।। सा विद्या या विमुक्तये ।।

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, मा. विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व दिनांक १२ जून २०२१ रोजी संपन्न झालेल्या ५१ व्या मा. विद्या परिषद बैठकीतील विषय क्र. २६/५१–२०२१**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

1. B.Sc.-III Year-Biophysics
2. B.Sc.-III Year-Bioinformatics
3. B.Sc.-III Year-Biotechnology
4. B.Sc.-III Year-Biotechnology (Vocational)
5. B.Sc.-III Year-Botany
6. B.Sc.-III Year-Horticulture
7. B.Sc.-III Year-Agro Chemical Fertilizers
8. B.Sc.-III Year-Analytical Chemistry
9. B.Sc.-III Year-Biochemistry
10. B.Sc.-III Year-Chemistry
11. B.Sc.-III Year-Dyes & Drugs Chemistry
12. B.Sc.-III Year-Industrial Chemistry
13. B.C.A. (Bachelor of Computer Application)-III Year
14. B.I.T. (Bachelor of Information Technology)-III Year
15. B.Sc.-III Year-Computer Science
16. B.Sc.-III Year-Network Technology
17. B.Sc.-III Year-Computer Application (Optional)
18. B.Sc.-III Year-Computer Science (Optional)
19. B.Sc.-III Year-Information Technology (Optional)
20. B.Sc.-III Year-Software Engineering
21. B.Sc.-III Year-Dairy Science
22. B.Sc.-III Year-Electronics
23. B.Sc.-III Year-Environmental Science
24. B.Sc.-III Year-Fishery Science
25. B.Sc.-III Year-Geology
26. B.Sc.-III Year-Mathematics
27. B.Sc.-III Year-Microbiology
28. B.Sc.-III year Agricultural Microbiology
29. B.Sc.-III Year-Physics
30. B.Sc.-III Year Statistics
31. B.Sc.-III Year-Zoology

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२१–२२/७५

दिनांक : १२.०७.२०२१.

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :
१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
७) अधीक्षक, परिक्षा विभाग विज्ञान व तंत्रज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

B.Sc. THIRD YEAR
HORTICULTURE-CURRICULUM
(2021-2022)

WITH EFFECT FROM JUNE-2021

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. Similarly university had implemented Choice Based Credit System (CBCS) pattern at UG level from the academic year 2016-2017 progressively (for B.Sc. first year from 2016-2017, for B.Sc. second year form 2017-2018 and for B.Sc. third year from 2018-2019 respectively).

Revision and updating of the curriculum is the continuous process to provide an updated education to the students at large. In view of this priority and in keeping with vision and mission, process of revision and updating the curriculum is initiated and implemented at UG level from the academic year **2019-2020** progressively (for B.Sc. first year from **2019-2020**, for B.Sc. second year form **2020-2021** and for B.Sc. third year from **2021-2022** respectively). 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 is mentioned. A list of practical exercises and skills for laboratory work to be completed in the academic year is also given. A common skeleton question paper for all the courses is also provided at the end of the syllabus.

SALIENT FEATURES:

The syllabus of B.Sc. Third year Horticulture has been framed to meet the requirement of Choice based Credit System. The courses offered herein will train and orient the students in the field of Horticulture.

The DSCH-I&II deals with production technology of spices, condiment, aromatic and medicinal crops. The DSCHP-I deals with practicals of production technology of spices, condiment, aromatic and medicinal crops. This would help students to lay a strong foundation in the field of production technology.

The DSECH-I&II deals with post harvest and handling, processing and preservation technology. The DSECHP-I deals with practicals on post harvest and handling, processing and preservation technology. This would help students to lay a strong foundation in the field of processing and preservation technology.

Overall after completion of this course, students will also acquire fundamental knowledge in production, processing and preservation technology.

Discipline Specific Courses and Discipline Specific Elective Courses offered during this program is designed with the aim of imparting specific practical knowledge to the students which will lead to the self employability through development of their own enterprises.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO-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.
PEO-2: To update curriculum by introducing recent advances in the subject and enable the students to face the competitive examinations successfully.
PEO-3: To impart knowledge of Horticultural science as the applied objective of education.
PEO-4: To develop a scientific attitude to make students open minded, critical and curious.
PEO-5: To develop an ability to work on their own and to make them fit for the society.
PEO-6: To develop skill in practical work, experiments, equipments and laboratory use.
PEO-7: To develop ability for the application of the acquired knowledge in the fields of horticulture so as to make our country self-reliant and self-sufficient.
PEO-8: To appreciate and apply ethical principles of Horticultural science.

PROGRAM OUTCOMES (POs):

PO-1: This program will train and orient the students in the field of production technology, post harvest and handling, processing and preservation technology.
PO-2: This program will help the students for their career development.
PO-3: This program will provide updated curriculum with recent advances in the subject and enable the students to face the competitive examinations successfully.
PO-4: This program shall train and orient the students for laboratory skills and serve as human resource for the educational institutes, industries and other organizations.
PO-5: The programme also has a strong interdisciplinary component. Emphasis is given on the experimental learning through hands-on laboratory exercises, field trips and assignments.
PO-6: Students will be able to understand and explain different specializations in horticulture such as production technology, post harvest and handling, processing and preservation technology etc. Students will be able to demonstrate the experimental techniques and methods in horticultural sciences and have innovative research ideas.
PO-7: The programme will enlighten the current thrust areas of the subject and provide substantial exposure and skills in horticulture.
PO-8: Skill Enhancement Courses being offered during this program will provide job opportunities and additional specific skills to the students for self employability through the development of their own enterprises.

PREREQUISITE:

The optional courses are offered to the students registered for undergraduate programs. Such students should have the basic knowledge of biological Science and willing to gain additional knowledge in the field of horticulture. Admissions to B. Sc. Program are given as per the University rules.

UTILITY OF COURSE:

This program will train and orient the students in the field of Horticulture and Agriculture. This will help the students for their career development. Practical Courses offered during this

program will provide additional specific knowledge to the students for self employability through the development of their own enterprises.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Semester Pattern Curriculum Under CBCS For

Faculty of Science & Technology, Under Graduate (UG) Programmes

CLASS: B.Sc. THIRD YEAR, SUBJECT: HORTICULTURE

Class –B. Sc. Third year: An outline (w.e.f. Academic year 2021-2022)

Semester/ Annual	Course No.	Course Name	Instruction Hrs/ week	Total Periods	Marks for		Credits (Marks)
					Internal (CA)	External (ESE)	
Semester-V	DSCH-I	**DSCH-I:** Production Technology of Spices and Condiment Crops **(Theory Paper-XII)**	03	45	10	40	Credits: 02 (Marks:50)
	DECH-I	**DECH-I:** Post Harvest and Handling of Horticultural Crops **(Theory Paper-XIII)**	03	45	10	40	Credits: 02 (Marks:50)
Semester-VI	DSCH-II	**DSCH-II:** Production Technology of Medicinal and Aromatic Plants **(Theory Paper-XIV)**	03	45	10	40	Credits: 02 (Marks:50)
	DECH-II	**DECH-II:** Processing and Preservation Technology **(Theory Paper-XV)**	03	45	10	40	Credits: 02 (Marks:50)
Annual Pattern	DSCHP-I	**DSCHP-I:** Practicals based on section-A of DSCH-I&II **(Practical Paper-XVI)**	03	16 Practicals/ Batch/ Year	10	40	Credits: 02 (Marks:50)
	SECH-III	**SECH-III:** Medicinal plants **OR** **SECH-III:** Biocontrol	03	45 (Theory periods-21/ Year, Practicals-08/year)	25	25	Credits: 02 (Marks:50)
Annual Pattern	DECHP-I	**DSECHP-I:** Practicals based on section-B of DECH-I&II **(Practical Paper-XVII)**	03	16 Practicals/ Batch/ Year	10	40	Credits: 02 (Marks:50)
	SECH-IV	**SECH-IV**: Vermicompost **OR** **SECH-IV:** Irrigation systems	03	45 (Theory periods-21/ Year, Practicals-08/year)	25	25	Credits: 02 (Marks:50)
Total Marks & Credits Semester-V and VI					Marks: 110	Marks: 290	Credits: 16 Marks:400

DSCH: Discipline Specific Course in Horticulture,
DSCHP: Discipline Specific Course Horticulture Practicals**,**
DECH: Discipline Elective Course in Horticulture,
DECHP: Discipline Specific Elective Course Horticulture Practicals,
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 10 Marks (Theory): 05 marks for Test and 05 marks for home assignment
CA of 10 Marks (Practical): 05 marks for Test and 05 marks for Record book, excursion report and viva voce at the time of practical examination,
CA of Marks 25: 15 for marks Seminar & 10 marks for Test

SEMESTER–V
DESCIPLINE SPECIFIC COURSE IN HORTICULTURE-DSCH
(A Theory Course)

DSCH-I: Production Technology of Spice and Condiment Crops
(Theory Paper-XII)

DESCIPLINE ELECTIVE COURSE IN HORTICULTURE-DECH
(A Theory Course)

DECH-I: Post Harvest and Handling of Horticultural Crops
(Theory Paper-XIII)

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

SEMESTER–V
DSCH-I: Production Technology of Spice and Condiment Crops
(Theory Paper-XII)

Learning Objectives:
1. To know about the Soil and climatic requirements of the spices and condiments
2. To study in detail cultivation practices of spices and condiments
3. To acquire knowledge of harvesting, grading, packing and marketing of spices and condiments.

Learning Outcomes:
1. The students will be able to understand the Soil and climatic requirements of the spices and condiments.
2. The students will be able to understand the in detail cultivation practices of spices and condiments.
3. Students will acquire knowledge of harvesting, grading, packing and marketing of spices and condiments.

UNIT-I: SPICES AND CONDIMENTS-I (12 PERIODS)
Introduction; Geographical distribution of spices and condiments, area of production, history, origin, distribution, varieties, soil and climatic requirements, propagation and planting, after care, manures and fertilizers, irrigation, processing , harvesting, grading, packing and marketing of Turmeric, Coriander and Cardamom

UNIT-II: SPICES AND CONDIMENTS-II (10 PERIODS)
Geographical distribution of spices and condiments, area of production, history, origin, distribution, varieties, soil and climatic requirements, propagation and planting, after care, manures and fertilizers, irrigation, processing , harvesting, grading, packing and marketing of Ginger, Fenugreek, Clove and Cumin

UNIT-III: SPICES AND CONDIMENTS-III (13 PERIODS)
Geographical distribution of spices and condiments, area of production, history, origin, distribution, varieties, soil and climatic requirements, propagation and planting, after care,

manures and fertilizers, irrigation, processing , harvesting, grading, packing and marketing of Chilli, Mustard, Curry leaf and Black pepper

UNIT-IV: SPICES AND CONDIMENTS-IV (10 PERIODS)

Geographical distribution of spices and condiments, area of production, history, origin, distribution, varieties, soil and climatic requirements, propagation and planting, after care, manures and fertilizers, irrigation, processing , harvesting, grading, packing and marketing of Garlic, onion, Saffron and Nutmeg

Theory Paper-XII: Production Technology of Spice and Condiment Crops (Unit Wise Distribution of Periods and maximum marks)

Unit	Title of the unit	Periods Distributed	Maximum Marks
Unit-I	Spices and condiments-I	12	20
Unit-II	Spices and condiments-II	10	20
Unit-III	Spices and condiments-III	13	20
Unit-IV	Spices and condiments-IV	10	20
Total		**45**	**80**

SEMESTER–V

DECH-I: Post Harvest and Handling of Horticultural Crops
(Theory Paper-XIII)

Learning Objectives:

1. To know about the post harvest, harvesting factors and maturity indices of the horticultural crops.
2. To study in detail ripening, respiration and transpiration in relation to harvesting, packing, transportation and storage of horticultural crops.
3. To acquire knowledge of biodeterioration of horticultural crops

Learning Outcomes:

1. The students will be able to understand the post harvest, harvesting factors and maturity indices of the horticultural crops.
2. The students will be able to understand the in detail ripening, respiration and transpiration in relation to harvesting, packing, transportation and storage of horticultural crops.
3. Students will acquire knowledge of biodeterioration of horticultural crops.

UNIT-I: INTRODUCTION (12 PERIODS)

Importance of Post Harvest Handling; Maturity and maturity indices of Horticultural crops; harvesting methods of Horticultural crops

UNIT-II: HARVESTING FACTORS (13 PERIODS)

Factors responsible for Maturity, Ripening and Deterioration of Horticultural crops; **Pre harvest factors**- Selection of varieties, Cultural operations, Pre harvest treatments, Maturity and Harvesting; **Post harvest factors-**Curing, De greening, Pre cooling, Washing and drying, Storing and grading, Disinfestations, Post harvest treatments and Waxing

UNIT- III: RIPENING (10 PERIODS)

Methods used for hastening and delaying ripening; Chemical that hastens ripening; Chemicals that delay in ripening; Respiration and Transpiration in relation to Harvesting, Packing, Transportation and Storage

UNIT-IV: BIODETERIORATION (10 PERIODS)

Nature and causes of deterioration; Primary causes of losses- Mechanical losses, Physio–biochemical losses, Microbial losses and Physical losses; Secondary causes of losses- Methods of pre Cooling, Grading, Packaging, Storage and Transport of Horticultural crops

Theory Paper-XIII: Post Harvest and Handling of Horticultural Crops
(Unit Wise Distribution of Periods and maximum marks)

Unit	Title of the unit	Periods Distributed	Maximum Marks
Unit-I	Introduction	12	20
Unit-II	Harvesting factors	13	20

Unit-III	Ripening	10	20
Unit-IV	Biodeterioration	10	20
Total		**45**	**80**

SEMESTER–VI
DESCIPLINE SPECIFIC COURSE IN HORTICULTURE-DSCH
(A Theory Course)
DSCH-II: Production Technology of Medicinal and Aromatic Plants
(Theory Paper-XIV)

DESCIPLINE ELECTIVE COURSE IN HORTICULTURE-DECH
(A Theory Course)
DECH-II: Processing and Preservation Technology
(Theory Paper-XV)

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

SEMESTER–VI
DSCH-II: Production Technology of Medicinal and Aromatic Plants
(Theory Paper-XIV)

Learning Objectives:
1. To know about the history, origin and distribution of medicinal and aromatic plants. 2. To study in detail cultivation practices of medicinal and aromatic plants.
3. To acquire knowledge of harvesting, processing and marketing of medicinal and aromatic plants.

Learning Outcomes:
1. The students will be able to understand the history, origin and distribution of medicinal and aromatic plants.
2. The students will be able to understand in detail cultivation practices of medicinal and aromatic plants.
3. Students will acquire knowledge of harvesting, processing and marketing of medicinal and aromatic plants.

UNIT-I: MEDICINAL AND AROMATIC PLANTS-I (13 PERIODS)
Introduction to medicinal and aromatic plants; History, origin, distribution, propagation, cultural practices, nutrition and water management, harvesting, processing and marketing of Diascoria, Rauwolfia and Opium

UNIT-II: MEDICINAL AND AROMATIC PLANTS-II (12 PERIODS)
Introduction to medicinal and aromatic plants; History, origin, distribution, propagation, cultural practices, nutrition and water management, harvesting, processing and marketing of Periwinkle, Aloe, Guggul and Plantago

UNIT-III: MEDICINAL AND AROMATIC PLANTS-III (10 PERIODS)

Introduction to medicinal and aromatic plants; History, origin, distribution, propagation, cultural practices, nutrition and water management, harvesting, processing and marketing of Coleus, Stevia, Senna and Solanum

UNIT-IV: MEDICINAL AND AROMATIC PLANTS-IV (10 PERIODS)

Introduction to medicinal and aromatic plants; History, origin, distribution, propagation, cultural practices, nutrition and water management, harvesting, processing and marketing of Sandalwood, Mehendi, Mint and Lemon grass

Theory Paper-XIV: Production Technology of Medicinal and Aromatic Plants

(Unit Wise Distribution of Periods and maximum marks)

Unit	Title of the unit	Periods Distributed	Maximum Marks
Unit-I	Medicinal and aromatic plants-I	13	20
Unit-II	Medicinal and aromatic plants-II	12	20
Unit-III	Medicinal and aromatic plants-III	10	20
Unit-IV	Medicinal and aromatic plants-IV	10	20
Total		**45**	**80**

SEMESTER–VI

DECH-II: Processing and Preservation Technology
(Theory Paper-XV)

Learning Objectives:

1. To know about the importance, scope and principles of preservation of fruits and vegetables.
2. To study in detail dehydration and canning of fruits and vegetables.
3. To acquire knowledge of preparation of fruit and vegetable products.

Learning Outcomes:

1. The students will be able to understand the importance, scope and principles of preservation of fruits and vegetables.
2. The students will be able to understand in detail dehydration and canning of fruits and vegetables.
3. Students will acquire knowledge of preparation of fruit and vegetable products.

Unit-I: General account *(12 periods)*

History of Food Preservation; Importance and Scope of Fruit and Vegetable Preservation; Selection of Site for Fruits and Vegetables Preservation Unit; Principles and Methods of Preservation

Unit-II: Dehydration and Canning *(10 periods)*

Dehydration of Fruits and Vegetables; Canning of vegetables; Food preservatives; Colours and flavours used in food Industry

Unit-III: Preparation of fruit products *(13 periods)*

Preparation of Mango pulp, Papaya jam, Grape juice, Apple jelly, Citrus squash & marmalade

Unit-IV: Preparation of vegetable products *(10 periods)*

Tomato juice, Tomato sauce, Garlic and Ginger paste, Chilli pickle and Mixed Vegetable Pickle

Theory Paper-XV: Processing and Preservation Technology

(Unit Wise Distribution of Periods and maximum marks)

Unit	Title of the unit	Periods Distributed	Maximum Marks
Unit-I	General account	12	20
Unit-II	Dehydration and canning	10	20
Unit-III	Preparation of fruit products	13	20
Unit-IV	Preparation of vegetable products	10	20
Total		**45**	**80**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Semester Pattern Curriculum Under CBCS For
Faculty of Science & Technology, Under Graduate (UG) Programmes
CLASS: B.Sc. THIRD YEAR, SUBJECT: HORTICULTURE

Skeleton Question Paper
End Semester Examination (ESE)
SEMESTER–V&VI
Theory Paper-XII, XIII & XIV, XV

Time: 1 hour 30 min
Maximum Marks: 40

Note:
1. Attempt all questions
2. All question carry equal marks
3. Draw neat and well labeled diagrams wherever necessary

Q1. Long Answer Type Question (LATQ) **15 marks**
OR
a. Short Answer Type Questions (SATQ) **08 marks**
b. Short Answer Type Question (SATQ) **07 marks**
(This question will be based on any two units with equal weightage to each unit)

Q2. Long Answer Type Question (LATQ) **15 marks**
OR
a. Short Answer Type Question (SATQ) **08 marks**
b. Short Answer Type Question (SATQ) **07 marks**
(This question will be based on remaining two units with equal weightage to each unit excluding the units used for Q1.)

Q3. Attempt any two of the four **10 marks**
a. Short note Type Question (SNTQ) 05 marks
b. Short note Type Question (SNTQ) 05 marks
c. Short note Type Question (SNTQ) 05 marks
d. Short note Type Question (SNTQ) 05 marks
(This question will be based on all the four units of the entire syllabus)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Semester Pattern Curriculum Under CBCS For
Faculty of Science & Technology, Under Graduate (UG) Programmes
CLASS: B.Sc. THIRD YEAR, SUBJECT: HORTICULTURE

Annual Pattern
PRACTICAL COURSES

DSCHP-I: Practicals based on theory paper-XII&XIV
(Practical paper-XVI)

DECHP-I: Practicals based on theory paper-XIII&XV
(Practical paper-XVII)

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

Annual Pattern
PRACTICAL COURSES
DSCHP-I: Practicals based on theory paper-XII&XIV
(Practical paper-XVI)

Practical Exercises:
1. Study of Spices and Condiments **(8 practicals)**
2. After care in Spices and Condiments **(4 practicals)**
3. Harvesting and curing of spices and condiments **(4 practicals)**
4. Study of Medicinal plants **(4 practicals)**
5. Study of Aromatic plants **(2 practicals)**
6. Extraction of Essential Oils from Aromatic plants **(4 practicals)**
7. Micro Chemical tests of ingredients from Medicinal plants **(4practicals)**
8. Horticultural excursions-Several local and at least a lone long excursion are expected.

Note:
1. Minimum 16 practicals are expected to be completed during the academic year.
2. The submission of practical record book, excursion report, collected material, preparations etc. are expected for CA during the academic year. The CA carries marks.

Skeleton Question Paper
End Semester Examination (ESE)
DSCHP-I: Practicals based on theory paper-XII&XIV
(Practical paper-XVI)

Time: Three hours
Maximum Marks: 40

Note:
1. Attempt all questions
2. All questions carry equal marks
3. Draw neat and well labeled diagrams wherever necessary

Q1. Identify and describe the given spice and condiment crop samples of Specimen- **A** and **B** **12**

Q2. Identify and describe the given Medicinal and Aromatic plant samples of the Specimen- **C** and **D** **12**

Q3. Detect the essential oil /micro-chemical tests of the given Specimen-**E** **12**

Q4. Viva-Voce **04**

Annual Pattern

PRACTICAL COURSES

DECHP-I: Practicals based on theory paper-XIII&XV
(Practical paper-XVII)

Practical Exercises:

1. Maturity and Harvesting Indices of Important Fruit and vegetable Crops **(4 practicals)**
2. Temperature and Relative Humidity for Storage of Fruits **(2 practicals)**
3. Temperature and Relative Humidity for Storage of Vegetables **(2 practicals)**
4. Changes in Total Soluble Solids of Fruits during Storage **(2 practicals)**
5. Changes in Acidity of Fruits during Storage **(2 practicals)**
6. Changes in Total Sugars of Fruits during Storage **(2 practicals)**
7. Changes in Reducing and Non Reducing Sugars of Fruits during Storage **(2 practicals)**
8. Preparation of Mango pulp **(2 practicals)**
9. Preparation of Papaya jam **(2 practicals)**
10. Preparation of Apple & Wood Apple jelly **(2 practicals)**
11. Preparation of Citrus Squash **(2 practicals)**
12. Preparation of Citrus Marmalade **(1 practicals)**
13. Preparation of Tomato sauce **(1 practicals)**
14. Preparation of Chili pickle **(1 practicals)**
15. Preparation of Mixed Vegetable pickle **(1 practicals)**
16. Horticultural excursions-Several local and at least a lone long excursion are expected.

Note:

1. Minimum 16 practicals are expected to be completed during the academic year.
2. The submission of practical record book, excursion report, collected material, preparations etc. are expected for CA during the academic year. The CA carries marks.

Skeleton Question Paper
End Semester Examination (ESE)
DECHP-I: Practicals based on theory paper-XIII&XV
(Practical paper-XVII)

Time: Three hours
Maximum Marks: 40

Note:
1. Attempt all questions
2. All questions carry equal marks
3. Draw neat and well labeled diagrams wherever necessary

Q1. Estimate the Total Soluble Solids (TSS)/Acidity/Reducing Sugars/Total Sugars of given fruit sample of the Specimen- **A** **12**

Q2. Prepare the given fruit product of the given sample of Specimen-**B** **12**

Q3. Prepare the given vegetable product of the given sample of Specimen-**C** **12**

Q.4. Viva-voce **04**

Annual Pattern

SKILL ENHANCEMENT COURSES (SEC)

SEC-III: MEDICINAL PLANTS
OR
SEC-III: BIOCONTROL

SEC-IV: VERMICOMPOST
OR
SEC-IV: IRRIGATION SYSTEMS

Periods (Theory& Practicals): 45
Credits: 02 (Maximum Marks: 50)

SEC-III: MEDICINAL PLANTS

UNIT-I: MEDICINAL PLANTS (6 periods)
Introduction, Definitions, Scope and Importance, Concept of active principles
UNIT-II: STUDY OF MEDICINAL PLANTS (15 periods)
Description, Identification and Classification, medicinal uses of locally available medicinal plants (Awla, Adulsa, Ginger)
UNIT-III: PRACTICALS ON MEDICINAL PLANT PRODUCT PREPARATION (8 practicals)
Preparation of Awla candy, Awla masticator (Awla supari), Adulsa syrup, Ginger syrup and cake, Visit to a 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.

OR

SECH-III: BIOCONTROL

UNIT-I: BIOCONTROL (6 periods)
Introduction, Definition, Biocontrol agents, Need of biocontrol, Concept of biocontrol (ways, limitations and factors affecting success of biocontrol, Environmental health hazards due to pesticides and fungicides), Plant based products (Azadirachtin, Neem cake, Indiara, Pyrethrines, Phermones, Trichoderma etc.)
UNIT-II: TRICHODERMA CULTIVATION (15 periods)
Introduction, Systematic position, thallus structure, Trichoderma as biocontrol agent, Mode of action, Uses, Trichoderma as a commercial biocontrol agent, Cultivation details of Trichoderma
UNIT-III: PRACTICALS ON TRICHODERMA CULTIVATION (8 practicals)
Principle, Requirement, procedure, observations, Harvesting, results and records precautions, Visit to a Trichoderma cultivation laboratory in nearby area (Students are expected to prepare a model of Trichoderma cultivation laboratory, a visit report and to submit the same at the time of practical examination.

SECH-IV: VERMICOMPOST

UNIT-I: VERMICOMPOST (21 periods)

Introduction, Definition, Study of earth worm species, adequate food, moisture, temperature and light,

Building of Vermicompost beads, nutrient value of vermicompost, Vermicompost requirement of crops,

UNIT-II: practicals on Vermicompost preparation (08 periods)

Principle, Requirement, procedure, observations, Visit to a Vermicompost unit in nearby area (Students are expected to prepare a model of Vermicompost pit, a visit report and to submit the same at the time of practical examination.

OR

SECH-IV: IRRIGATION SYSTYEMS

UNIT-I: IRRIGATION SYSTEMS (21 periods)

Introduction, Importance, soil, climate, water, requirement of horticultural crops, critical stages of plants, uptake of moisture,

Roll in photosynthesis, translocation of nutrients, evaporation losses

UNIT-II: PRACTICALS ON LAYOUT OF IRRIGATION SYSTEMS (8 practicals)

Layout of Ring irrigation system, Chanel irrigation system, subsurface irrigation system, Drip irrigation system, Sprinkler Irrigation system, Visit to orchards in nearby area. Students are expected to prepare a paper sketch layout plan of irrigation systems, a visit report and to submit the same at the time of practical examination.

Selected Readings for SEC:

1. Fruit and Vegetable Preservation Principles and Practices-Srivastava R.P. and Sanjeev Kumar International Book Distributing Company, New Delhi-2005
2. Post Harvest Technology of Fruits and Vegetables: Handling, Processing, Fermentation and Waste Management vol. I & II Varma L. R. and Joshi V.K. Indus Publishing, 2000
3. Preservation of Fruits and Vegetables Khader ICAR, New Delhi-2010
4. Skills in plant science-Bodke S.S. & N.M.Dhekle
5. Fruit and Vegetable Processing M.G. Danthy FAO, Rome
6. Post harvest Handling and Processing of Fruit and Vegetable-I.S. Singh Text book
7. Fruit Processing- David Arthey, Reference book
8. Handbook of Fruit- Sinha and Hui John Wiley and
9. Preservation -Principles and Practices-Srivastava RP & Kumar S International Book, Distributors, 2003
10. Handbook of Fruit Science &Technology: Production, Composition and Processing- Salunkhe DK

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Semester Pattern Curriculum Under CBCS For
Faculty of Science & Technology, Under Graduate (UG) Programmes
CLASS: B.Sc. THIRD YEAR, SUBJECT: HORTICULTURE

Mark Sheet
End of Semester Examination **(ESE)**
SKILL ENHANCEMENT COURSE (SEC)-III&IV

Maximum Marks: 25

Candidate's Seat No.:

Sr. No.	**Assessment Criteria**	**Maximum Marks**	**Obtained Marks**
1.	Skill work report submission	10	
2.	Over all skill judgment	10	
3.	Skill work presentation	05	
4.	Total	25	

Name & Signature of:
Examiner- 1:

Examiner- 2: