SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

SEMESTER PATTERN CURRICULUM UNDER CHOICE BASED CREDIT SYSTEM (CBCS) FOR

Faculty of Science

Under Graduate (UG) Programmes

SUBJECT: HORTICULTURE

CLASS: B.Sc. SECOND YEAR

CLASS: B.Sc. SECOND YEAR

HORTICULTURE

(With effect from Academic Year 2017-2018)

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CURRICULUM DESIGNING COMMITTEE

1. **Dr.Bodke S.S.** — Chairman
   Yeshwant Mahavidyalaya, Nanded
2. **Mr. Patil S.A.** — Member
   Yeshwant Mahavidyalaya, Nanded

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INTRODUCTION

The SRTMUN is gearing up for several initiatives towards academic excellence, quality improvement and administrative reforms. In view of this priority and in-keeping with Vision and Mission; process was already initiated towards introduction of semester system, grading system and credit system. In the recent past, University had already implemented Credit based grading system to campus schools and Choice Based Credit System (**CBCS**) pattern for PG in all the affiliated colleges from the academic year **2014-2015**. These regulations shall be called as Choice Based Course Credit System & Grading, 2014. In short it will be referred as **SRTMUN CBCS REGULATION**.

Now University is going one step ahead to implement Choice Based Credit System (**CBCS**) pattern at UG level from the academic year **2016-2017** progressively for B.Sc. first year, second year and third year respectively. Revision and updating of the curriculum is the continuous process to provide an updated education to the students at large. Presently there is wide diversity in the curriculum of different Indian Universities which inhibited mobility of students in other universities or states. To ensure and have uniform curriculum at UG and PG levels as per the **SRTMUN CBCS REGULATION**, curriculum of different Indian Universities, syllabus of NET, SET, MPSC, UPSC, Forest Services and the UGC model curriculum are referred to serve as a base in updating the same.

The B.Sc. Horticulture (General) semester pattern course is running in different affiliated colleges of the SRTMUN. The course content has been designed under CBCS pattern. The course content of each theory paper is divided into units by giving appropriate titles and subtitles. For each unit, total number of periods required, weight age of maximum marks and credits are mentioned. A list of practical exercises and skills for laboratory work to be completed in the academic year is also given. A list of selected reading material and a common skeleton question paper for all courses are also provided at the end of the syllabus.

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OBJECTIVES

1. To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.

2. To update curriculum by introducing recent advances in the subject and enable the students to face NET, SET, UPSC and other competitive examinations successfully.

3. To impart knowledge of horticultural science as the basic objective of Education

4. To develop a scientific attitude to make students open minded, critical and curious

5. To develop an ability to work on their own and to make them fit for the society

6. To expose themselves to the diversity amongst life forms

7. To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of horticultural plant materials and data

8. To make aware of natural resources and environment and the importance of conserving the same

9. To develop ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient

10. To appreciate and apply ethical principles to horticultural science research and studies

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An Outline:

Semester/ Annual	Course No.	Course Name	Instruction Hrs/week	Total Periods	Marks for		Credits (Marks)
					Internal (CA)	External (ESE)	
Semester-III	CCH-III (Section-A)	Production Technology of Vegetable Crops-I **(P-VI)**	03	45	10	40	Credits: 02 (Marks:50)
	CCH-III (Section-B)	Ornamental and Landscape Gardening **(P-VII)**	03	45	10	40	Credits: 02 (Marks:50)
Semester-IV	CCH-IV(Section-A)	Production Technology of Vegetable Crops-II **(P-VIII)**	03	45	10	40	Credits: 02 (Marks:50)
	CCH-IV(Section-B)	Commercial Floriculture **(P-IX)**	03	45	10	40	Credits: 02 (Marks:50)
Annual Pattern	CCHP-II	Practicals based on CCH-III (Section-A) **(P-X)**	03	08 Practicals	05	20	Credits: 02 (Marks:50)
		Practicals based on CCH-IV (Section-A) **(P-X)**	03	08 Practicals	05	20	
	SECH-I	Any one skill from optional **(SECH-I)**	03	45	25	25	Credits: 02 (Marks:50)
Annual Pattern	CCHP-III	Practicals based on CCH-III (Section-B) **(P-XI)**	03	08 Practicals	05	20	Credits: 02 (Marks:50)
		Practicals based on CCH-IV (Section-B) **(P-XI)**	03	08 Practicals	05	20	
	SECH-II	Any one skill from optional **(SECH-II)**	03	45	25	25	Credits: 02 (Marks:50)
Total Credits Semester-III and IV					Marks: 60+50= 110	Marks: 240+50= 290	Credits: 12+04=16 (Marks: 300+100 =400)

CCH: Core Course Horticulture, **CCHP:** Core Course Horticulture Practical, **ESE:** End of semester examination, **CA:** Continuous Assessment, **SECH:** Skill Enhancement Course Horticulture

Distribution of credits: 80% of the total credits for ESE and 20% for CA

- **CA of Marks-10:** 10 marks for Test / Record Book & Viva voce
- **CA of Marks 25:** 15 for marks Seminar & 10 marks for Test

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SEMESTER–III

CCH-III (SECTION-A): PRODUCTION TECHNOLOGY OF VEGETABLE CROPS-I **(P-VI)**

Periods: 45 **Credits: 02 (Maximum Marks: 50)**

UNIT – I: VEGETABLE CROPS (10 PERIODS)

1. Importance and scope of Olericulture
2. Nutritive value of vegetables
3. Classification of vegetables
4. Types of vegetable gardening

UNIT – II: SOLANACEOUS VEGETABLE CROPS (12 PERIODS)

Origin, history, distribution, area and production, uses and composition, varities, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of fruit vegetable crops mentioned below

1. Tomato
2. Brinjal
3. Potato

UNIT–III: CUCURBITACEOUS VEGETABLE CROPS (13 PERIODS)

Origin, history, distribution, area and production, uses and composition, varities, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of vegetable crops mentioned below

1. Bitter gourd
2. Ridge gourd
3. Cucumber

UNIT – IV: LEGUMINOUS VEGETABLE CROPS (10 PERIODS)

Origin, history, distribution, area and production, uses and composition, varities, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of vegetable crops mentioned below

1. Cluster bean
2. Garden pea
3. Methi (Fenugreek)

SEMESTER–III

CCB-III (SECTION-B): ORNAMENTAL AND LANDSCAPE GARDENING **(P-VII)**

Periods: 45 **Credits: 02 (Maximum Marks: 50)**

UNIT – I: PRINCIPLES OF LANDSCAPE GARDENING (12 PERIODS)

1. Importance and scope of landscape gardening
2. History of landscape gardening
3. Art principles
4. Some important terms of landscape gardening
5. Garden adornments

UNIT – II: GARDEN FEATURES –I (10 PERIODS)

1. Walls
2. Fencing
3. Steps
4. Garden
5. Garden drives and paths
6. Hedges
7. Edges
8. Arches
9. Pergola
10. Lawn

UNIT – III: GARDEN FEATURES -II (10 PERIODS)

1. Carpet bedding
2. Flower beds
3. Shrubbery
4. Borders
5. Rockery
6. Water gardens
7. Bonsai
8. Topiary

UNIT – IV: GARDENS TYPES AND STYLES (13 PERIODS)

- **Garden types**
  1. Indoor garden
  2. Outdoor garden
- **Garden styles**
  1. Formal gardens
  2. Informal gardens
  3. Freestyle gardens

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SEMESTER–IV

CCB-IV (SECTION-A): PRODUCTION TECHNOLOGY OF VEGETABLE CROPS-II **(P-VIII)**

Periods: 45 **Credits: 02 (Maximum Marks: 50)**

UNIT – I: CRUCIFEROUS VEGETABLE CROPS (12 PERIODS)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of vegetable crops mentioned below

1. Cabbage
2. Cauliflower
3. Radish

UNIT–II: MALVACEOUS AND CHENOPODIACEOUS VEGETABLE CROPS (10 PERIODS)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of vegetable crops mentioned below

1. Okra (Bhendi)
2. Indian spinach
3. Beet root

UNIT–III: APIACEOUS AND MORINGACEOUS VEGETABLE CROPS (13 PERIODS)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of underground vegetable crops mentioned below

1. Carrot
2. Anethum (Shepu)
3. Drumstick

UNIT – IV: AMARYLLIDACEOUS, AMERANTACEOUS AND CONVOLVULACEOUS VEGETABLE CROPS (10 PERIODS)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield disease and pests of cruciferous vegetable crops mentioned below

1. Onion
2. Tandulja
3. Sweet potato

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SEMESTER–IV

CCB-IV (SECTION-B): COMMERCIAL FLORICULTURE **(P-IX)**

Periods: 45 **Credits: 02 (Maximum Marks: 50)**

UNIT – I: CULTIVATION PRACTICES – I (10 PERIODS)

Origin, history, area, production, economic importance, soil and climate, varieties, propagation, nursery raising, transplanting, manuring, irrigation, after care, plant protection, use of growth regulators, special horticultural practices, harvesting, post harvest handling, grading, packing, storage, transportation and marketing of following flowering plants

1. Rose
2. Jasmine
3. Tuberose

UNIT – II: CULTIVATION PRACTICES – II (10 PERIODS)

Origin, history, area, production, economic importance, soil and climate, varieties, propagation, nursery raising, transplanting, manuring, irrigation, after care, plant protection, use of growth regulators, special horticultural practices, harvesting, post harvest handling, grading, packing, storage, transportation and marketing of following flowering plants

1. Gladiolus
2. Carnation
3. Orchids

UNIT – III: CULTIVATION PRACTICES – III (13 PERIODS)

Origin, history, area, production, economic importance, soil and climate, varieties, propagation, nursery raising, transplanting, manuring, irrigation, after care, plant protection, use of growth regulators, special horticultural practices, harvesting, post harvest handling, grading, packing, storage, transportation and marketing of following flowering plants

1. Chrysanthemum
2. Aster
3. Marigold

UNIT – I: CULTIVATION PRACTICES – IV (12 PERIODS)

Origin, history, area, production, economic importance, soil and climate, varieties, propagation, nursery raising, transplanting, manuring, irrigation, after care, plant protection, use of growth regulators, special horticultural practices, harvesting, post harvest handling, grading, packing, storage, transportation and marketing of following flowering plants

1. Gaillardia
2. Gerbera
3. Dahlia

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CCH-III & IV

END OF SEMESTER EXAMINATION (ESE)

Skeleton question paper for

Time: Two hours **Maximum Marks: 40**

Note: *(i) Attempt all questions*

(ii) All questions carry equal marks

(iii) Draw neat and well labelled diagrams wherever necessary

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Q1.	Ten Multiple Choice Questions (MCQ)	10 Marks
Q2.	Long Answer Type Question (LATQ)	10 Marks
	OR	
	a. Short Answer Type Question (SATQ)	05 Marks
	b. Short Answer Type Question (SATQ)	05 Marks
Q3.	Long Answer Type Question (LATQ)	10 Marks
	OR	
	a. Short Answer Type Question (SATQ)	05 Marks
	b. Short Answer Type Question (SATQ)	05 Marks
Q4.	Long Answer Type Question (LATQ)	10 Marks
	OR	
	a. Short Answer Type Question (SATQ)	05 Marks
	b. Short Answer Type Question (SATQ)	05 Marks

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ANNUAL PATTERN

CCBP-II: PRACTICALS BASED ON SECTION-A OF CCH-III&IV (P-X)

Practical: 16 **Credits: 02 (Maximum Marks: 50)**

Practical Exercises:

1. Identification description of vegetable crops (**3 practicals**)
2. Preparation of nursery beds for raising the seedlings of vegetable crops **(1 practical**)
3. Transplantation of vegetable crops **(1 practical**)
4. Pre sowing seed treatments in vegetable crops (cold water/ hot water/acid/ chilling) **(2 practicals**)
5. Intercultural operations in vegetable crops **(2 practicals**)
6. Study of manures and fertilizers application in vegetable crops **(2 practicals**)
7. Study of irrigation methods in vegetable crops (furrow/sprinkler/drip irrigation) **(2 practicals**)
8. Preparation of vegetables for marketing (cleaning, trimming, washing, sorting, grading , stocking and bundling) **(2 practicals**)
9. Preparation of seed herbaria of vegetable crops **(1 practical**)
10. Visit to commercial vegetable garden and local vegetable market is compulsory. *Students should submit visit report in detail during continuous assessment. The report shall carry marks*

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CCBP-II: PRACTICALS BASED ON SECTION-A OF CCB-III&IV (P-X)

END OF SEMESTER EXAMINATION (ESE)

Skeleton question paper

Time: Four hours **Maximum Marks: 40**

Note: *(i) Attempt all questions*
(ii) Show your preparation to the examiner
(iii) Draw neat and well labelled diagrams wherever necessary

Q1.	Identify and describe the given vegetable specimen- **A** and **B**.	**08**
Q2.	Observe and interpret the effect of pre sowing seed treatments on germination of given vegetable specimen-**C.**	**08**
Q3.	Prepare a paper sketch and describe Drip / furrow / sprinkler irrigation system in a vegetable garden	**08**
Q4.	Prepare the given vegetable specimen- **D** for marketing	**08**
Q5.	Identify and describe given spots **E, F, G** and **H** (Root/stem/leaf/flower/fruit vegetable)	**08**

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CCBP-III: PRACTICALS BASED ON SECTION-B OF CCB-III&IV (P-XI)

Practicals: 16 **Credits: 02 (Maximum Marks: 50)**

Practical Exercises:

1. Identification of ornamental plants **(2 practicals)**
2. Preparation of nursery beds for raising the seedlings of ornamental plants**(1 practical)**
3. Planting of hedges **(1 practical)**
4. Planting of edges **(1 practical)**
5. Planting and maintenance of lawn **(1 practical)**
6. Study of pruning and training of ornamental crops **(1 practical)**
7. Study of special horticultural practices (pinching/stopping, disbudding, disshooting) **(2 practicals)**
8. Landscaping for highways **(1 practical)**
9. Layout of formal gardens **(1 practical)**
10. Layout of informal gardens **(1 practical)**
11. Study of topiary in gardens **(1 practical)**
12. Study of flower arrangements **(1 practical)**
13. Preparation of media for extending vase life of flowers **(1 practical)**
14. Study of preparation of seed samples of ornamental crops **(1 practical)**
15. Visit to commercial local flower nursery and market is compulsory. *Students should submit visit report in detail during continuous assessment. The report shall carry marks*

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CCBP-III: PRACTICALS BASED ON SECTION-B OF CCB-III&IV (P-XI)

END OF SEMESTER EXAMINATION (ESE)

Skeleton question paper

Time: Four hours **Maximum Marks: 40**

Note: *(i) Attempt all questions*
(ii) Show your preparation to the examiner
(iii) Draw neat and well labelled diagrams wherever necessary

Q1.	Identify and describe the given ornamental plant specimen **A** and **B**.	**08**
Q2.	Prepare a layout plan of formal / informal garden	**08**
Q3.	Prepare garland / bouquet / flowerpots	**08**
Q4.	Prepare a medium for extending vase life of cut flowers	**08**
Q5.	Identify and describe given spots **C, D, E** and **F** (Ornamental plant samples)	**08**

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SKILL ENHANCEMENT COURSE HORTICULTURE

SECH-I

Periods: 45 **Credits: 02 (Maximum Marks: 50)**

SECH-IA: GREEN HOUSE (PROTECTED CULTIVATION OF PLANTS-PLASTCULTURE)

UNIT-I: PLASTICULTURE (06 periods)
Introduction, Definitions, Need, Concept and principles, History
UNIT-II: Green House (15 periods)
Types, Structure, Ideal Erection, Advantages and disadvantages and aftercare of green house, General list of crops grown in greenhouse
UNIT-III: PRACTICALS (8 practicals)
Study of green house by visiting green houses of different crops in nearby area. Students are expected to observe and study the green house under different heads such as Name of farmer, site, address, orientation, type, structural design, span-single/multi span, total area, length, width, middle height, side height, foundation depth, framework, covering, cold storage chain-exhaust fan/ fan for circulation of air cooler etc, water management-drip/sprinkler irrigation system/liquid manuring/ foggers etc, equipment-pH meter/water meter etc, electric work, Installation-month and year, building structure- land development/ bore well etc, other miscellaneous work, erection cost (total budget)/ loan facility/subsidy etc, crop grown, yield (average), operation-manual/semi automatic/automatic, transport facility, market, any other, day and date of visit, name of teacher accompanied, Fully/partially controlled, photographs of the visited green house. Students are also expected to prepare a model of green house and a visit report

OR

SECB-IB: ORCHARD: LAYOUT AND PLANTING SKILL

UNIT-I: ORHARD (6 periods)
Introduction, Importance of fruit growing, soil, climate, water, manure and fertilizer requirement of fruit crops
UNIT-II: PLANNING AND PLANTING (15 periods)
Planning of an orchard: selection of site, preliminary operations, orchard buildings, roads, paths, well digging, fencing, wind-breaks, selection of plant material, spacing of planting and overall aspects of orcharding. **Planting:** Systems of planting in an orchard (Square system, Rectangular system, Hexagonal system, Quincunx system, Contour system, high density planting system and meadow orcharding)
UNIT-III: PRACTICALS ON LAYOUT OF AN ORCHARD (8 practicals)
Layout of Square system, Rectangular system, Hexagonal system, Quincunx system, Contour system, digging pits, calculation of number of plants in different systems of planting. Visit to orchards in nearby area. Students are expected to prepare a paper sketch layout plan of planting systems, a visit report and to submit the same at the time of practical examination.

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SKILL ENHANCEMENT COURSE HORTICULTURE

SECB-II

Periods: 45 **Credits: 02 (Maximum Marks: 50)**

SECB-IIA: NURSERY ESTABLISHMENT SKILL

UNIT-I: NURSERY (6 periods)

Introduction, Definition, Importance and Scope of nursery, Factors affecting the nursery establishment, Registration and Certification of nursery

UNIT-II: NURSERY ESTABLISHMENT (15 periods)

Classification of nursery, Time of nursery raising, land requirement, selection of site for a nursery, types of nursery beds, Preparation of nursery beds, Media for raising nursery plants, Propagation structures, Seed and Sowing, Essential operations in nursery raising, aftercare and handling of nursery plants, Management of water, nutrition, weed, temperature, insect pest and diseases in nursery, Parts of nursery, Calculation for seed requirement

UNIT-III: PRACTICALS ON NURSERY ESTABLISHMENT (8 practicals)

Establishment of a fruit and vegetable nursery. Visit to fruit and vegetable nurseries in nearby area. Students are expected to prepare a model of fruit and vegetable nursery, a visit report and to submit the same at the time of practical examination.

OR

SECB-IIB: FRUIT AND VEGETABLE PRESERVATION SKILL

UNIT-I: PRESERVATION (6 periods)

Introduction, Principle of preservation, Methods of preservation

UNIT-II: PREPARATION AND PRESERVATION OF FRUIT AND VEGETABLE PRODUCTS (15 periods)

Preparation and preservation of Jam, Jelly, Marmalade, Jam Marmalade, Jelly Marmalade, Squash, candy, Sauce and Ketchup, Pickle, Canning of fruits and vegetables

UNIT-III: PRACTICALS ON SPIRULINA CULTIVATION (8 practicals)

Preparation and preservation of Jam, Jelly, Marmalade, Jam Marmalade, Jelly Marmalade, Squash, candy, Sauce and Ketchup, Pickle, Canning of fruits and vegetables. Visit to a fruit and vegetable production industry in nearby area. Students are expected to prepare a model of production industry, a visit report and to submit the same at the time of practical examination.

SUGGESTED READINGS FOR SECB-I&II:

Jitendra Singh (2008): Basic Horticulture, Kalyani Publishers, Ansari Road, 23, Daryaganj, New Delhi, Page1-351

Sharma R.R. and Manish Shrivastav (2004): Internatinal Book Distributing Co. Charbagh, Lucknow, Page 1-488

Arupratan Ghosh (2009): Green house Technology, Kalyani Publishers, Ansari Road, 23, Daryaganj, New Delhi, Page1-223

Vijaya Khader (1993): Mushrooms for livelihood, Kalyani publishers, Ludhiana-141 008, Page 1-64

Patil B.A. et al (2004): Applied Botany, Sunny publication, Pune, Page 1-214

Dhumal K.N. et al (1998): Plant Diversity& Plants and Human welfare, Nirali prakashan, Pune Page 1-296

Aneja K.R. (1993): Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom cultivation, Vishawa prakashan

Aneja K.R. (1993): Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom cultivation, Vishawa prakashan

Kunte Y.N. and K.S. Yawalkar (1988): Introduction to principlesof fruit growing, Agri Horticultural Publishing House, 52, Bajaj Nagar, Nagpur, Page 1-163

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SKILL ENHANCEMENT COURSE BOTANY

SECB-I&II

END OF SEMESTER EXAMINATION (ESE)

Maximum Marks: 25

SEAT NO:

MARK SHEET

Sr. No.	END OF SEMESTER EXAMINATION (ESE)	Maximum Marks	Obtained Marks
1	Skill Work report submission	10	
2	Over all skill judgement	10	
3	Skill Work presentation	05	
4	Total Marks	25	

Name & Signature of:

Examiner- 1:

Examiner- 2: