

Rayat Shikshan Sanstha's
SADGURU GADGE MAHARAJ COLLEGE, KARAD
(An Autonomous College - Affiliated to Shivaji University, Kolhapur)
Accredited By NAAC with A⁺ Grade (CGPA 3.63)

National Education Policy (NEP-2.0)

Syllabus for

B.Sc. Part -II

Skill Enhancement Course

Syllabus to be implemented from June 2024 onwards of

Academic Year 2024-25

Rayat Shikshan Sanstha's
Sadguru Gadge Maharaj College, Karad (Autonomous)
Syllabus for Bachelor of Science (B. Sc.) Part – II

1. TITLE: **Skill Enhancement Course**
2. YEAR OF IMPLEMENTATION: **2024 – 2025**
3. PREAMBLE:

The B. Sc. Skill Enhancement Course under autonomy has been prepared keeping in view the unique requirements of B. Sc. SEC students. The contents have been drawn up to accommodate the widening horizons of the discipline of techniques of Skill enhancement. The emphasis is to provide students the latest information along with due weightage to the concepts of Organic farming, Bonsai technique and Terrarium; so that they are able to understand and appreciate the current interdisciplinary approaches in the study of same. The course content also lists new practical exercises so the students gets a hands on experience of the latest techniques that are currently in use. The course will also inspire students to pursue higher studies in organic farming and bonsai techniques, for becoming an entrepreneur and enable students to get employed in plant based industries.

4. GENERAL OBJECTIVES OF THE COURSE:
 - To impart the knowledge of various skills is the basic objective of education.
 - To develop scientific attitude among the students and to make the students open minded, critical and curious.
 - To develop skill in practical work, experiments and natural resource management.
 - To make the students aware of natural resources and its utilization.

- To enable the students to acquire knowledge of plants, natural resources and related subjects so as to understand nature and environment in the benefit of human beings.
- To develop ability for the application of acquired knowledge to improve agriculture and related fields to make the country self-reliant.

5. DURATION: **01 year**

6. PATTERN: **NEP 2.0**

7. MEDIUM OF INSTRUCTION: **English**

8. STRUCTURE OF COURSE:

1) THIRD SEMESTER (NO. OF PAPERS – 02)

Sr. No.	Subject Title	Paper No. & Paper Code	Title of Paper	No. of lectures per week	Credits
1	SEC	SEC-II SECB23-301	Organic Farming- I	02 (T)	02
2		SEC-III SECB23-302	Organic Farming- II	04 (P)	02

2) FOURTH SEMESTER (NO. OF PAPERS – 02)

Sr. No.	Subject Title	Paper No. & Paper Code	Title of Paper	No. of lectures per week	Credits
1	SEC	SEC-IV SECB23-401	Bonsai and Terrarium- I	02(T)	02
2		SEC-V SECB23-402	Bonsai and Terrarium- II	04(P)	02

3) Structure and titles of papers of B. Sc. Course

B. Sc. II Semester III

SEC- II: Organic Farming- I

SEC- III: Organic Farming- II

B. Sc. II Semester IV

SEC -IV: Bonsai and Terrarium- I

SEC- V: Bonsai and Terrarium- II

4) Other Features:

A) LIBRARY:

Reference books, Text books, Journals, Periodicals available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) SPECIFIC EQUIPMENTS:

a) Computer, LCD projector, Visualizer, Smart Board

b) Laboratory Equipment's:

1. Microscope with digital camera
2. Digital weighing balance
3. pH meter
4. Spectrophotometer
5. Cooling centrifuge
6. Laminar air flow
7. Microtome
8. Autoclave
9. Hot Air Oven
10. Incubator
11. Refrigerator
12. Stereo zoom microscope
13. Dissecting microscope

5) Evaluation Structure for B. Sc. II SEC

Sem.	Paper Code	Credits	Title of Paper	Evaluation Scheme (Marks)			Grand Total
				CCE	SEE	Total	
III	SECB23-301	02	SEC-II Organic Farming- I	-	50	50	100
	SECB23-302	02	SEC- III Organic Farming- II	-	-	50	
						100	
IV	SECB23-401	02	SEC- IV Bonsai and Terrarium- I	-	50	50	100
	SECB23-402	02	SEC- V Bonsai and Terrarium- II	-	-	50	
						100	
Total		08					200

Evaluation Pattern of Practical (Semester wise)

Sem.	Practical Code	Credits	Title of Practical	Evaluation Scheme (Marks)			Total
				Practical Exam	Journal	Student performance /Project/Tour Report	
III	SECB23-302	02	SEC- III Practical (Organic Farming- II)	40	05	05	50
IV	SECB23-402	02	SEC- V Practical (Bonsai and Terrarium- II)	40	05	05	50
Total		04					100

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Bachelor of Science (B. Sc.) Part - II

Semester III

SEC-II (Theory)

SECB23-302: Organic Farming- I (Credits- 02)

Learning Objectives:

The Students should be able ...

- i. To understand the basic knowledge about Organic fertilizer production.
- ii. To imbibe the knowledge of effect of Organic farming.
- iii. To gain the knowledge about different techniques of Vermicomposting and *Azolla* cultivation.
- iv. To impart the knowledge about use of other organic fertilizers.

Total Lectures: - (30)

UNIT I: Vermicompost

(15)

Introduction, material used for vermicomposting and its classification. Methods of vermicomposting (Heap method, Window method, Pit method). Maintenance of vermicomposting beds: factors affecting vermicomposting viz- pH, moisture, temperature etc. Selection of useful species of worms, their maintenance, earthworm predators, parasites, pathogens. Process of vermiwash, its collection, nutritional composition of vermiwash and vermicompost. Application of vermicompost and vermiwash.

UNIT II: *Azolla* cultivation and Organic fertilizers production

(15)

Historical development of *Azolla* production. Methods of production of *Azolla* in small scale and large scale. Harvesting, marketing and economic importance of *Azolla* (food, fodder, feed, fertilizer etc). Nutritional values and composition of *Azolla* sps. Biofertilizers- Definition, different types of biofertilizers. Mass production of biofertilizers, application of biofertilizers. Method of organic fertilizer production (FYM, Green manure).

Course Outcomes:

The student's will be able ...

- i. To explain useful species of worms, their maintenance, predators, parasites, pathogens of earthworms.
- ii. To get the knowledge about different methods of Organic farming.
- iii. To apply the methods used in Vermicomposting and *Azolla* cultivation.
- iv. To gain the knowledge about different organic fertilizers .

Reference Books:

1. Kale,R.D.(1998): Earthworm Cinderella of Organic Farming. Prism Book Pvt Ltd, Bangalore, India.pp.88.
2. Darwin,C. (1881): The formation of vegetable mould through the action of worms, with observations on their habitats. Murray, London. pp.326.
3. Ansari,A.A. and Ismail,S.A.(2012): Earthworms and Vermiculture Biotechnology, Management of Organic Waste, Dr. Sunil Kumar (Ed.), InTech,Available from: <http://www.intechopen.com/books/management-of-organic-waste/earthworms-and-vermiculture-biotechnology>.
4. Bhawalkar, U.S. (1995): 'Vermiculture Ecotechnology', Bhawalkar Earthworm Research Institute, Pune, India.pp.332.
5. Suhane,R.K.(2007):Vermicompost.Publication of Rajendra Agriculture University, Pusa, Bihar, India, pp.88.
6. Edwards CA, Arancon NQ, Sherman RL (2010) Vermiculture Technology: Earthworms, Organic Wastes and Environmental Management, CRC Press.
7. Holcombe, D., and J.J. Longfellow. 2003. **OSCR: blueprint for a successful vermicomposting system**. Technical document. pp. 57
8. Maliwal P L 2020 *Principles of Organic Farming: Textbook* (Jodhpur: Scientific Publishers).
9. Ansari,A.A. and Ismail,S.A.(2012): Earthworms and Vermiculture Biotechnology, Management of Organic Waste, Dr. Sunil Kumar (Ed.), InTech,Available from: <http://www.intechopen.com/books/management-of-organic-waste/earthworms-and-vermiculture-biotechnology>.
10. Sahrawat,K.L.(2004):Vermicomposting: Recycling wastes into valuable organic fertilizer. Global Theme on Agrecosystems Report no.8.Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics.pp.20.

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Sadguru Gadge Maharaj College, Karad (Autonomous)
Syllabus to be introduced from June 2024
B.Sc. Part II Semester- III**

SEC-III (Practical)

SECB23-302: Organic Farming-II (Credits 02)

Learning Objectives:

- i. To familiarize the students with general procedures of Organic farming.
- ii. To learn various techniques of vermicomposting, vermiwash and *Azolla* cultivation.
- iii. To learn the practical application of *Azolla* biofertilizer.
- iv. To impart the knowledge about vermiwash, vermicompost and other organic fertilizers.

1. Preparation of Bed method of Vermicompost
2. Preparation of Pit method of Vermicompost.
3. Preparation of Vermiwash.
4. Cultivation of *Azolla* – small scale method.
5. Cultivation of *Azolla* – large scale method.
6. Practical application of *Azolla* on seed germination.
7. Practical application of *Azolla* on seedling growth.
8. Study of uses of *Azolla* (Biofertilizer, food, fodder, feed etc).
9. Preparation of FYM/Green manure.

Course Outcomes:

- i. Student's learn and use all organic farming procedures.
- ii. Student's demonstrate the methods used for Vermicompost and Vermiwash.
- iii. Student's demonstrate the methods used for *Azolla* cultivation
- iv. Student's practically apply *Azolla* biofertilizer on some field crops.

Nature of Theory Question Paper
B. Sc. Part II Organic farming- I (SEC-II)

Total Marks – 50 Marks

Q.1 Choose the correct alternative from the following.

10 marks

1) to 8)

Q.2 Attempt any TWO of the following.

20 marks

a)

b)

c)

Q.3 Write short notes on any FOUR of the following.

20 marks

a)

b)

c)

d)

e)

f)

Nature of Practical Question Paper
B. Sc. Part II Organic farming- II (SEC-III)

Total Marks – 50 Marks

Q.1 Demonstrate the specimens 'A' and 'B'	16 marks
Q.2 Comment on the specimens 'C'	08 marks
Q.3 Identify and Describe	16 marks
D)	
E)	
F)	
G)	
Q. 4 Journal	05 marks
Q. 5 Viva-voce	05 marks

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Bachelor of Science (B. Sc.) Part - II: Bonsai and Terrarium- I

Semester IV

(SEC-IV) (Credit- 02)

Learning Objectives:

The Students should be able ...

- i. To know the latest development in the field of Bonsai and Terrarium.
- ii. To develop skills in the area of designing, styles and making of Bonsai and Terrarium.
- iii. To create knowledge on self-employment through and entrepreneur skills.
- iv. To develop skills in the area of designing and making of kitchen gardening.

Total Lectures: - (30)

UNIT I: Introduction and scope of Bonsai (15)

Introduction - History, aim, scope and importance of Bonsai - Identification and collection of suitable plants for bonsai making. Tools, containers, wiring and preparation of media. Designing, styles and making of bonsai. Training and pruning techniques in bonsai. Irrigation facilities, pest and disease management. Scope and economic importance of bonsai.

UNIT-II: Terrarium and Kitchen Gardening (15)

Terrarium: History, definition, Types – Based on types of container (Open and Closed system terrarium), based on plant type (Desert and Rainforest terrarium). Preparation of a Terrarium and its steps, Plants suitable for terrarium. Maintenance of the terrarium. Economic importance and Terrarium Marketing.

Kitchen gardening: Introduction, layout and establishment of Kitchen garden.

Learning Outcomes:

The students will be able to...

- i. Recognize about preliminary techniques about Bonsai and Terrarium.
- ii. Understand the necessary skills to take care and maintain a Bonsai and Terrarium plant.
- iii. Apply knowledge on Bonsai and Terrarium cultivation and marketing.

iv. Implement the acquired knowledge on commercial applications Bonsai and Terrarium

Reference Books:

1. Paul Lesniewicz., 1994. Bonsai in your home. Sterling publishing Co, New York.
2. Randhawa, G.S., and Amitabha Mukhopadhyay, 2000. Floriculture in India, Allied publishers, India.
3. Roy Edwin Biles, (2003). The complete Book of Gardening. Biotech Books, Delhi - 35.
4. Bhattacharjee, S.K. (2006). Advances in Ornamental Horticulture. Pointer Publication, Jaipur.
5. Doesh Beer Singh and Poonam Wazir, (2002). Bonsai - An art. Scientific Publishers, Jodhpur.
6. Chadha, K.L., 2001. Handbook of horticulture. ICAR, New Delhi.
7. Bhattacharjee, S.K., 2004. Landscape gardening and design with plants. Aavishkar Publishers and Distributors, Jaipur, India.

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Bonsai and Terrarium- II

Semester-IV

Practicals (SEC-V) (Credits 02)

Learning Objectives:

- i. To identify the wild plants species for bonsai and terrarium making.
 - ii. To select the suitable tools for bonsai and terrarium making.
 - iii. To prepare the bonsai and terrarium of market value.
 - iv. To impart the knowledge about kitchen gardening.
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1. Identification and selection of suitable plants to make different styles of bonsai.
 2. Tools used for bonsai making.
 3. Study of role of fertilizer and its importance for bonsai making.
 4. Study of special styles of bonsai. (Bonsai on Rock and Root over bonsai).
 5. Basic requirement of preparation of Bottle Garden /Terrarium.
 6. Method of Preparation of Bottle Garden / Terrarium.
 7. Basic requirement for Kitchen gardening.
 8. Methods of Kitchen gardening.

Learning Outcomes:

- i. Student's understand the programmes being carried out to conserve species through bonsai and terrarium techniques.
- ii. Students investigate the current status of bonsai and terrarium.
- iii. Student's implement the acquired knowledge on commercial applications of Bonsai and Terrarium.
- iv. Student's demonstrate the methods used for kitchen gardening.

Nature of Theory Question Paper

B. Sc. Part II Bonsai and Terrarium- I (SEC-IV)

Total Marks – 50 Marks

Q.1. Choose the correct alternative from the following. 10 marks

1) to 10)

Q.2. Attempt any TWO of the following. 20 marks

A)

B)

C)

Q.3. Write short notes on any FOUR of the following. 20 marks

a)

b)

c)

d)

e)

f)

Nature of Practical Question Paper

B. Sc. Part II Bonsai and Terrarium- II (SEC-V)

Total Marks – 50 Marks

Q.1. Demonstrate the specimens 'A' and 'B'	16 marks
Q.2. Comment on the specimens 'C'	08 marks
Q.3. Identify and Describe	16 marks
D)	
E)	
F)	
G)	
Q. 4. Journal	05 marks
Q. 5. Viva-voce	05 marks