat), Diseases of pulses Pigeon pea, Gram, Diseases of oilseeds (Soybean), Diseases of turmeric & Ginger.

Unit II: Horticulture Crop Causes Diseases management (07 Hours)

Disease of Floricultural Crops (Rose, Tuberose), Vegetables crop (Tomato), Fruits (Pomogranate, Mango, Strawberry), Smart farming techniques in horticulture.

Suggested readings:

1. Agrios, G. N. (2005). *Plant pathology* (5th ed.). Elsevier Academic Press.
2. Mehrotra, R. S., & Aggarwal, A. (2017). *Plant pathology*. McGraw Hill Education (India).
3. Singh, R. S. (2017). *Introduction to principles of plant pathology* (4th ed.). Oxford & IBH Publishing.
4. Bilgrami, K. S., & Dube, H. C. (1990). *A textbook of modern plant pathology*. Vikas Publishing House.
5. Chattopadhyay, S. B. (2006). *Principles and procedures of plant protection*. Oxford & IBH Publishing.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Minor Practical- (Based on paper V and VI)

Practical:

Group-I

1. Determination of soil texture (feel method / hydrometer method)
2. Determination of soil pH
3. To study water holding capacity of different soil
4. Determination of soil moisture content
5. Estimation of organic matter
6. Observation of soil microorganisms
7. Preparation of vermicompost (demonstration)

Practical:

Group-II

1. Study of symptoms of major crop diseases (any 4)
- 2-4. Identification of fungal, bacterial, and viral diseases (specimens/slides)
- 5 Study of different types of spores
6. Isolation of fungi (demonstration)
7. Preparation of Bordeaux mixture
8. Study of fungicides and their formulations
9. Study of Biopesticides
10. Field visit to observe crop diseases

Suggested readings:

1. Brady, N. C., & Weil, R. R. (2016). *The nature and properties of soils* (15th ed.). Pearson Education.
2. Das, D. K. (2014). *Practical manual of soil science*. Kalyani Publishers.
3. Jackson, M. L. (1973). *Soil chemical analysis*. Prentice Hall of India.
4. Piper, C. S. (1966). *Soil and plant analysis*. Hans Publishers.
5. Black, C. A. (Ed.). (1965). *Methods of soil analysis* (Vol. 1 & 2). American Society of Agronomy.
6. Subba Rao, N. S. (2017). *Soil microbiology* (5th ed.). Oxford & IBH Publishing.
7. Agrios, G. N. (2005). *Plant pathology* (5th ed.). Elsevier Academic Press.
8. Mehrotra, R. S., & Aggarwal, A. (2017). *Plant pathology*. Tata McGraw-Hill Education.
9. Singh, R. S. (2017). *Introduction to principles of plant pathology* (4th ed.). Oxford & IBH Publishing.
10. Bilgrami, K. S., & Dube, H. C. (1990). *A textbook of modern plant pathology*. Vikas Publishing House.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Open Elective- III: Organic Farming and Biopesticides
Theory: 30 Hours
(Credits: 02)
Marks: 50

1. **Compost making:** Preparation of Compost using Kitchen waste, dry leaves and Manure.
2. **Seed Treatment:** Treatment of Seeds using Neem extract or cow urine.
3. **Natural Pesticides:** Preparation of pest resistant seeds using neem oil spray, Gralic spray or cow dung-based pesticides.
4. **Cow Dung and Urine Fertilizer:** Preparation of Jeevamrut or Panchagavya as natural fertilizer.
5. **Broad Spectrum Botanical pesticide:** Preparation of pesticides using Neem spray (General Pest Repellent).
6. **Insect and Fungal Control:** Preparation of Garlic- Chili spray.
7. **Algae Cultivation:** Grow algae or *Azolla* in water trays to use as a bio-fertilizer or animal feed.
8. **Natural Growth Promoter:** using a Banana Peel.
9. **Aphid and Caterpillar Control:** Preparation of Tobacco Extract.
10. Fungal Disease Control: Preparation of fermented Buttermilk Spray
11. **Preparation of Dashparani Ark.**
12. Biocontrol agents.
13. Filed Visit to any farm.

Suggested readings:

1. Brady, N. C., & Weil, R. R. (2016). *The nature and properties of soils* (15th ed.). Pearson Education.
2. Das, D. K. (2014). *Introductory soil science*. Kalyani Publishers.
3. Tisdale, S. L., Nelson, W. L., Beaton, J. D., & Havlin, J. L. (2014). *Soil fertility and fertilizers: An introduction to nutrient management* (8th ed.). Pearson.
4. Subba Rao, N. S. (2017). *Soil microbiology* (5th ed.). Oxford & IBH Publishing.
5. Edwards, C. A., Arancon, N. Q., & Sherman, R. (2011). *Vermiculture technology: Earthworms, organic wastes, and environmental management*. CRC Press.
6. Palaniappan, S. P., & Annadurai, K. (2007). *Organic farming: Theory and practice*. Scientific Publishers.
7. Yadav, A. K. (2016). *Natural farming*. Agri Biovet Press.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
VSC-I (P) Mushroom cultivation
Theory: 30 Hours
(Credits: 02)
Marks: 50

- 1-2. Identification of edible and poisoned mushroom.
- 3-4. Preparation of mother Spawn for Oyster and Button mushroom.
5. Study of Sterilization techniques.
- 6-7. Preparation of Bed for Oyster and button mushroom.
8. Study of Disease in mushroom
- 9-10. Post-harvest processing of mushroom (Drying, Blanching, freezing, canning))
11. Preparation of value added products (Soop, powder, biscuit).
12. Field Visit to mushroom cultivation unit.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. III
Skill Enhancement Course (SEC)
Practical
(Credits: 02)
Marks: 30

1. Identification of Fishes from local water bodies.
2. Collection of data from local market
- 3-5. Analysis of water (pH, Temperature, EC, TDS).
6. Preparation of fish nursery.
7. Study of aquatic weeds and their control.
8. Study of design and layout of fish farm.
9. Study of preparation of fish feed
10. Study of fabrication of aquarium.
11. Study aquarium species.
12. Visit to Advanced aquafarm.

B.Voc. II
(Sustainable Agriculture)
Semester-IV

Titles of Papers for B.Voc. II (Sustainable Agriculture)

Sem.	Course	Paper No.	Title of Paper
IV.	Major	Major Paper- V	Micro propagation and Genetically Modified Crops
		Major Paper- VI	Nursery Management in Commercial Crops
		B.Voc. Major Practical - I	Micro propagation and Genetically Modified Crops and Nursery Management in Commercial Crops
	Minor	Minor Paper- V	Livestock Farming
		Minor Paper- VI	Animal Husbandry and Dairy Sciences
		B.Voc. Minor Practical- II	Livestock Farming and Animal Husbandry and Dairy Sciences
	OE	OE-I (T/P) (2)	Precision Farming
	SEC	SEC-II (2) (P)	Apiculture
	AEC-I	AEC-II English (2)	English
	VEC	VEC-II (2)	Environmental Studies
	CEP	CEP-I (2) (P)	Community Engagement Programme

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
Major Paper-V
Micro-propagation and Genetically Modified Crops
Theory: 30 Hours
(Credits: 02)

Unit I: Introduction Micro-propagation (8 hours)

Definition and Concept of Micro-propagation, importance and applications, advances over Conventional methods, requirements for Micro-propagation, laboratory Setup.

Unit II: Types of culture media and Tissue Culture Techniques (7 hours)

Different types of plant growth media , different types of plant growth regulators Various steps involved in micro-propagation Meristem culture, Callus culture, Organ culture, Somatic embryogenesis, Synthetic seeds.

Unit III: Industrial Application in Tissue Culture (8 hours)

Application of tissue culture techniques in horticulture, Agriculture, Forestry, Germplasm conservation

Unit IV: Genetically Modified Crops (GM) (7 hours)

Introduction definition of GM crops, Need for genetic modification, Methods of gene transfer, steps in development of GM crops, Example and advantages of GM crops

Suggested readings:

1. Balasubramanian, Pand Palaniappan, S.P.2001. Principles and Practices of Agronomy Agro Bios (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 Agroy & Crop Science Society of America, Madison, WI.
6. Reddy.T.Y and Reddy, G.H.S.1995.Principles of Agronomy, Kalyani Publishers, Ludhiana.
7. Chatterjee, B. N. and Maiti, S.1985.Principles and Practices of Rice Growing. Oxford & IBH Publishing Co., New Delhi

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
Major Paper-VI
Nursery Management in Commercial Crops
Theory: 30 Hours
(Credits: 02)

Unit I: Introduction to Nursery Management

(8 hours)

Overview of nursery industry and plant propagation, Importance, scope, and career opportunities in Commercial nursery management, Types of nurseries (open field, shade/net house, polyhouse), Hitech Nursery trade and market trends in India

Unit II: Planning and Layout of Commercial Nursery

(7 hours)

Site selection criteria (soil, water, accessibility, sunlight), Design and layout of nursery beds/blocks, Structures and facilities (benches, mist chambers, cold frames, shade nets), Sanitation and layout for Operational efficiency, Tools, Implements & Growing Media, Basic nursery tools and their uses

Unit III: Plant Propagation Techniques

(8 hours)

Seed selection, treatment, sowing, and germination Vegetative propagation methods: Cuttings, Layering, Grafting and budding, Special propagation structures (rhizomes, tubers, suckers), Hardening and acclimatization.

Unit IV: Nursery Management in Crops

(7 hours)

Nursery management practices in Commercial crops like Chrysanthemum, Banana, Chilli, Sugarcane, and Dragon fruit.

Suggested readings:

1. Foja Singh., 1997. Advances in Floriculture. Media Today Pvt. Ltd., New Delhi-17.
2. Prasad, S. and U. Kumar. 1998. Commercial floriculture. Agro Botanica. Bikaner - 334 004.
3. Roy. A. Larson., 1992. Introduction of Floriculture. International Book DistributingCo, Lucknow.
4. Vishnu Swarup., 1997. Ornamental Horticulture. Macmillan India Ltd., New Delhi-2. Wltez, S., 1972. The world gladiolus, NAGG, USA.
5. Yadav, L.P. and Bose, T.K., 1986. Biology, conservation and culture of orchids. East-West Press Private Limited, New Delhi.E.
6. Yadav.I.S. and M.L. Choudhary., 1997. Progressive floriculture. The House of Sarpan, (Media), Bangalore.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
B.Voc. Paper I (Major- IV)
Micro-propagation and Genetically Modified Crops
And Nursery Management in Commercial Crops
Theory: 30 Hours
(Credits: 02)

Practical:

Group: I

1. To study Preparation of Culture media (MS Media)
2. To study different Sterilization Techniques
3. To study different Micro propagation techniques.
4. To study Golden Rice
5. To study Bt Cotton and Bt Brinjal crop.
6. Visit to Tissue culture lab.

Group: II

7. To Study Design and orientation of poly/green houses.
8. To Study Type of containers used in protected culture.
9. To Study Use of substrate and preparation of substrate for protected cultivation
1. To Study Training and Pruning horticulture practices.
11. To Study Maintenance of cooling and heating system in green houses.
12. To Study Budding and Grafting horticulture practices.
13. To Visit Protected cultivation of Tomato, Capsicum and Cucumber.
14. Visit to Nursery/Research station

Suggested readings:

1. Foja Singh., 1997. Advances in Floriculture. Media Today Pvt. Ltd., New Delhi-17.
2. Prasad, S. and U. Kumar. 1998. Commercial floriculture. Agro Botanica. Bikaner - 334 004.
3. Roy. A. Larson., 1992. Introduction of Floriculture. International Book DistributingCo., Lucknow.
4. Vishnu Swarup., 1997. Ornamental Horticulture. Macmillan India Ltd., New Delhi-2. Wltez, S., 1972. The world gladiolus, NAGG, USA.
5. Yadav, L.P. and Bose, T.K., 1986. Biology, conservation and culture of orchids. East-West Press Private Limited, New Delhi. E.
6. Yadav.I.S. and M.L. Choudhary., 1997. Progressive floriculture. The House of Sarpan,(Media), Bangalore.

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B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
Minor Paper- V
Livestock Farming
Theory: 30 Hours
(Credits: 02)

Unit I: Economic importance of Livestock (8 hours)

Role of Livestock in National economy: Management- Principles of management, General Management Practices in Dairy farming-Grooming, Drying off, Control of bad habits, Castration, Dehorning, Trimming, Shoeing, Identification marks, removing extra teats.

Unit II: Aquaculture (7 hours)

Importance, species of aquarium, types of habitat, water bodies, products-by products of fisheries, aquatic ecology and limnology, Breeding and hatchery management etc.

Unit III: Pearl Farming (7 hours)

Importance of pearl farming, species for Pearl production, water quality management, Implantation techniques, post-harvest management

Unit IV: Animal Disease and Parasitic Diseases (8 hours)

Classification of Animal Diseases: Study of major Diseases- Foot and mouth disease (FMD) Brucellosis, Babesiasis, Theileriosis. Diseases of lactating cow: Mastitis, Dystokia Milk fever, Prolaps, Ketosis. Diseases of Calves: Pneumonia, Calf score, Diarrhea.

Suggested readings:

1. A Text Book of Animal Husbandry by G. C. Banarjee
2. A Text Book of Animal Science by Dr. A. U. Bhikane and Dr. S. B. Kawitkar
3. Advances in Dairy Animal Production by V. D. Mudgal, K. K. Singhal and D. D. Sharma
4. Hand book of animal Husbandry, The I. C. A. R. publication
5. Animal Husbandry & Dairy Science by Jagdish Prasad.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
Minor Paper- VI
Animal Husbandry and Dairy Sciences
Theory: 30 Hours
(Credits: 02)

Unit I: Animal husbandry **(8 hours)**

Cattle and Buffalo management- Housing of Cattle, Calf rising, Heifer management, Management of pregnant and lactating cow and Buffaloes

Unit II: Care and management **(7 hours)**

Care and management of cross breed cow, Care and management of breeding bull, Sheep and Goat management- Housing of sheep and goat, General management practices.

Unit III: Dairy Management **(8 hours)**

Dairy Development in India- Operation Flood Programme, Contribution of Military Dairy Farm, NDDB, NDRI, Milk grid to dairy development. Dairy Co-operatives structure and functions

Unit IV: Composition of Milk **(7hours)**

Definition of Milk, Composition of Milk, Constituent of Milk, Factors affecting Quality and Quantity of milk, Nutritive value of milk, Physico-chemical properties of milk. Clean milk production: Source of contamination, milk adulteration etc.

Suggested readings:

1. A Text Book of Animal Husbandry by G. C. Banarjee
2. A Text Book of Animal Science by. Dr. A. U. Bhikane and Dr. S. B. Kawitkar
3. Advances in Dairy Animal Production by V. D. Mudgal, K. K. Singhal and D. D. Sharma
4. Hand book of animal Husbandry, The I. C. A. R. publication
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B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
Minor Paper- V and VI
Livestock Farming and Animal Husbandry and Dairy Sciences
Theory: 30 Hours
(Credits: 02)

Practical:

Group I

1. To study Morphology of cattle, and buffalo
2. To study Aquaculture.
3. To study Specific purposes of Cattle Breeds
 - a. Milch: Gir, Sahiwal, Red Sindhi,
 - b. Draught: Khillar, Dangi, Redkandhari.
 - c. Dual: Deoni, Hariyana
 - d. Exotic: Jearsy, H.F.
 - e. Cross breed: Holdeo, Jerdeo.
4. Study of Buffalo Breeds: Murrah, Jaffrabadi, Nagpuri and Surti
5. Study of management practices in Pearl farming.
6. To study different Identification marks of farm animals
7. To study of Handling and casting of farm animals

Group II

8. To study of milking dairy animals
9. To study Determination of age of animal
10. To study Determination of body weight of animal
11. To study Recording temperature, pulse and respiration rate of farm animals
12. To study Preparation of antiseptic ointment
13. To study Preparation of vaccination schedule for Milch Animal
14. To Study of dairy farm records
15. Visit to veterinary hospital
16. Visit to Dairy farm/ Aqua farm/ Goat farm/ Pearl Farm

Suggested readings:

1. A Text Book of Animal Husbandry by G. C. Banarjee.
2. A Text Book of Animal Science by Dr. A. U. Bhikane and Dr. S. B. Kawitkar.
3. Advances in Dairy Animal Production by V. D. Mudgal, K. K. Singhal and D. D. Sharma.
4. Hand book of animal Husbandry, The I. C. A. R. publication.
5. Animal Husbandry & Dairy Science by Jagdish Pras.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
B.Voc. Open Elective: IV
Precision Farming
(Credits: 02)

List of Practical:

Group: I

1. Study of Concepts and Components of Precision Farming
2. Study and Use of Global Positioning System (GPS) in Agriculture
3. Introduction to Geographic Information System (GIS) for Farm Mapping
4. Interpretation of Remote Sensing Data in Crop Monitoring
5. Preparation of Soil Fertility Maps using Grid Sampling
6. Delineation of Management Zones in Precision Farming
7. Yield Monitoring and Yield Mapping Techniques
8. Calibration of Variable Rate Fertilizer Applicator

Group: II

9. Sensor-Based Nitrogen Management using SPAD/Green Seeker
10. Use of Leaf Color Chart (LCC) in Nutrient Management
11. Design and Layout of Precision Drip Irrigation System
12. Automation of Irrigation using Soil Moisture Sensors
13. Application of Drones in Crop Monitoring and Spraying
14. Site-Specific Weed Management Techniques
15. Use of Decision Support Systems (DSS) in Crop Management
16. Field visit to Precision Agriculture farm

Suggested readings:

1. A Handbook of Precision Agriculture: Principles and Applications edited by Ancha Srinivasan.
2. Precision Farming: A New Approach by Tulasa Ram, Shiv Kumar Lohan, Ranveer Singh & Purshotam Singh.
3. Precision Farming & Protected Cultivation: Concepts and Applications by Sanjeev Kumar, S. N. Saravaiya, A. K. Pandey.
4. Artificial Intelligence for Precision Agriculture edited by Pethuru Raj, N. Gayathri & Kathrine.
5. Remote Sensing in Precision Agriculture edited by Salim Lamine et al.

शिवाजी विद्यापीठ, कोल्हापूर
बी.व्होक.भाग II (शाश्वत शेती – NEP 2020 (2.0))
सेमिस्टर IV – मुक्त निवड विषय IV
विषय :अचूक शेती (Precision Farming)
सिद्धांत :30 तास) श्रेयांक 2

प्रात्यक्षिकांची यादी :

गट :I

1. अचूक शेतीची संकल्पना व घटकांचा अभ्यास
2. शेतीमध्ये ग्लोबल पोजिशनिंग सिस्टम (GPS) चा अभ्यास व वापर
3. शेत नकाशा तयार करण्यासाठी भौगोलिक माहिती प्रणाली (GIS) ची ओळख
4. पीक निरीक्षणासाठी रिमोट सेन्सिंग डेटाचे विश्लेषण
5. ग्रीड नमुना पद्धतीने मृदा सुपीकता नकाशा तयार करणे
6. अचूक शेतीमध्ये व्यवस्थापन क्षेत्रांचे (Management Zones) विभाजन
7. उत्पादन निरीक्षण (Yield Monitoring) व उत्पादन नकाशांकन तंत्र
8. चल दर खत यंत्राचे (Variable Rate Fertilizer Applicator) कॅलिब्रेशन

गट :II

9. SPAD / ग्रीन सीकर वापरून सेन्सर आधारित नत्र व्यवस्थापन
10. पोषक व्यवस्थापनासाठी पानांचा रंग तक्ता (Leaf Color Chart - LCC) वापरणे
11. अचूक ठिबक सिंचन प्रणालीची रचना व आराखडा तयार करणे
12. मृदा आर्द्रता सेन्सर वापरून सिंचनाचे स्वयंचलन
13. पीक निरीक्षण व फवारणीमध्ये ड्रोनचा वापर
14. स्थानविशिष्ट तण व्यवस्थापन तंत्र
15. पीक व्यवस्थापनासाठी निर्णय सहाय्य प्रणाली (DSS) चा वापर
16. अचूक शेती करणाऱ्या शेताला शैक्षणिक भेट

संदर्भ :

1. **Ancha Srinivasan (संपादक).** अचूक शेतीचे मार्गदर्शन: तत्वे आणि अनुप्रयोग (A Handbook of Precision Agriculture: Principles and Applications)
2. **Tulasa Ram, Shiv Kumar Lohan, Ranveer Singh & Purshotam Singh.** अचूक शेती: एक नवीन दृष्टिकोन (Precision Farming: A New Approach)
3. **Sanjeev Kumar, S. N. Saravaiya, A. K. Pandey.** अचूक शेती आणि संरक्षित शेती: संकल्पना व अनुप्रयोग (Precision Farming & Protected Cultivation: Concepts and Applications)
4. **Pethuru Raj, N. Gayathri & Kathrine (संपादक).** अचूक शेतीसाठी कृत्रिम बुद्धिमत्ता (Artificial Intelligence for Precision Agriculture)
5. **Salim Lamine et al. (संपादक).** अचूक शेतीमध्ये दूरसंवेदी तंत्रज्ञान (Remote Sensing in Precision Agriculture)

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
B.Voc. SEC- II
Apiculture
(Credits: 02)

Practical:

- 1.3. Morphology and Identification of bee species (3 examples)
- 4-5. Plant species in Apiculture
6. Identification of Casts (Queen, Drone, and worker)
7. Equipment's in beekeeping (Bee Boxes)
8. Disease and Pests in beekeeping
9. Study of Structure of Honey comb
10. Extraction of Honey and wax
11. Reduction of adulteration in honey
12. Visit to Apiary.

Reference Books:

1. Principles and Practices of Apiculture by D. Elumalai et al. covers biology, colony management, honey & products, diseases, pollination, marketing, etc.
2. Textbook of Apiculture (Beekeeping) by D.K. Belsare, R.K. Singh, S.D. Belsare & R.H. Deshmukh broad coverage including modern tech, bee products & livelihood.
3. Beekeeping: A Concise Guide by Dharam P. Abrol good comprehensive reference covering colony management, products, diseases & marketin.)
4. Beekeeping: A Comprehensive Guide to Bees and Beekeeping by Dharam P. Abrol big reference work with detailed practical and scientific inf.
5. Understanding Apiculture by Ashok Kumar introductory to intermediate student book.
6. Perspectives in Indian Apiculture by R.C. Mishra focus on Indian apiculture, management & agro-ecology.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part II (Sustainable Agriculture) NEP 2020 (2.0) Syllabus with effect from June 2026
B. Voc. II (Sustainable Agriculture) Sem. IV
B.Voc. CEP- I
Community Engagement Programme
Practical
(Credits: 02)

1. Introduction to community Engagement
2. Field ethics and safety
3. Development of Communication skill for community engagement
4. Community Based Activities (Any 2 activities to be selected)

Module 1 Survey and data analysis

1. Survey and documentation of major crops in surrounding region
2. Preparation of Checklist
3. Survey of weeds and Pests.

Module 2 Orientation and training

1. Orientation of farmers regarding organic farming
2. Awareness of farmers about hazardous effects of chemical uses in Agri. Production

Module 3 Knowledge sharing and cultural preservation

1. Orientation on preservation of traditional knowledge of agricultural, seed varieties and farming rituals.
2. Awareness of farmers on Soil health improvement water conservation, pollution in sustainable manner.

Module 4 Farmer Empowerment

1. Farmers meet organization at village/local level for providing information on skills and resources in sustainable agriculture like preparation of bio-fertilizers, biopesticide, petrocrop farming etc.
 2. Attending farmer meet/Gramsabha at local level and sharing benefits of agro-processing units, agro-tourism, smart and precision farming, value added business etc.
- Submission of report on activities conducted

Course Outcomes:

- Students will be able to explain the scientific principles of organic waste decomposition and Nutrient recycling.
- Students are able to various composting techniques such as aerobic, anaerobic,
- Vermin-composting, and pit/heap methods.
- Students understand the role of organic compost in enhancing soil fertility, structure,
- Students acquire hands-on experience in preparing, maintaining, and monitoring compost Pits/units.
- Students are able to understand different Insects their classifications.
- Students are able to understand control measures for insects
- Students are able to understand increasing shelf life of processed products.
- Students are practically experiential learning of different insects attack on horticultural and
- Agricultural crop.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Voc. Part I (Sustainable Agriculture) NEP 2020 (2.0)
Semester – III & IV
Nature of a Question Paper
Time: 1:00 Hr
Total Marks: 30

Solve questions from the following.

Q. 1 Multiple choice Question

06 Marks

- i.
- ii.
- iii.
- iv.
- v.
- vi.

Q. 2 Long answer Question (Any Two out of three)

12 Marks

- i.
- ii.
- iii.

Q. 3 Short Answer Questions (Any Four out of six)

12 Marks

- i.
- ii.
- iii.
- iv.
- v.
- vi.

Internal Assessment 20 Marks

- Home Assignment
- Class Assignment (Tutorial Type)
- Quiz
- Mid-Term Test

Nature of Practical Question Paper

Internal practical examination

50 marks

- 1. Group I
- 2. Group II
- 3. Submission of Certified Journal

20 Marks
20 Marks
10 Marks

Assessment:

The NEP 2020 emphasizes upon formative and continuous assessment rather than summative assessment. Therefore, the scheme of assessment should have components of these two types of assessments. Assessment has to have correlations with the learning outcomes that are to be achieved by a student after completion of the course.

a) Continuous Assessment: Assignments, projects, presentations, seminars and quizzes

b) Examinations: Midterm, finals, or comprehensive exams.

c) Research Projects/Dissertation/Thesis: Evaluated through submission and viva-voce

d) Grading System: Standardized letter grades, percentages, or CGPA

Letter Grades and Grade Points:

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the programme of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Computation of SGPA and CGPA: UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

1. The SGPA is the ratio of the sum of the product of the number of credits with the grade Points scored by a student in all the courses taken by a student and the sum of the number of Credits of all the courses undergone by a student, i.e.

$$\text{SGPA (S}_i\text{)} = \frac{\sum (C_{ix}G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i th course and G_i is the grade point scored by the Student in the i th course.