SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

SCHOOL OF AGRICULTURAL SCIENCES

Minutes of 4th BoS Meeting

B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture

Venue : Audio Visual Hall,
Sri Manakula Vinayagar Engineering College

Date & Time : 30th March 2023 at 10:00 A.M

REGULATIONS 2021

(R-2021)

25 years of ACADEMIC EXCELLENCE

2.G.1

2.G.2

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, Accredited by NAAC with 'A' Grade)
Madagadipet, Puducherry – 605 107

SCHOOL OF AGRICULTURAL SCIENCES

Minutes of 4th BoS Meeting

B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture

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Date & Time : 30th March 2023 at 10:00 A.M

2.G.3

2.G.4

SCHOOL OF AGRICULTURAL SCIENCES.

Minutes of the 4th Board of Studies Meeting (30.03.2023)

Si. No	Name and members with designation and official address.	Member as per UGC norms	Signature
1	**Dr. G. Mohammed Yassin,** Dean, School of Agricultural Sciences Sri Manakula Vinayagar Engineering College, Madagadipet, Puducherry - 605107	Chairman	
2	**Dr. S, Ramesh Kumar,** Professor in Horticulture, Faculty of Agriculture, Annamalai University, Chidambaram - 608002	Subject Expert (University Nominee)	
3	**Dr. R. Raman,** Professor and Director, Centre for Natural Farming and Sustainable Agriculture, Faculty of Agriculture, Annamalai University, Chidambaram - 608002	Subject Expert (Academic Council Nominee)	
4	**Dr. B. Karthikeyan,** Associate Professor in Microbiology, Faculty of Agriculture, Annamalai University, Chidambaram – 608002	Subject Expert (Academic Council Nominee)	
5	**Dr. R. Narasimman,** Jr. Rice Breeder, Perunthalaiver Kamarajar Krishi Vighan Kendra Vazhudavoor Road, Kurumbapet Puducherry - 605009	Representative from Industry	30/3/23
6	**Dr. A. A. Arivalagar,** Dean Academics (Core), Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Special Invitee	

2.G.6

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
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Madagadipet, Puducherry - 605 107

SCHOOL OF AGRICULTURAL SCIENCES

Minutes of 4th Board of Studies Meeting

The minutes of the Fourth Board of Studies meeting for **B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture** in **SCHOOL OF AGRICULTURAL SCIENCES** was held on **31st March 2023 at 10:00 AM** in the Audio Visual Hall, Sri Manakula Vinayagar Engineering College is appended.

The following members were present in the BoS meeting

Sl. No	Name of the Member with Designation and Official Address	Members (as per UGC Norms)
1	**Dr. G. Mohammed Yassin, Ph.D** Dean, School of Agricultural Sciences Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Chairman
2	**Dr. S. Ramesh Kumar** Professor (Horticulture) Faculty of Agriculture, Annamalai University, Chidambaram, Tamil Nadu - 608002	Subject Expert (University Nominee)
3	**Dr. B. Karthikeyan** Associate Professor (Microbiology), Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu - 608002	Subject Expert (Academic Council Nominee)
4	**Dr. R. RAMAN** Professor and Director, Centre for Natural Farming and Sustainable Agriculture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu - 608002	Subject Expert (Academic Council Nominee)
5	**Dr. R. Narasimman,** Jr. Rice Breeder Perunthalaivar Kamaraj Krishi Vigyan Kendra (PKKVK) Vazhudavoor Rd, Kurumbapet, Marie Oulgaret, Puducherry- 605009.	Representative from Industry
6	**Dr. A. A. Arivalagar,** Dean Academics (Core), Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Special Invitee

Dr. G. Mohammed Yassin, Ph.D
Dean

2.G.7

7	**Dr. T. Thiruchelvame** Associate professor and Head Dept. of Food Technology Manakula Vinayagar Institute of Technology, Madagadipet, Puducherry - 605107	Faculty Member (Food Technology)
8	**Dr. T. Kavitha,** Associate Professor and Head, Dept of Food Science, School of Arts and Science Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Food Science)
9	**Dr. T. Coumaressin,** Associate Professor, Department of Mechanical Engineering, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Engineering)
10	**Mr. A. K. Rao Keluskar,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agri. Extension)
11	**Mr. M. Selva Ganapathy,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agri. Economics)
12	**Mr. S. Senthil Kumar,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agronomy)
13	**Mr. V. Rajendra Prasath,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agronomy)
14	**Ms. S. Saranya,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agri. Microbiology)
15	**Ms. P. Ilakkiya,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Floriculture)
16	**Ms. B. Bavithra,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Vegetable Science)

Dr.G.MOHAMED YASSIN, Ph.D.,
Dean
School of Agricultural Sciences
Sri Manakula Vinayagar Engineering College
(An Autonomous Institution)
Madagadipet, Puducherry-605107

2.6.19

17	**Mr. J. Sundaram,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Fruit Science)
18	**Dr. M. Sureshkumar,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Genetics and Plant Breeding)
19	**Ms. K. Sowmia,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Genetics and Plant Breeding)
20	**Mr. V. Mohane,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Crop Physiology)
21	**Mr. H. Easwardhass** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Seed Science)
22	**Mrs. J. Saroja,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agri. Entomology)
23	**Dr. V. Devi Shanthini,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Plant Pathology)
24	**Dr. K. Rajkumar,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Soil Science)
25	**Mrs. R. Hema,** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Soil Science)
26	**Mr. K. Srinivasan,** Associate Professor, Department of Mechanical Engineering, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Civil Engineering)
27	**Ms. I. Indhuja** Assistant Professor, School of Agricultural Sciences, Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry - 605107	Faculty Member (Agri. Statistics)

Dean
School of Agricultural Sciences

2.6.11

2.G1.12

Minutes of the Meeting

Dr. G. Mohammed Yassin, Chairman, welcomed the Board members and presented the Agenda.

BOS / 2023 / SAGS / 4.1

1. **To confirm the minutes of Third Board of Studies of B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture held on 15.10.2022**

As there is no remarks, the Board unanimously confirmed the minutes of the Third Board of studies meeting for B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture held on 15.10.2022

BOS / 2023 / SAGS / 4.2

2. **To consider and approve modifications in the Academic Regulations (R2021) in the School of Agricultural Sciences.**

The Board of Studies noted the resolution of the 5th Academic Council meeting of SMVEC held on 17.12.2022 for the conducting special examination for the students permitted to participate in the State / National / International level Events / Competitions / Sports with the approval of Head of the Institutions if they miss the opportunity to appear for the End Semester Examination.

The Board concurred the above said provisions to be included as a Clause in "7.20 Special Examination" in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021 as given in the **Annexure I**

BOS / 2023 / SAGS / 4.3

3. **To consider and approve the change in nomenclature for the course U21AAEXB604 Entrepreneurship Development and Business Management 1+1 in curriculum and syllabi for VI semesters of B.Sc. (Hons.) Agriculture degree programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021.**

The Board approved the proposed changes for the course as **U21AAEXB604 Entrepreneurship Development and Business Communication (1+1) as per ICAR nomenclature** in the curriculum and syllabi for VI semesters for B.Sc. (Hons.) Agriculture programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021 for the academic year 2022-2023

BOS / 2023 / SAGS / 4.4

4. **To consider and approve the offer an Elective course U21AAGME611 Biopesticide and Biofertilizer (2+1) in the curriculum and syllabi for VI semesters of B.Sc. (Hons.) Agriculture degree programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021.**

The Board approved to offer an elective course **U21AAGME611 Biopesticide and Biofertilizer (2+1)** which is a recommended elective course by the ICAR. This course will be offered in the VI Semester in the curriculum and syllabi for IV semesters of B.Sc. (Hons.) Agriculture degree programme in **R2021** in lieu of the course U21AAGME611 Applied Microbiology (2+1)

Dr.G.MOHAMED YASSIN, Ph.D.,
Dean
School of Agricultural Sciences
Sri Manakula Vinayagar Engineering C...

2.G.12

2.G.14

BOS / 2023 / SAGS / 4.5

5. **To consider and approve the curriculum and syllabi for VI semesters of B.Sc. (Hons.) Agriculture degree programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021.**

   The Board approved the curriculum and syllabi of VI semesters for B.Sc. (Hons.) Agriculture programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021 for the academic year 2022-2023. as given in the **Annexure II** after incorporating the suggestion made in the Board meeting.

BOS / 2023 / SAGS / 4.6

6. **To consider and approve the curriculum and syllabi for VI semesters of B.Sc. (Hons.) Horticulture degree programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021.** The Board approved the curriculum and syllabi of VI semesters for B.Sc. (Hons.) Horticulture programme in the School of Agricultural Sciences under SMVEC Autonomous Regulations R2021 for the academic year 2022-2023 as given in the **Annexure III** after incorporating the suggestion made in the Board meeting..

BOS / 2023 / SAGS / 4.7

7. **To consider and approve the list of external examiners for the End semester (Final Theory) Examinations (Question paper setting and exam paper evaluation) in the respect of B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture for 2021 Regulations.**

   The Board approved the list of external examiners for the End semester (Final Theory) Examinations for Question paper setting and exam paper evaluation with respect to B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture for 2021 Regulations placed in the **Annexure – IV.**

The meeting was concluded at 01.00 PM. with vote of thanks by **Mr. S. Senthil Kumar,** Assistant Professor (Agronomy), SAGS, Sri Manakula Vinayagar Engineering College.

Dr.G.MOHAMED YASSIN, Ph.D.,
Dean
School of Agricultural Sciences
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2.G.15

2.G1.16

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

DEAN Agriculture <deanagri@smvec.ac.in>

(no subject)

Rajamani Raman <ramanagron@gmail.com> Fri, May 26, 2023 at 6:31 PM
To: DEAN Agriculture <deanagri@smvec.ac.in>

Dear Sir
Greetings

I have thoroughly gone through the minutes of the BoS meeting and syllabus content revised as per the discussion in BoS for both B.SC Agri/Horti.
Kindly proceed further to process of the same.

Regards

Prof.R. Raman

2.G.17

2.G.18

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

DEAN Agriculture <deanagri@smvec.ac.in>

SMVEC - SAGS - Minutes of 4th Board if Studies - Reg

Rameshkumar Srinivasan <rameshflora1974@gmail.com> Fri, May 26, 2023 at 11:31 AM
To: DEAN Agriculture <deanagri@smvec.ac.in>
Cc: karthi keyan B <bkeyan473@gmail.com>, ramanagron@gmail.com, naras65@gmail.com, deanacademic1@smvec.ac.in

Dear Sir
I have gone through the minutes of the BoS meeting and syllabus content revised as per the discussion in BoS.
Kindly proceed further to process the same.
Regards
Dr. S.Rameshkumar

[Quoted text hidden]

2.G.19

2.G1.20

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

DEAN Agriculture <deanagri@smvec.ac.in>

SMVEC - SAGS - Minutes of 4th Board if Studies - Reg

MyNarasimman <naras65@gmail.com> Tue, May 23, 2023 at 12:24 PM
To: DEAN Agriculture <deanagri@smvec.ac.in>

Sir, I have gone through the syllabus of Agri-VI and Horti-VI semester and as well the minutes of the fourth BoS meeting. The suggested corrections have been carried out and hence the syllabus have been approved.
with regards,
R.NARASIMMAN
[Quoted text hidden]

2.6.21

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

DEAN Agriculture <deanagri@smvec.ac.in>

SMVEC - SAGS - Minutes of 4th Board if Studies - Reg

karthi keyan B <bkeyan473@gmail.com>
To: DEAN Agriculture <deanagri@smvec.ac.in>

Mon, May 22, 2023 at 7:42 PM

Dear sir,
I have gone through minutes of 4th Board of studies of minutes. Please changes in the meeting.
1.Mention the department name for concern staff.
2.Year is missing in reference books mentioned (For eg in organic farming course)
3.Precossive farming and protected cultivation course reference is very old please change it.
4.overall check year is missing.
Thanking you
Your
B. Karthikeyan

On Wed, 26 Apr, 2023, 3:24 pm DEAN Agriculture, <deanagri@smvec.ac.in> wrote:
> Please find the attachment file

2.6.23

2.G.24

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
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Puducherry – 605 107

SCHOOL OF AGRICULTURAL SCIENCES

4th Board of Studies

Annexure – I

Minutes of 5th Academic Council Meeting of SMVEC

2.6.25

2.G1.26

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

Minutes approved in 5th Meeting of Academic Council Regarding Modifications in the Autonomous Regulations

School	Regulations	Modifications / Inclusion
• Engineering	R2019 and R2020	• Improvement Test • Re-earn of Continuous Assessment Mark (CAM) • Revised Eligibility criteria for admission into UG Engineering programmes • Special Examinations • Internal evaluation procedure for Employment Enhancement Courses (EEC)
• School of Arts and Science	R2020	• Improvement Test • Re-earn of Continuous Assessment Mark (CAM) • Special Examinations • Internal evaluation procedure for Employment Enhancement Courses (EEC)
• School of Architecture	R2020	• Special Examinations
• School of Allied Health Sciences	R2020	
• School of Agricultural Sciences	R2021	
• College of Physiotherapy	R2021	
• Centre of Legal Education	R2022	

Copy to

1. Controller of Examination (CoE)
2. Registrar
3. Academic Section
4. Deans (SOA, SAS, SHAS, SAGS, COP, CLE)
5. HoDs (Engineering)
6. Admission Wing
7. Library
8. Director Office

Dean Academics
(Dr. S. Anbumalar)

Director cum Principal
(Dr. V.S.K. Venkatachalapathy)

Dr.G.MOHAMED YASSIN, Ph.D.,
Dean
School of Agricultural Sciences
Sri Manakula Vinayagar Engineering College
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2.6.27

2.6.28

B. To apprise the Academic Council about the following for ratification

(i) Special Examination conducted for the candidate who participated in National/International event with prior permission during his / her End Semester Examination period and requesting approval for inclusion of the same policy/Procedure in SMVEC Autonomous Regulations for all Programmes under the following Clauses

Clause 8.5.1/ 7.5 /12.4 / R.14.3 /7.20 / 6.5: Special Examinations

TO CONSIDER CONDUCTING SPECIAL EXAMINATIONS FOR THE STUDENTS PERMITTED TO PARTICIPATE IN THE STATE / NATIONAL / INTERNATIONAL LEVEL EVENTS/COMPETITIONS / SPORTS WITH THE APPROVAL OF HEAD OF THE INSTITUTIONS IF THEY MISS THE OPPORTUNITY TO APPEAR FOR END SEMESTER EXAMS.

The Controller of Examinations in concern with Dean Academics and with the approval of Head of the Institution notifies the dates for the end semester examinations for various Programmes offered. The students those who fulfills required attendance percentage will register for End Semester Examinations. Sometimes, conduction of State / National / International level events / Competitions / Sports by the reputed Organizations etc., coincides with the dates of the End Semester Exams.

Students those who are eligible to appear for the End Semester Examinations, will be in the verge of participating in the events and thereby they will be missing the opportunity to appear for the end semester exam. This will cause serious consequences like appearing for the missed papers as arrear and there by losing the ranking, classification, job opportunity etc., Moreover the participation of students in the State / National/ International level events Competitions / Sports not only get credit for themselves but also bring laurels to the Institution.

Hence, to avoid such types of hardships for the students who are participating in the events, it has been proposed to conduct special examinations immediately on their return to the college after participating in the events. However, to avail this opportunity the student has to submit all their participation details to the committee constituted under the leadership of Dean Academics. The committee scrutinizes the details and send its suggestions to the head of the institution for final approval. Thus amending the conduction of special exam in the regulations will aspire more students to achieve in the future.

The above said clause for conduct of Special Examinations will be included in SMVEC Autonomous Regulations under the following clause

a. Clause "8.5.1 Special Examinations" in Regulations R2019/R2020 for all Programmes in Engineering and School of Arts and Science
b. Clause "7.5 Special Examinations" in Regulations R2020 for all Programmes in School of Allied Health Sciences
c. Clause "12.4 Special Examinations" in Regulations R2021 for Physiotherapy Programme in College of Physiotherapy

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2.6.29

2.G.30

d. Clause "R.14.3 Special Examinations" in Regulations R2020 for B.Arch programme in School of Architecture
e. Clause "7.20 Special Examinations" in Regulations R2021 for B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Horticulture programmes in School of Agricultural Sciences.
f. Clause "6.5 Special Examinations" in Regulations R2022 for LL.B programme in Centre of Legal Education
g. Clause "7.5 Special Examinations" in Regulations R2022 for B.A. LL.B programme in Centre of Legal Education

(ii) Ratification for issuing Diploma Certificates for the Students who have passed in diploma from SMVEC- School of Allied Health Sciences (SAHS) by following the guidelines given in UGC-2018 regulations for Autonomous Colleges under Clause 10.1.

As per UGC Autonomous Regulations 2018, Clause 10.1: Matters Regarding Starting of New Courses, an autonomous college is free to start diploma (undergraduate and postgraduate) or certificate courses without prior approval of the University. However, approval of the concerned statutory bodies of the college may be obtained, wherever required. Diplomas and certificates shall be issued under the seal of the college.

As per the above clause, we have started offering diploma courses in the School of Allied Health Sciences from the academic year 2020-21 onwards. The first batch students got graduated in the academic year 2021-22. Hence, the Diploma certificate was issued to the students and requesting the Academic Council to ratify it.

(iii) Ratification for internal evaluation procedure to be adopted for Employment Enhancement Courses (EEC). As per the proposed procedure, the students will be evaluated based on their regularity in the class hours and as well as mark secured in the test conducted at the end of the course. However, the students should take their online test to get their associate level international certification.

The Employment Enhancement Courses (EEC) are present for various Programmes as a part of Curriculum. As per the proposed procedure, the students will be evaluated for Employment Enhancement Courses (EEC) based on their regularity in the class hours and as well as in the test conducted at the end of the course. However, the students should take their online test to get their associate level international certification and it is submitted to the Academic Council for ratification.

Dr.G.MOHAMED YASSIN, Ph.D.,
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2.6.31

2.G.32

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
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SCHOOL OF AGRICULTURAL SCIENCES

4th Board of Studies

Annexure – II

Curriculum and syllabi of VI semester for B.Sc. (Hons.) Agriculture

2.G1.33

B.Sc. (Hons.) AGRICULTURE DEGREE PROGRAMME

DEPARTMENT WISE DISTRIBUTION OF COURSES

ABSTRACT

Sl.No.	Department / Discipline	No. of courses	Credit hours	Total Credits
Agricultural Economics				
1.	Agricultural Economics	5	8+3	11
Agricultural Extension				
2.	Agricultural Extension	4	6+3	9
Basic Sciences and Languages				
3.	Computer Science	1	1+1	2
4.	Mathematics	1	0+1	1
5.	Statistics	1	1+1	2
6.	English	1	0+1	1
Agricultural Entomology				
7.	Agricultural Entomology	4	6+4	10
Agronomy				
8.	Agronomy	11	12+10	22
9.	Agricultural Engineering	4	4+4	8
10.	Animal Husbandry	1	2+1	3
Horticulture				
11.	Horticulture	5	5+5	10
12.	Food Science	1	2+0	2
13.	Forestry	1	1+1	2
Plant Breeding and Genetics				
14.	Genetics and Plant Breeding	4	8+4	12
15.	Seed Science and Technology	1	2+1	3
16.	Crop Physiology	1	2+1	3
Plant Pathology and Agricultural Microbiology				
17.	Plant Pathology	4	7+4	11
18.	Agricultural Microbiology	1	2+1	3
19.	Nematology	1	1+1	2
Soil Science & Agrl. Chemistry				
20.	Soil Science & Agrl. Chemistry	3	5+3	8
21.	Biochemistry	1	1+1	2
22.	Environmental Science	1	2+1	3
23.	**Elective Courses**	3	6+3	9
	Total	**60**	**84+55**	**139**
Student READY				
24.	Rural Agricultural Work Experience and Agro-Industrial Attachment (RAWE&AIA)	1	0+20	20
25.	Experiential Learning Programme	2	0+20	20
	Total	**3**	**0+40**	**40**

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2.6.35

Non-Gradial courses				
26.	NSS /NCC	1	0+1	1
27.	PED	1	0+1	1
28.	Educational Tour	2	0+2	2
	Total Non-Gradial courses	**4**	**0+4**	**4**
	Grand Total	**67**	**84+99**	**183**
Remedial Course				
	Introductory Biology	1	0+1	1

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B.Sc. (Hons.) Agriculture

DEPARTMENT WISE DISTRIBUTION OF COURSES

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
AGRICULTURAL ECONOMICS				
1.	U21AAECT201	Fundamentals of Agricultural Economics	2+0	II
2.	U21AAECB301	Farm Management, Production & Resource Economics	1+1	III
3.	U21AAECB401	Agricultural Marketing Trade & Prices	2+1	IV
4.	U21AAECT501	Intellectual Property Rights#	1+0	V
5.	U21AAECB601	Agricultural Finance and Cooperation	2+1	VI
		TOTAL	**8 + 3=11**	
AGRICULTURAL EXTENSION				
1.	U21AAEXT101	Rural Sociology & Educational Psychology	2+0	I
2.	U21AAEXB203	Fundamentals of Agricultural Extension Education	2+1	II
3.	U21CAEXB502	Communication Skills and Personality Development	1+1	V
4.	U21AAEXB604	Entrepreneurship Development and Business Communication	1+1	VI
		TOTAL	**6 + 3=9**	
BASIC SCIENCES AND LANGUAGES				
1.	U21CENGP105	Comprehension & Communication Skills in English	0+1	I
2.	U21CMATB109	Elementary Mathematics	0+1	I
3.	U21ACOMB206	Agri- Informatics	1+1	II
4.	U21CSTAB410	Statistical Methods	1+1	IV
		TOTAL	**2 + 4=6**	

DEPARTMENT OF AGRICULTURAL ENTOMOLOGY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21CAENB202	Fundamentals of Entomology	2+1	II
2.	U21AAENB303	Principles of Integrated Pest Management	1+1	III
3.	U21AAENB503	Pests of Crops and Stored Grain and their Management	2+1	V
4.	U21AAENB603	Management of Beneficial Insects	1+1	VI
		TOTAL	**6 + 4=10**	

DEPARTMENT OF AGRONOMY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
AGRONOMY				
1.	U21AAGRB103	Fundamentals of Agronomy and Agricultural Heritage	2+1	I
2.	U21AAGRB 204	Introductory Agro-meteorology & Climate Change	1+1	II
3.	U21AAGRB209	Irrigation and Weed Management	1+1	II
4.	U21AAGRB403	Crop Production Technology – I *(Kharif Crops)*	2+1	IV
5.	U21AAGRT404	Farming System & Sustainable Agriculture	1+0	IV

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6.	U21AAGRB405	Geoinformatics and Nano-technology and Precision Farming#	1+1	IV
7.	U21AAGRP505	Practical Crop Production – I (*Kharif* crops)	0+1	V
8.	U21AAGRB506	Crop Production Technology –II *(Rabi Crops)*	2+1	V
9.	U21AAGRB507	Rainfed Agriculture & Watershed Management	1+1	V
10.	U21AAGRP605	Practical Crop Production –II (*Rabi* crops)	0+1	VI
11.	U21AAGRB606	Principles of Organic Farming	1+1	VI
		TOTAL	**12+10=22**	
AGRICULTURAL ENGINEERING				
1.	U21AAEGB302	Farm Machinery and Power	1+1	III
2.	U21AAEGB402	Soil and Water Conservation Engineering	1+1	IV
3.	U21AAEGB504	Renewable Energy and Green Technology	1+1	V
4.	U21AAEGB602	Protected Cultivation and Secondary Agriculture	1+1	VI
		TOTAL	**4 + 4=8**	
ANIMAL HUSBANDRY				
1.	U21AAMPB305	Livestock and Poultry Management	2+1	III
			2 + 1=3	

DEPARTMENT OF HORTICULTURE

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
HORTICULTURE				
1.	U21AHORB107	Fundamentals of Horticulture	1+1	I
2.	U21AHORB308	Production Technology for Vegetables and Spices	1+1	III
3.	U21AHORB407	Production Technology for Ornamental Crops, MAP and Landscaping	1+1	IV
4.	U21AHORB508	Production Technology for Fruit and Plantation Crops	1+1	V
5.	U21AHORB609	Post-harvest Management and Value Addition of Fruits and Vegetables	1+1	VI
		TOTAL	**5 + 5=10**	
FORESTRY				
1.	U21AFORB208	Introduction to Forestry	1+1	II
		TOTAL	**1 + 1=2**	
FOOD SCIENCE				
1.	U21AFSNT607	Principles of Food Science and Nutrition	2+0	VI
		TOTAL	**2 + 0=2**	

DEPARTMENT OF PLANT BREEDING AND GENETICS

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
GENETICS AND PLANT BREEDING				
1.	U21CGPBB106	Fundamentals of Genetics	2+1	I
2.	U21CGPBB307	Fundamentals of Plant Breeding	2+1	III
3.	U21AGPBB406	Fundamentals of Plant Biotechnology	2+1	IV
4.	U21AGPBB608	Crop Improvement	2+1	VI
		TOTAL	**8 + 4=12**	

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SEED SCIENCE AND TECHNOLOGY				
1.	U21ASSTB310	Principles of Seed Technology	2+1	III
		TOTAL	**2 + 1=3**	
CROP PHYSIOLOGY				
1.	U21ACRPB104	Fundamentals of Crop Physiology	2+1	I
		TOTAL	**2 + 1=3**	

DEPARTMENT OF PLANT PATHOLOGY & AGRICULTURAL MICROBIOLOGY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
PLANT PATHOLOGY				
1.	U21APATB304	Fundamentals of Plant Pathology	2+1	III
2.	U21APATB408	Principles of Integrated Disease Management	1+1	IV
3.	U21APATB510	Diseases of Field and Horticultural Crops and their Management-I	2+1	V
4.	U21APATB610	Diseases of Field and Horticultural Crops and their Management-II	2+1	VI
		TOTAL	**7 + 4=11**	
AGRICULTURAL MICROBIOLOGY				
1.	U21AAGMB102	Agricultural Microbiology	2+1	I
		TOTAL	**2+1 = 3**	
NEMATOLOGY				
1.	U21AANMB306	Introductory Nematology	1+1	III
		TOTAL	**1 +1=2**	

DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
SOIL SCIENCE AND AGRICULTURAL CHEMISTRY				
1.	U21CSACB108	Fundamentals of Soil Science	2+1	I
2.	U21ASACB309	Problematic Soils and their Management	1+1	III
3.	U21CSACB509	Manures, Fertilizers and Soil Fertility Management	2+1	V
		TOTAL	**5+3=8**	
BIOCHEMISTRY				
1.	U21CBICB205	Fundamentals of Biochemistry	1+1	II
		TOTAL	**1 + 1=2**	
ENVIRONMENTAL SCIENCE				
1.	U21AENSB207	Environmental Studies and Disaster Management#	2+1	II
		TOTAL	**2 + 1=3**	

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LIST OF ELECTIVE COURSES

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21AAECE409	Agribusiness Management	2+1	IV
2.	U21AAEXE409	Agricultural Journalism	2+1	IV
3.	U21AAGRE409	Weed Management	2+1	IV
4.	U21AHORE409	Landscaping	2+1	IV
1.	U21AAGRE511	System Simulation and Agro-advisory	2+1	V
2.	U21AGPBE511	Commercial Plant Breeding	2+1	V
3.	U21AHORE511	Protected Cultivation	2+1	V
1.	U21AAGME611	Biopesticides & Biofertilizer	2+1	VI
2.	U21AGPBE611	Micro Propagation Technologies	2+1	VI
3.	U21AHORE611	Hi-tech Horticulture	2+1	VI
4.	U21ASACE611	Agrochemicals	2+1	VI

STUDENT READY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21AAEXP701	Rural Agricultural Work Experience and Agro-Industrial Attachment (RAWE&AIA)	0+20	VII
		TOTAL	**0 + 20=20**	
Experiential Learning Programme				
1.	U21AELPP8XX	Experiential Learning Programme-1	0+10	VIII
2.	U21AELPP8XX	Experiential Learning Programme-2	0+10	VIII
		TOTAL	**0 + 20=20**	

LIST OF EXPERIENTIAL LEARNING PROGRAMME COURSES

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21AELPP801	Commercial Beekeeping	0+10	VIII
2.	U21AELPP802	Commercial Sericulture	0+10	VIII
3.	U21AELPP803	Urban Entomology and Pest Management	0+10	VIII
4.	U21AELPP804	Production Technology for Bio-control Agents#	0+10	VIII
5.	U21AELPP805	Organic Production Technology	0+10	VIII
6.	U21AELPP806	Integrated Farming System	0+10	VIII
7.	U21AELPP807	Poultry Production Technology	0+10	VIII

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8.	U21AELPP808	Commercial Horticulture	0+10	VIII
9.	U21AELPP809	Floriculture and Landscape Architecture	0+10	VIII
10.	U21AELPP810	Molecular Breeding	0+10	VIII
11.	U21AELPP811	Plant Tissue Culture	0+10	VIII
12.	U21AELPP812	Commercial Seed Production	0+10	VIII
13.	U21AELPP813	Mushroom Cultivation Technology	0+10	VIII
14.	U21AELPP814	Bio-inoculants Production Technology	0+10	VIII
15.	U21AELPP815	Soil, Plant, Water, Manure and Fertilizers Testing	0+10	VIII
16.	U21AELPP816	Agriculture Waste Management	0+10	VIII

NON-GRADIAL COURSES

Sl.No.	Course No.	Cours e Title	Cr.Hr.	Semester
1.	U21CNCCP110 / U21CNSS P110	National Cadet Corps / National Service Scheme	0+1	I
2.	U21CPEDP111	Physical Education & Yoga Practices	0+1	I
3.	U21AMVEP41I	Educational Tour - I (State)	0+1	IV
4.	U21AMVEP702	Educational Tour - II (All India)	0+1	VII
		TOTAL	**0 + 4 = 4**	

REMEDIAL COURSE

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21AREMP112	Introductory Biology	0+1	I
		TOTAL	**0 + 1 = 1**	

Team Teaching

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B.Sc. (Hons.) Agriculture

VI semester

1	U21AAECB601	Agricultural Finance and Cooperation	2+1
2	U21AAEGB602	Protected Cultivation and Secondary Agriculture	1+1
3	U21AAENB603	Management of Beneficial Insects	1+1
4	U21AAEXB604	Entrepreneurship Development and Business Communication	1+1
5	U21AAGRP605	Practical Crop Production –II (*Rabi* crops)	0+1
6	U21AAGRB606	Principles of Organic Farming	1+1
7	U21AFSNT607	Principles of Food Science and Nutrition	2+0
8	U21AGPBB608	Crop Improvement	2+1
9	U21AHORB609	Post-harvest Management and Value Addition of Fruits and Vegetables	1+1
10	U21APATB610	Diseases of Field and Horticultural Crops and their Management-II	2+1
11	U21AAGME611	Biopesticides & Biofertilizer	2+1
	U21AGPBE611	Micro Propagation Technologies	
	U21AHORE611	Hi-tech Horticulture	
	U21ASACE611	Agrochemicals	
		TOTAL	**15+10 = 25**

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U21AAECB601 **AGRICULTURAL FINANCE AND CO-OPERATION** **(2+1)**

Theory

Unit I: Agricultural Finance – Nature and Scope **(4 hrs)**

Agricultural Finance - meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Sources of credit - advantages and disadvantages - Rural indebtedness - History and Development of rural credit in India.

Unit II: Financial Institutions **(9 hrs)**

Sources of agricultural finance: institutional and non-institutional sources and their roles, commercial banks - social control and nationalization of commercial banks - AD branches - Area approach – Priority sector lending. Micro financing including KCC, Micro finance – SHG Models, Lead Bank Scheme, RRBs, Scale of finance and unit cost. Cost of credit. An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, World Bank, Insurance and Credit Guarantee Corporation of India. Recent development in agricultural credit: Rural credit policies of Government – Subsidized farm credit - Differential Interest Rate (DIR) Scheme – Loan relief measures

Unit III: Farm Financial Analysis **(6 hrs)**

Credit analysis: 3R's, 7P's and 5C's of credit. Preparation of bankable projects / Farm credit proposals – Feasibility; Appraisal - Time value of money: Compounding and Discounting - Undiscounted and Discounted measures. Preparation and analysis of financial statements Balance Sheet, Income Statement and Cash Flow Statement. Basic guidelines for preparation of project reports - Bank norms – SWOC analysis.

Unit IV: Co-operation **(6 hrs)**

Agricultural Cooperation in India – Meaning, brief history of cooperative development in India Pre and Post - Independence periods and Co-operation in different plan periods, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Co- operative credit structure: short term and long term. Agricultural Cooperation - credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED. Strength and weakness of co-operative credit system, Policies for revitalizing co- operative credit.

Unit V: Banking and Insurance **(9 hrs)**

Negotiable Instruments: Meaning, Importance and Types - Central bank: RBI – functions Credit control – Objectives and Methods: CRR, SLR and Repo rate - Credit rationing - Dear money and cheap money. Financial Inclusion and Exclusion: credit widening and credit deepening monetary policies. Credit gap: Factors influencing credit gap. Non - Banking Financial Institutions (NBFI). NPA – Causes, consequences and mitigation. Crop Insurance: Schemes, Coverage, Advantages and Limitations in Implementation. Weather based crop insurance, features, determinants of compensation. Livestock Insurance Schemes - Agricultural Insurance Company of India Ltd (AIC): Objectives and functions.

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Practical **(17 hrs)**

Determination of most profitable level of capital use. Optimum allocation of limited amount of capital among different enterprise. Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using published data. Visit to a commercial bank, cooperative bank / cooperative society to acquire first- hand knowledge of their management, schemes and procedures. Visit to District Central Co-operative Bank (DCCB) to study its role, functions and procedures for availing loan – Fixation of Scale of Finance. Guest lecture on Role and functions of Lead Bank & NABARD and its Role and Functions. Estimation of credit requirement of farm business – A case study. Preparation and analysis of Balance Sheet, and Cash Flow Statement – A case study. Exercise on Financial Ratio Analysis. Appraisal of farm credit proposals – A case study. Preparation and analysis of income statement – A case study. Preparation of Bankable projects / Farm Credit Proposals and appraisal - Undiscounted methods and Discounted methods. Techno-economic parameters for preparation of projects for various agricultural products and its value added products. Analysis of Different Crop Insurance Products.

Lecture Schedule

1. Agricultural Finance - meaning, scope and significance, credit needs and its role in Indianagriculture.
2. Agricultural credit: meaning, definition, need and classification.
3. Sources of credit - advantages and disadvantages.
4. Rural indebtedness - History and Development of rural credit in India.
5. Sources of agricultural finance: institutional and non-institutional sources - their roles.
6. Commercial banks - social control and nationalization of commercial banks banks - AD branches - Area approach – Priority sector lending.
7. Micro financing including KCC, Micro finance – SHG Models, Lead bank scheme.
8. RRBs, Scale of finance and unit cost. Cost of credit.
9. An introduction to higher financing institutions - RBI, NABARD,
10. An introduction to higher financing institutions - ADB, IMF and World Bank.
11. Role of Insurance and Credit Guarantee Corporation of India.
12. Recent developments in agricultural credit.
13. Rural credit policies of Government: Subsidized farm credit- Differential Interest Rate (DIR)Scheme– Loan relief measures
14. Credit analysis: 3 R's, 7 P's and 3C's of credit.
15. Preparation of bankable projects / Farm credit proposals – Feasibility.
16. Appraisal: Time value of money: Compounding and Discounting - Undiscounted and Discounted measures.
17. **MID SEMESTER EXAMINATION**
18. Preparation and analysis of financial statements – Balance Sheet, Income Statement andCash Flow Statement.
19. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.
20. Agricultural Cooperation in India – Meaning, brief history of cooperative development in India.

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21. Pre and Post - Independence periods and Co-operation in different plan periods, objectives, principles of cooperation, significance of cooperatives in Indian agriculture.
22. Co-operating credit structure: short term and long term. Agricultural Cooperation - credit, marketing.
23. Consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing;
24. Role of ICA, NCUI, NCDC and NAFED.
25. Strength and weakness of co-operative credit system, Policies for revitalizing co-operativecredit.
26. Negotiable Instruments: Meaning, Importance and Types.
27. Central bank: RBI – functions, Credit control – Objectives and Methods: CRR, SLR and Repo rate.
28. Credit rationing - Dear money and cheap money.
29. Financial Inclusion and Exclusion: credit widening and credit deepening monetary policies. Credit gap: Factors influencing credit gap.
30. Non - Banking Financial Institutions (NBFI). NPA – Causes, consequences and mitigation.
31. Crop Insurance and Livestock Insurance Schemes: Coverage, Advantages and Limitations in implementation.
32. PMFBY – introduction, current scenario, coverage, advantages and limitations.
33. Weather based crop insurance, features, determinants of compensation.
34. Agricultural Insurance Company of India Ltd (AIC): Objectives and functions.

Practical Schedule

1. Determination of most profitable level of capital use.
2. Optimum allocation of limited amount of capital among different enterprises.
3. Analysis of progress and performance of cooperatives using published data.
4. Analysis of progress and performance of commercial banks and RRBs using published data.
5. Visit to a commercial bank, cooperative bank / cooperative society to acquire first - hand knowledge of their management, schemes and procedures.
6. Visit to District Central Co-operative Bank (DCCB) to study its role, functions and procedures for availing loan – Fixation of Scale of Finance.
7. Visit to / Guest lecture on Role and functions of Lead Bank.
8. Visit to / Guest lecture on Role and functions of NABARD headquarters.
9. Estimation of credit requirement of farm business – A case study.
10. Preparation and analysis of Balance Sheet and Cash Flow Statement and Appraisal of farm credit proposals – A case study.
11. Visit to / Guest lecture on Agricultural Insurance Company.
12. Preparation and analysis of income statement – A case study.
13. Preparation of Bankable projects / Farm Credit Proposals and appraisal.
14. Undiscounted methods and Discounted methods.
15. Techno-economic parameters for preparation of projects for various agricultural products and its value added products.

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16. Analysis of Different Crop Insurance Products
17. **FINAL PRACTICAL EXAMINATION.**

Text Books

1. V.B. Jugale, 2022. Theories of Agricultural Finance Atlantic Publishers and Distributors (P) Ltd,
2. Subba Reddy, S and P. Raghu Ram. 2011. Agricultural Finance and Management. Oxford & IBH. New Delhi.
3. Patnaik, V.E. and A.K. Roy. 1988. Cooperation and Cooperative Management. Kalyani Publishers. Ludhiana.

References

1. Geman H, 2019. Agricultural Finance - From Crops to Land, Water and Infrastructure, John Wiley & Sons Inc
2. N Srinivasan, 2022. State of Agricultural Finance in India SAGE Publications Pvt. Ltd
3. K. Prabhakar Rajkumar 2008 Agricultural Finance in India: The Role of NABARD, New Century Publications
4. K. K. Tripathy and Anshu Singh 2022, Rural Finance and Financial Inclusion : A Synthesis of Policy Milestones and Emerging Paradigms. Notion Press, Chennai
5. Muniraj, R. 1987. Farm Finance for Development. Oxford & IBH. New Delhi.
6. Lee, W.F., M.D. Boehlje, A.G. Nelson and W.G. Murray. 1998. Agricultural Finance. Kalyani Publishers. New Delhi.
7. Mammoria, C.B. and R.D. Saxena. 1973. Cooperation in India. Kitab Mahal. Allahabad.

e - References:

1. www.rbi.org
2. www.nabard.org
3. www.imf.org
4. www.worldbank.org
5. https://www.ica.coop/en
6. https://icaap.coop/
7. https://www.nafed-india.com/

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U21AAEGB602 **PROTECTED CULTIVATION AND SECONDARY AGRICULTURE** **(1+1)**

Theory:

Unit I: Protected cultivation and design of green houses **(4 hrs)**

Protected cultivation - need, advantages and limitations - present status. Green house technology - introduction - types of greenhouses - plant response to greenhouse environment. Planning and design of greenhouses - design criteria of green house for cooling and heating purposes - green house equipments - materials for construction of traditional and low cost green houses- irrigation systems used in greenhouses.

Unit II: Applications of greenhouses **(2 hrs)**

Typical applications - passive solar greenhouse - hot air greenhouse heating systems - greenhouse drying - cost estimation and economic analysis.

Unit III: Engineering properties of food materials **(3 hrs)**

Important engineering properties: physical, thermal, aero and hydro dynamic mechanical, frictional, rheological and optical properties of cereals, pulses and oil seeds and their application in PHT equipment design and operation.

Unit IV: Drying and dehydration **(4 hrs)**

Drying and dehydration, moisture determination- direct method and indirect method of moisture determination. EMC - importance of EMC - drying theory - drying rate periods- constant rate period- falling rate period - CMC. Drying methods- contact type dryers- convectivetype dryer- radiation dryer. Commercial grain dryer - deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer, LSU dryer and solar dryer - types of solar dryer.

Unit V: Material handling **(3 hrs)**

Material handling - material handling equipments- selection of material handling equipments. Belt conveyor- bucket elevator - screw conveyor - pneumatic conveyor - their working principle and selection - capacity - horse power - advantages and limitations.

Practical: **(17 hrs)**

Study of different type of greenhouses based on shape. Determine the rate of air exchangein an active summer winter cooling system. Determination of drying rate of agricultural products inside green house.Study of greenhouse equipments. Visit to various Post Harvest Laboratories. Determination of moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

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Lecture Schedule:

1. Introduction to protected cultivation - need, advantages and limitations and presentstatus - green house technology - types of greenhouses
2. Plant response to greenhouse environment - sunlight, temperature, relative humidity,carbon dioxide enrichment - soil / media
3. Planning and design of greenhouses -design criteria of green house for cooling and heating purposes framework and cladding materials.
4. Green house equipments - materials for construction of traditional and low cost greenhouses - irrigation systems used in greenhouses.
5. Typical applications of greenhouses - passive solar greenhouse, hot air greenhouseheating system
6. Green house drying- cost estimation and economic analysis.
7. Important Engineering properties of cereals, pulses and oilseeds and their application in PHT equipment design and operation.
8. Physical properties – size - shape - sphericity - density - specific gravity. Mechanical properties – aero and hydrodynamic properties - terminal velocity - drag coefficient - application.
9. **MID SEMESTER EXAMINATION.**
10. Thermal properties- specific heat - thermal conductivity- thermal diffusivity - Frictional properties - angle of repose - angle of internal friction - optical and rheological properties- application
11. Drying and dehydration - moisture measurement, direct method and indirect methods of moisture measurements.
12. EMC - importance of EMC - drying theory- drying rate periods - constant rate period, falling rate period, CMC.
13. Drying methods - contact type dryers - convective type dryer- radiation dryer - Commercial grain dryers - thin layer dryer, deep bed dryer,
14. Flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer, LSU dryer and solar dryer - types of solar dryer
15. Material handling - material handling equipments- selection of material handling equipments. Belt conveyor - idlers - idler spacing - belt material - belt tension-working principle and selection.
16. Bucket elevator - head section - boot section - elevator legs - elevator belts- bucket drive mechanism - working principle and selection.
17. Screw conveyor - details - various shapes screw trough - capacity - horse power, Pneumatic conveyor - working principle and selection. - Advantages and limitations.

Practical Schedule:

1. Study of different types of greenhouses based on shape.
2. Determination of rate of air exchange in an active summer and winter cooling systems.
3. Determination of drying rate of agricultural products inside green house.
4. Study of greenhouse equipment's.
5. Determination of engineering properties shape and size, bulk density and porosity of biomaterials.

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6. Determination of moisture content of various grains by direct method - oven drying and infrared moisture methods.
7. Determination of moisture content of various grains by indirect method – moisture meter.
8. Performance evaluation of grain winnower
9. Performance evaluation of air screen cleaner
10. Study of fluidized bed dryer
11. Performance evaluation of tray dryer
12. Determination of capacity of a belt conveyor and its performance evaluation
13. Determination of capacity of a bucket conveyor and its performance evaluation
14. Field visit to greenhouse.
15. Visit to post harvest processing unit.
16. Visit to Seed processing unit.
17. **FINAL PRACTICAL EXAMINATION**

Text Books:

1. Ratnesh Kumar, Suresh Chandra, Samsher., 2020,Practical Manual of Protected Cultivation and Secondary Agriculture, Jain Brothers
2. M.N.Dabhi and N.K. Dhamsananiya 2017 Agricultural Processing and food engineering (A basicapproach) published by Kalyani Publisher. New Delhi.
3. Greenhouse Management for Horticulture crops -SandhyaSharaf., 2012. Oxford Book Company,
4. Chakraverty A. 1998 Post-harvest technology of cereals, Pulses and Oil seeds, Oxford & IBH publishers. New Delhi.
5. Sahay K.M and Singh K .K. 1994 Unit operations of agricultural processing. Vikas Publishinghouse Pvt. Ltd. New Delhi.

References Books

1. Sanoj Kumar , Ashok Kumar and Satish Kumar.,2020 Protected Cultivation and Secondary Agriculture, Lambert Academic Publishing
2. Singh Brahma and Balraj Singh., 2014. Advances in Protected Cultivation, NIPC.
3. Greenhouse Management for Horticulture crops -S.Prasad & U.Kumar., 2013. AGROBIOS (INDIA).
4. Greenhouse for Homeowners and Gardeners - John W. Bartok, Jr., 2000. NRAES
5. Greenhouse Engineering - Robert A. Aldrich and John W. Bartok, Jr., 1994. NRAES

E- References

1. www.ncert.nic.in
2. www.ramapublishinghouse.com
3. www.digitalgreen.org
4. www.amrita.edu
5. www. nhb.gov.in

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U21AAENB603 MANAGEMENT OF BENEFICIAL INSECTS (1+1)

Theory

Unit I: Honey bee species and their management **(6 hrs)**

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants.

Unit II: Mulberry cultivation and Silkworm rearing **(5 hrs)**

Types of silkworms, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons.

Unit III: Pests and diseases of mulberry silkworm **(3 hrs)**

Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

Unit- IV: Lac insects **(1 hr)**

Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control.

Unit - V: Predators, parasitoids, pollinators, weed killers and scavengers: **(2 hrs)**

Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

Practical **(17 hrs)**

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworms, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

Lecture Schedule:

1. Economic classification of insects and importance of beneficial insects
2. Bee species – comparison – castes of bees – bee behaviour and bee dance
3. Apiary management practices – bee pasturage – foraging – bee communications- seasonal variations- Seasonal management of honey bees
4. Different types hives -Bee products- Bee enemies- predators and parasites
5. Bee diseases – bacteria, virus, fungi and protozoan

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6. Equipments used in bee keeping
7. Ecological requirements for mulberry cultivation – soil type – mulberry varieties - Different methods of propagation -merits and demerits – selection of semi hard wood cuttings -methods of mulberry leaf harvest and preservation
8. Pests and diseases of mulberry
9. **MID SEMESTER EXAMINATION**
10. Types of silkworms - Mulberry silkworm – origin – classification based on voltinism, moultinism, geographical distribution and genetic nature - tasar, eri, muga
11. Characters of multivoltine races, bivoltine races, cross breeds and bivoltine hybrids – double hybrids– suitability for rearing in different seasons
12. Morphology and biology of silkworm – sexual dimorphism in immature and adult stages – silkworm genetics – chromosome number – sex limited characters in egg, larva and cocoon for grainage use -tasar, eri, muga
13. Methods of chawki and late age silkworm rearing- disinfections.
14. Pests and diseases of silkworms
15. Lac insect- biology-strains-Natural enemies of lac insect and lac products
16. Biological control – definition, parasitoids and predators and their role in pest management and mass production.
17. Biological weed control, pollinators, scavengers and soil builders

Practical Schedule:

1. Identification, morphology and structural adaptations in honey bees
2. Different species of honey bees
3. Bee keeping appliances and seasonal management
4. Rearing of queen, worker and drone cell and colony organization
5. Bee enemies and diseases/ bee products
6. Mulberry nursery bed preparation – methods of planting - Pruning methods – leaf / shoot harvest– preservation of leaves. Cultivation of the host plants of eri, muga and tasar silkworms.
7. Pests and diseases of mulberry / Economics of Mulberry
8. Different species of silkworms- Chawki and late age silkworm rearing
9. Appliances and disinfection in silkworm rearing
10. Pests and diseases of mulberry silkworm
11. Lac insect-life history, hosts and culturing of lac, natural enemies and lac products
12. Identification and culturing of parasitoids and predators
13. Mass production techniques of predators and parasitoids
14. Visit to parasitoids and predators production units and working out of cost economics.
15. Identification of weeds, and weed killers, pollinators, scavengers and soil builders
16. Visit to research and training institutions for bee keeping, sericulture, lac insect and natural enemies and working out of cost economics.
17. **FINAL PRACTICAL EXAMINATION**

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Text Books:

1. Ganga. G and J. Sulochana Chetty. 2017. Introduction to Sericulture, Oxford and IBH Pub. Co Pvt. Ltd., New Delhi.
2. Belsare. D. K. et al., 2019. Text book of Apiculture, Himalaya Publishing House.
3. Dandin, S.B., J.Jayaswal and K. Giridhar.2003. Hand book of Sericulture Technologies. Central Silk Board, Bangalore.
4. Singh.T. and Saratchandra, B.2004. Principles and techniques of silkworm seed production. Discovery publishing house, New Delhi.
5. Srivastava, K.P. and G.S. Dhaliwal. (2011) Text Book of Applied Entomology Vol.II, Kalyani Publishers, New Delhi.
6. Madhan Mohan Roa. M.A Text book of Sericulture, 1998, B. S. Publications.
7. Jean Prost, P and Paul Medon. 1994. Apiculture, Oxford and IBH Pub. Co Pvt. Ltd., New Delhi.

References Books:

1. David, B.V. and V.V. Ramamurthy. 2011. Elements of Economic Entomology, Namrutha Publications, Chennai. {ISBN: 978-81-921477-0-3}
2. Pedigo, L.P. and M.E. Rice. 1996.Entomology and Pest Management. Prentice-Hall of IdiaPvt Ltd,New Delhi. {ISBN-978-8120338869}
3. Dhaliwal, G.S. and R.Arora. 2014. Integrated Pest Management – Concepts and approaches. Kalyani publishers, New Delhi. {ISBN: 81-7663-904-4}
4. Opender Koul and G. S. Dhaliwal. 2019. Predators and Parasitoids, CRC Press.

e – References

1. http://www.sristi.org/hbnew
2. http://www.ncipm.org.in/recent-publications.html
3. http://www.ipmnet.org
4. www.silkbase.org
5. www.papilo.ab.a.u.tokyo.ac.jp

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U21AAEXB604 ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS COMMUNICATION (1+1)

Theory

Unit I – Entrepreneur and Entrepreneurial Process (3 hrs)

Concept and Types of Entrepreneurship - Importance of Entrepreneurship, Characteristics of Entrepreneurs and Entrepreneurial Skills - Entrepreneurial process.

Unit II – Entrepreneurship Opportunities (3 hrs)

Government policy and programs and institutions for entrepreneurship development, Impact of economic reforms on Agribusiness/ Agrienterprises, Entrepreneurial Development Process, Opportunities for agri-entrepreneurship and rural enterprise, SWOT Analysis.

Unit III – Managerial Functions – I (5 hrs)

Planning, managing and setting up of an enterprise – Financing for enterprise : Venture capital, contract farming, Joint venture, PPP. Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation)

Unit IV – Managerial Functions – II (4 hrs)

Business Leadership Skills (Communication, direction and achievement motivation), problem solving skill.

Unit V – Functional areas of Management (2 hrs)

Supply Chain Management – Drivers and flows and Total Quality Management – Meaning and Principles, Project Planning Formulation, report preparation and Startups in Agri Business in India.

Practical (17 hrs)

Assessing entrepreneurial traits, practicing business communication, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs

Lecture Schedule

1. Concept of Entrepreneurship and Types of Entrepreneurship
2. Characteristics of Entrepreneurs and Entrepreneurial Skills
3. Entrepreneurial process — Importance of Entrepreneurship
4. Government policy and programs and institutions for entrepreneurship development.
5. Impact of economic reforms on Agribusiness/ Agri-enterprises.
6. Entrepreneurial Development Process - Opportunities for agri-entrepreneurship and rural enterprise, SWOC Analysis
7. Planning, managing and setting up of an enterprise.
8. Financing for enterprise: Venture capital, contract farming, Joint venture, PPP.
9. **MID SEMESTER EXAMINATION**
10. Developing organizational skill (controlling & supervising)

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11. Developing organizational skill (Problem solving, monitoring & evaluation)
12. Business Leadership Skills (Communication, direction)
13. Motivation, hypothesis behind motivation, entrepreneurial motivation training.
14. Business Leadership Skills - controlling, supervising, problem solving.
15. Managerial skills - Organizing. Communication, direction and Problem solving skill.
16. Supply Chain Management – Importance, Drivers and flows and Total Quality Management – Meaning and Principles
17. Project Planning Formulation, report preparation and Startups in Agri Business in India.

Practical Schedule

1. Assessment of entrepreneurial traits
2. Practicing business communication
3. Understanding about Problem solving skills through case analysis - I
4. Understanding about Problem solving skills through case analysis - II
5. Discussion and Understanding achievement motivation by case analysis
6. Exercise in creativity
7. Understanding Time audit through planning by case analysis.
8. Visit to entrepreneurship development institutes
9. Visit to firms / discussion with entrepreneurs
10. Exercise on SWOC Analysis of Agribusiness enterprises in India - I
11. Exercise on SWOC Analysis of Agribusiness enterprises in India - II
12. Identification of new business opportunities.
13. Preparation of business plan and proposal writing - I
14. Preparation of business plan and proposal writing - II
15. Presentation and evaluation of the business plan – I and II
16. Visit to startup centers.
17. **FINAL PRACTICAL EXAMINATION**

Text book

1. Yuvaraja, N. 2020. Entrepreneurship Development and Agri Business Management, Brillion Publishing, New Delhi.
2. Sagar Mondal and G.L. Ray. 2009. Text Book of Entrepreneurship and Rural Development, Kalyani Publishers, Ludhiana.
3. Gupta, C.B. 2001. Management: Theory and Practice. Sultan Chand and Sons, New Delhi.

Reference Books

1. Vasant Desai. 2000. Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, New Delhi.
2. Khanka, S.S.1999. Entrepreneurial Development. S. Chand and Co., New Delhi.
3. Vasant Desai. 1997. Small Scale Industries and Entrepreneurship. Himalaya Publishing House, New Delhi.

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E- References

1. www.ediindia.org
2. www.iie.nic.in
3. www.msme.gov.in
4. www.niesbudtraining.org

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PRACTICAL CROP PRODUCTION – II

U21AAGRP605 **(*RABI* CROPS)** **(0+1)**

Practical

Each student will be allotted a minimum land area of 100/200 m^2. He / she will do all field operations in the allotted land from field preparation to harvest and processing.

Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce.

Rice (Transplanted or direct sown)

Transplanted rice:

- Rice ecosystems - Climate and weather - Seasons and varieties of India.
- Preparation of nursery - Application of manures to nursery - seed treatment - Forming nursery beds and sowing seeds - Weed management and plant protection to nursery.
- Preparation of main field - Application of organic manures - Green manuring - Bio-fertilizers - Pulling out seedlings and transplanting - Rajarajan 1000 (SRI) - Application of herbicides - Water management - Nutrient management - Plant protection measures - Mechanization in rice cultivation - Recording growth, yield attributes and yield.
- Harvesting, threshing, drying and cleaning the produce - Working out cost of cultivation and economics.

Practical Schedule:

1. Selection of nursery area, preparation of nursery, application of manures and fertilizer to nursery
2. Study and practice of green manuring and bio-fertilizer application in rice
3. Acquiring skill in seed treatment, seed soaking and incubation, nursery sowing and management
4. Study and practice of main field preparation and puddling operations
5. Practicing of field preparatory operations – sectioning of field bunds and plastering, leveling and basal application of fertilizers
6. Practicing transplanting techniques in lowland rice/ exposure to mechanizedtransplanting
7. Estimation of plant population and acquiring skill in gap filling and thinning
8. Study of weeds and weed management in rice/ exposure to mechanized weeding
9. **MID-SEMESTER EXAMINATION**
10. Acquiring skill in nutrient management and practicing top dressing techniques
11. Study of water management practices for lowland rice
12. Observation of insect pests and diseases and their management
13. Recording growth and other related characters of rice
14. Estimation of yield and yield parameters in rice
15. Harvesting, threshing and cleaning of the produce/ exposure to mechanized harvesting& threshing. [Crop Weather Calander]
16. Preparation of balance sheet including cost of cultivation and net returns per student
17. **FINAL PRACTICAL EXAMINATION**

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Text Books:

1. Rajendra Prasad. 2004. Text Book on Field Crop Production, Indian Council of Agrl.Research, New Delhi.
2. Reddy,S. R. 2012. Agronomy of field crops. Kalyani publishers, New Delhi.
3. K Annadurai and B Chandrasekaran. 2009. A Text Book Of Rice Science. Scientific Publishers.

Reference Books:

1. Ahlawat, I. P. S. , Om Prakash and G. S. Saini. 1998. Scientific Crop Production in India.Rama Publishing House, Meerut.
2. Chidda Singh. 1997. Modern techniques of raising field crops. Oxford and IBH PublishingCo. Pvt. Ltd., New Delhi.
3. ICAR 2015. Hand book of Agriculture. Indian Council of Agriculture, New Delhi.
4. Crop Production Guide. 2020. Directorate of Agriculture, Chennai and Tamil Nadu Agricultural University, Coimbatore.

E-References:

1. www.irri.org
2. www.crri.nic.in
3. www.drrindia.org

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U21AAGRB606 PRINCIPLES OF ORGANIC FARMING (1+1)

Theory

Unit I: Types of farming and impacts of green revolution farming (2 hrs)

Types of farming – Impacts of green revolution farming – Fate of agro chemicals in ecosystem.

Unit II: Organic Farming - Concepts and Principles (3 hrs)

Ecology and Principles of ecology. Biodiversity: importance and measure to preserve biodiversity. Organic farming: Definition - Scope - Principles and concepts - History of organic farming - global scenario –pre requisites for Organic farming: Integrated Farming System approach – organic carbon: status and improvement strategies – conservation tillage. GAP in organic farming.

Unit III: Nutrient Management in Organic Farming (4 hrs)

Principles of nutrient management in organic farm - Organic sources and potentials – on farm and off farm sources – organic waste recycling methods - Composting types, Microbial Inoculants - Soil and crop management - inter cropping, crop rotation, green manures, cover crops, mulching - bio fertilizers. Panchagavya and other organic solutions (bio stimulants) – Preparation and usage.

Unit IV: Pest and Disease Management in Organic Farming (4 hrs)

Principles of pest management in organic farm - Bio intensive pest and diseases management bio-replents- physical, cultural, mechanical and biological methods – non-chemical weed management methods: preventive, physical, cultural, mechanical and biological control measures.

Unit V: Certification, Exports and ITK (4 hrs)

Organic certification – NPOP guidelines - Certification agencies in India – crop production standards – Quality Standards - labeling and accreditation process - marketing and export opportunities - APEDA. Indigenous Technical Knowledge (ITK) in organic agriculture – rationale and principles - Benefits and problems of organic farming: promotional activities – economic evaluation of organic production systems.

Practical (17 hrs)

Experiencing organic farming practices – soil, seed, nutrient, weed, water, pest and diseases, post-harvest management - hands on experience on bio composting, vermicomposting, ITK based biological preparations, bio-inoculants - quality analysis of inputs and products - grading, packaging, post-harvest management – visit to organic farms, market outlets and organic certification centers.

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Lecture Schedule

1. Farming – types of farming – Specialized farming, Zero budget farming.
2. Impacts of green revolution farming
3. Fate of agro chemicals in ecosystem.
4. Ecology and Principles of ecology. Biodiversity: importance and measure to preservebiodiversity
5. Organic farming: Definition - Scope - Principles and concepts - History of organic farming.
6. Organic carbon: status and improvement strategies – conservation tillage.
7. Principles of nutrient management in organic farm - Organic sources and potentials – on farm and off farm sources – organic waste recycling methods
8. Soil and crop management - inter cropping, crop rotation, green manures, cover crops,mulching - bio fertilizers
9. **MID SEMESTER EXAMINATION**
10. Principles of pest management in organic farm - Bio intensive pest and diseases management - physical, cultural, mechanical and biological methods
11. Non-chemical weed management methods: preventive, physical, cultural, mechanicaland biological control measures.
12. Organic certification – NPOP guidelines
13. Certification agencies in India – crop production standards
14. Quality considerations - labeling and accreditation process - marketing and export opportunities.
15. Indigenous Technical Knowledge (ITK) in organic agriculture – Integrated farming systemapproach
16. Benefits and problems of organic farming
17. Economic evaluation of organic production systems

Practical Schedule

1. Global and Indian scenario of organic farming
2. Principles of Organic farming
3. Organic management of crops
4. Hands on experience on bio composting
5. Hands on experience on vermicomposting
6. Hands on experience on ITK based biological preparations
7. Hands on experience on Bio-dynamic preparations
8. Seed treatment practices in organic management
9. Bio fertilizers and bio-inoculants usage in organic farming
10. Nutrient management and Nutrient budgeting in organic farming
11. Weed management in organic farming
12. Insect management in organic farming
13. Disease management in organic farming
14. Bio-diversified Integrated farming practices for different ecosystems

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15. Organic certification procedures
16. Visit to organic farms, market outlets and organic certification centers
17. **FINAL PRACTICAL EXAMINATION**

Text books

1. Reddy, S.R., 2017. Principles of organic farming. Kalyani Publishers.
2. Dahama, A.K., 2009. Organic farming for sustainable agriculture, Agrobios publishers.
3. Sharma, A.K., 2008. A Hand book of organic farming, Agrobios Publishers.
4. Palaniappan, S.P., and Annadurai, K. 2008. Organic Farming: Theory and Practice, Scientific Publishers.
5. Lampkin, N., 1994. Organic farming. Farming press London.

References books

1. Veeresh, G.K., 2010. Organic farming, Cambridge university press.
2. Stockdale, E., 2000. Agronomic and environmental implications of organic farming systems. Advances in Agronomy, 70, 261-327.
3. Kannaiyan, S., 2003. Bioetchnology of Biofertilizers, CHIPS, Texas.
4. Reddy, S.R. 2011. Principles of Agronomy Kalyani Publishers, Ludhiana, India
5. Panda, S.C., 2006. Agronomy, Agribios Publication, New Delhi

E - References

1. https://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Compilation_techniquesorganic_agriculture_rev.pdf
2. https://eorganic.org/node/10805
3. https://www.nabard.org/demo/auth/writereaddata/File/OC%2038.pdf
4. https://apeda.gov.in/apedawebsite/Announcements/NPOP_Training_Manual_English_E_Book.pdf
5. https://www.manage.gov.in/publications/eBooks/Organic%20Agriculture.pdf

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U21AFSNT607 PRINCIPLES OF FOOD SCIENCE AND NUTRITION (2+0)

Theory

Unit I: Principles of Food Science and Nutrition (4 hrs)

Food Science - definition – classification of foods – functional and nutritional classification. Food groups and food pyramid. Methods of cooking - moist, dry and microwave - principles, merits and demerits. Importance and scope of nutrition – relation of nutrition to health.

Unit -II: Carbohydrate, Protein and Fat (6 hrs)

Carbohydrate – classification, functions, digestion and absorption, sources and Recommended Dietary allowance (RDA). Energy value of foods – determination. Protein – classification, functions digestion and absorption, sources and requirements. Protein quality of foods – supplementary value of protein. Fat - classification functions, digestion and absorption, sources and requirements. Rancidity – types of rancidity and prevention. Deficiency states of protein, carbohydrate and fat nutrition – signs and symptoms. [Functional foods and GMO's Fortified foods - Phytonutrients]

Unit III: Vitamin and Mineral Nutrition (13 hrs)

Fat Soluble vitamins – A, D, E and K- functions, sources, requirements and deficiency. Water soluble vitamins – thiamine, riboflavin , niacin, pyridoxine, folic acid, cyanacobalamin, biotin, pantothenic acid ascorbic acid – functions, sources, deficiency and requirements. Minerals - calcium, iron, phosphorus, iodine, magnesium, zinc, sodium, potassium, fluorine and chlorine – functions, sources, deficiency and requirements. Importance of water – maintenanceof electrolyte balance. Dietary fibre - importance, health benefits, sources and requirements. [Major sources of vitamins and minerals in cereals, pulses, millets, fruits and vegetables]

Unit IV: Food Preservation and Processing (8 hrs)

Introduction – preservation by sugar - processing of jam, squash, jelly, marmalade and beverages. Preservation by using salt, chemicals, dehydration technology, canning technology, preservation by low temperature and irradiation techniques. Processing of puffed, flaked and extruded products. Quality control of raw and processed products. [Minimal processing and packaging – cut fruits and cut vegetables] [Classes of preservations]

Unit V: Food Quality and Safety (4 hrs)

Food packaging materials – requirements – methods – nutrition labeling. Food adulterants and their detection methods. Food laws and regulations and quality control standards - FSSAI, ISO, EU standards, FDA, HACCP and Codex Alimentarius Commission.

Lecture Schedule

1. Food Science – definition, scope and classification, food pyramid
2. Methods, merits and demerits of moist heat, dry heat and microwave cooking of foods.

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3. Importance and scope of nutrition and the relation of nutrition to health.
4. Concepts of food science (density, phase change, pH, osmosis, surface tension, colloidal system *etc.*)
5. Carbohydrate – classification, functions, digestion and absorption, deficiency symptoms, sources and requirements.
6. Protein – classification, functions, digestion and absorption, deficiency symptoms, sources and requirements.
7. Protein quality – supplementary value of protein.
8. Fat - classification, functions, digestion and absorption, deficiency symptoms, sourcesand requirements.
9. Rancidity – types and prevention methods.
10. Determination of energy value of foods.
11. Fat soluble vitamins – A, D, E and K – functions, deficiency symptoms, sources and requirements.
12. Water soluble vitamins - thiamine, riboflavin, niacin, pyridoxine, folic acid, cyanacobalamin, biotin – functions, deficiencysymptoms, sources and requirements.
13. Water soluble acids -, pantothenic acid, ascorbic acid – functions, deficiencysymptoms, sources and requirements.
14. Minerals – calcium, iron, phosphorus, potassium – functions, sources, requirements and deficiency diseases.
15. Minerals –iodine, magnesium, zinc, sodium, fluorine and chlorine – functions, sources, requirements and deficiency diseases.
16. Importance of water and maintenance of electrolyte balance.
17. **MIDSEMESTER EXAMINATION**
18. Health benefits of fibre, requirements and sources
19. Energy metabolism
20. RDA and factors affecting RDA, RDA for various age groups.
21. Assessment of Nutritional status – Anthropometric, clinical, biophysical, functional, biochemical dietary assessments and vital health statistics
22. Balanced and modified diets, menu planning
23. New trends in food science and nutrition
24. Principles and methods of food processing and preservation (use of heat and low temperature)
25. Methods of food processing and preservation (use of chemicals, drying and radiation)
26. Types of dryers
27. Preservation by using sugar (jam, jelly, squash and marmalade),
28. Preservation by usingsalt (brining and pickling) and use of preservatives in food preservation.
29. Production of fermented food
30. Food microbiology (Bacteria, yeast, moulds spoilage of fresh and processed food)
31. Browning reaction of fruits and vegetables.
32. Food packaging – importance, types of packaging materials and nutrition labeling.
33. Common food adulterants and their detection.

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34. Food laws and regulations and quality control standards - FSSAI, ISO, EU standards, FDA,HACCP and Codex Alimentarius Commission.

Text Books

1. Srilakshmi, B. 2005. Food Science. New Age International (P) Ltd., Publishers,.
2. Srivastava, R.P., and Sanjeevkumar. S. 2013. Fruit and Vegetable preservation. International Book Distributing Co. Lucknow.
3. Srilakshmi .B. 2015. Nutrition Science. New Age International Pvt. Ltd. New Delhi.

References Books

1. Vijaya khader. 2001. Text book of Food Science and Technoology. Directorate of information and publications of agriculture, ICAR, New Delhi.
2. Bibek Ray. 2004. Fundamentals of Food Microbiology. CRC Press, New York
3. Adams, M. R. 2008. Food Microbiology (3rd edition), Panima Publishing Corporation, New Delhi
4. Frazier, W.C. 2008. Food Microbiology, 4th Edition, Tata Mc Graw Hill, New Delhi

E- reference

1. www.cellinteractive.com
2. www.nutrition.org.uk
3. www.fnic.nal.usda.gov
4. www.myfooddiary.com

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U21AGPBB608 CROP IMPROVEMENT (2+1)

Theory

Centers of origin, distribution of species, wild relatives in different cereals, pulses, oilseeds; Plant genetic resources, its utilization and conservation; Floral biology; study of genetics of qualitative and quantitative characters; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Ideotype concept and climate resilient crop varieties for future in the following crops

Unit I: Breeding Cereals **6 hrs**

Cereals and Millets: Rice, Wheat, Maize, Sorghum, Pearl millet and Finger millet.

Unit II: Breeding Pulses and Oil seeds **5 hrs**

Pulses: Redgram, Bengalgram, Greengram, Blackgram, Cowpea and Soybean.

Oilseeds: Groundnut, Sunflower, Gingelly, Castor, Rape and Mustard, Coconut, Oil Palm and other Oil Seeds

Unit III: Breeding Cash crops and Fodder crops **8 hrs**

Fibres: Cotton, Mesta and Jute

Sugars and starches: Sugarcane and Potato, Sweet Potato and Tapioca

Fumitories: Tobacco and Arecanut

Fodder: Guineagrass, Napiergrass, Cumbu–Napierhybrids, Lucerne and *Stylosanthes*.

Unit IV: Breeding Horticultural crops **11 hrs**

Vegetable crops: Bhendi, Tomato, Brinjal, Chilli, Cabbage, Cauliflower, Radish, Amaranthus, Drumstick, Ridge gourd, Bottle gourd, Bitter gourd and Cucumber.

Spices and Condiments: Onion, Garlic, Turmeric and Ginger.

Fruit crops: Mango, Papaya, Banana and Guava.

Flower crops: Rose and Jasmine

Unit V:Maintenance breeding and IPR Issues **4 hrs**

All India Coordinated Crop Improvement Projects. Procedure for release of new varieties; stages in seed multiplication; steps in nucleus and breeder seed production. Varietal rundown and renovation. Participatory plant breeding. Intellectual Property rights issues. Protection of plant varieties under UPOV and PPV & FR Act of India. Plant breeder's rights, Registration of plant varieties under PPV & FR Act. Breeders right, researcher rights and farmers rights.

Practical

Observation on floral biology – anthesis and pollination – selfing –crossing techniques observation on cultivated germplasm, wild species – Experimental design–handling segregating generations - Yield trials in following crops- Rice, Maize and Sorghum, Pearl millet and Finger millet, Red gram, Bengal gram, Green gram, Black gram, Cowpea and Soybean, Groundnut and Sunflower, Sesame and Castor, Cotton, Jute, Sugarcane, Potato, Guinea grass, Napiergrass, Cumbu Napier hybrids, Lucerne, *Stylosanthes*, Bhendi, Brinjal, Tomato, Chilli, Cabbage, Cauliflower, Radish, Amaranthus, Ridge gourd, snake gourd, Bitter gourd, Cucumber, Radish,

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Onion, Garlic, Turmeric, Ginger, Mango, Papaya, Banana, Guava, Rose and Jasmine. Nucleus and Breeder seed production in field crops. Visit to AICRIP and hybrid Seed production plots of different crops.

Lecture Schedule

Centers of origin, distribution of species, wild relatives in different cereals, pulses, oilseeds; Plant genetic resources, its utilization and conservation; Floral biology; study of genetics of qualitative and quantitative characters; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Ideotype- concept and climate resilient crop varieties for future in the following crops:

1. Cereals: Rice.
2. Cereals: Rice.
3. Cereals: Wheat
4. Cereals: Maize
5. Cereals: Sorghum
6. Cereals: Pearl millet and Finger millet,
7. Pulses: Red gram and Bengal gram
8. Pulses: Green gram and Black gram
9. Pulses: Soybean and Cowpea
10. Oilseeds: Groundnut and Gingelly
11. Oilseeds: Rapeseed and Mustard
12. Oilseeds :Coconut, Castor, Sunflower and Oil Palm and other Oil Seeds
13. Fibres: Cotton and Jute
14. Sugars: Sugarcane
15. Starches: Potato, Sweet Potato and Tapioca
16. Forage Grasses: Guinea Grass, Napier grass, Cumbu-Napier hybrids
17. **MID SEMESTER EXAMINATION**
18. Forage legumes: Lucerne and *Stylosanthes*
19. Fumitories and Narcotics: Tobacco and Arecanut,
20. Vegetable crops: Bhendi and Brinjal,
21. Vegetable crops: Tomato and Chilli
22. Vegetable crops: Cabbage and Cauliflower
23. Vegetable crops: Radish and Amaranthus and Drumstick
24. Vegetable crops: Ridge gourd and Bottle gourd
25. Vegetable crops: Bitter gourd and Cucumber
26. Spices and Condiments :Onion and Garlic
27. Spices and Condiments: Turmeric and Ginger
28. Fruit crops: Mango and Papaya
29. Fruit crops: Banana and Guava
30. Flower crops: Rose and Jasmine.
31. All India Coordinated Crop Improvement Projects. Procedure for release of new variety.

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32. Stages of seed production. Nucleus and Breeder seed production of field crops. Varietal run down and renovation.
33. Intellectual property and IPR Issues. Protection of plant varieties under UPOV and PPV &FR Act of India, Plant breeder's rights.
34. Registration of plant varieties under PPV & FR Act. Breeders, researcher and farmers rights.

Practical Schedule

Observation on floral biology – anthesis and pollination– selfing – crossing techniques– observation on cultivated germplasm, wild species – Experimental design – handling segregating generations - Yield trials in following crops.

1. Rice
2. Wheat and Maize
3. Sorghum, Pearl millet and Finger millet
4. Red gram, Bengal gram, Cowpea and Soybean
5. Green gram, Black gram and Groundnut
6. Sesamum, Sunflower, Mustard and Castor
7. Cotton and Jute
8. Sugarcane and Potato
9. Guinea grass, Cumbu–Napier hybrids, Lucerne and *Stylosanthes*
10. Bhendi, Brinjal, Tomato and Chilli
11. Cabbage, Cauliflower, Radish, Amaranthus and Drumstick
12. Ridgegourd, Bottlegourd, Bittergourd and Cucumber
13. Onion, Garlic, Turmeric and Ginger
14. Mango, Papaya, Banana and Guava
15. Rose and Jasmine
16. Visit to AICRP and Hybrid seed production plots of different field crops
17. **FINAL PRACTICAL EXAMINATION**

Text Books

1. B. D. Singh, 2022: Plant Breeding Principles and Methods: MedTech Science Press; 12th edition
2. Phundan Singh, 2014, Essentials of Plant Breeding, Kalyani Publishers.
3. Kumar, N. 2006. Breeding of Horticultural Crops - Principles and Practices. New India Publishing Agency,New Delhi.
4. Bhardwaj DN, 2015 edition, Breeding of Field Crops, Agrobios Publisher

References

1. PhundanSingh.2006.EssentialofPlantBreeding.Kalyani Publishers,Ludhiana.
2. George Acquaah..2012. Principles of Plant Genetics and Breeding. Blackwell Publishing Ltd.,USA.
3. Bharadwaj, D.N..2012.Breeding Field Crops. Agrobios (India), Jodhpur
4. Ram, H. H. 2011. Vegetable Breeding– Principles and Practice, Kalyani Publishers, NewDelhi.

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2.6.67

5. Kumar, N. 2006. Breeding of horticultural crops- Principles and Practices. New India Publishing Agency. New Delhi.
6. Sleper,D.A. and J.M.Poehlman.2007. Breeding Field Crops. Blackwell Publishing Professional (USA).
7. Ram, H.H.2011. Crop Breeding and Biotechnology. Kalyani Publishers (India).
8. Acharya,N.K .2014.Textbook of Intellectual Property Rights. Asia Law House, Hyderabad.
9. Loganathan,E.T. 2012. Intellectual Property Rights. New Century Publications, NewDelhi.
10. Rajendra Kumar, Yadav, Ram Krishna, 2018, 2nd Edition, Objective Breeding of Field Crops, Kalyani Publishers.

E-references

1. https://www.hzu.edu.in/agriculture/Breeding-of-Field-Horticultural-Crops.pdf
2. https://agritech.tnau.ac.in/crop_improvement/crop_imprv_breed.html
3. https://www.scientificpubonline.com/bookdetail/crop-improvement-agriculture-horticulture-crops/9789389832785/29
4. https://www.iaritoppers.com/2019/06/Breeding-Of-Field-Horticultural-Crops-ICAR-E-course-Free-PDF-Book-Download-e-krishi-shiksha.html

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U21AHORB609 **POST-HARVEST MANAGEMENT AND VALUE ADDITION OF FRUITS AND VEGETABLES** **(1+1)**

Theory

Unit I - Principles and importance of postharvest technology **(4 hrs)**

Importance of fruits and vegetables, extent and possible causes of post-harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening. Value addition of fruits and vegetables, Canning and grading of Quality standards.

Unit II - Post harvest handling and physiology of ripening **(6 hrs)**

Respiration and factors affecting respiration rate; Role of ethylene; Post harvest disease and disorders; Heat, chilling and freezing injury; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric). Climacteric and Non climacteric of Horticultural crops, Packages, Cold Chain, Processing and Packaging.

Unit III - Value addition and preservation **(4 hrs)**

Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.

Unit IV– Value added products and dehydration Canning techniques **(2 hrs)**

Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables Concept and methods, osmotic drying. Canning – Concepts and Standards, Packaging of product

Unit V –Quality Control and Standards **(1 hr)**

Quality control and Quality Standards, Certification of Fruits and Vegetables, AGMARK Standards, Fruits and Vegetable Canning and Value added products, Physiological of Ripening and Maturity Indices of Fruits and Vegetables,

Practical **(17 hrs)**

Applications of different types of packaging containers for shelf life extension, Effect of temperature on shelf life and quality of produce, Demonstration of chilling and freezing injury in vegetables and fruits, Extraction and preservation of pulps and juices, Preparation of jam, Preparation of Jelly, Preparation of RTS, Preparation of Nectar, Preparation of Squash, Osmotically dried products, Fruit bar and Candy and Tomato products, Canned products, Quality evaluation of products — physico-chemical and sensory, Visit to processing unit/ industry

Lecture Schedule

1. Scope and Importance of post harvest technology of fruits and vegetables - Extent and possible causes of post harvest losses - Causes of post harvest losses.
2. Pre-harvest factors affecting postharvest quality, maturity, ripening and shelf life of fruits and vegetables – Environmental factors (Temperature, Light, Rainfall, Wind, Relative humidity)
3. Cultural factors – (Rootstock, Variety, Mineral nutrients, growth regulators, Irrigation, pruning, thinning, girdling) — Pest and diseases.
4. Changes occurring during ripening – Ripening definition - Climacteric and non climacteric

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fruits – Metabolic changes - Maturation of seeds – Colour – Texture - Changes in carbohydrates- Changes in aromatic volatiles - Changes in organic acids – Fruit abscission – Changes in respiration rate – Development of surface waxes – Changes in tissue permeability.

5. Causes for deterioration of harvested fruits and Vegetables -Respiration and factors affecting respiration rate – Transpiration and factors affecting transpiration - Ethylene – Mechanical damage – Pest and Diseases.
6. Post harvest diseases and disorders - Heat, chilling and freezing injury.
7. Harvesting and field handling – Maturity indices of Horticultural crops - Methods of harvesting – Post harvest handling – Pre- cooling - Sorting and grading – Disinfestation – Post harvest treatments (Waxing, Wrapping, de-greening, ripening).
8. Storage – Methods of storage – Traditional storages (In-situ, pit storage, high altitude, clamp storage, wind breaks, cellars, barns, Night ventilation, Evaporative cool storage ZECC) - Improved storage methods (Refrigerated storage, modified atmospheric storage, controlled atmospheric storage, hypobaric storage).
9. **MID SEMESTER EXAMINATION**
10. Packaging of products - Definition – Properties of good packaging material – Different packaging materials for fresh fruits and vegetables for export – Cushioning materials – Purpose – Characteristics of cushioning material.
11. Value addition – Concept – Scope and importance of fruit preservation in India – Statusof fruit preservation in India. Principles and methods of preservation – Principles of preservation – Preservation methods – High temperature, low temperature, drying, filtration, chemicals, food additives, fermentation, carbonation, antibiotics, irradiation etc.
12. Intermediate moisture foods - Jam, jelly, marmalade – Problems in Jam making important considerations and problems in Jelly making- Problems in marmalade making. Preserve, candy – Concepts and Standards – Flow chart for manufacturing of preserve and candy – Problems in preservation of preserve and candied fruits – Glazed fruits/vegetables.
13. Fruit beverages –Fermented (Juices, Ready to serve, Nectar, cordial, Squash, crush, Syrup, Fruit Juice concentrate, Fruit Juice, Powder, Carbonated beverages) and non- fermented beverages (Wine, Champagne, Port, Sherry, Tokay, Muscat, Perry, Nira, Feni, Cider) – Preparation and preservation of unfermented fruit beverages.
14. Tomato processing - Concepts and Standards – Tomato juice – Tomato puree and paste – Tomato sauce/ketchup- Tomato chutney/pickle –Tomato cocktail – Tomato soup – Canned tomatoes.
15. Drying/dehydration of fruits and vegetables – Factors affect the rate of drying – Advantages of dehydration over sun drying – Process of drying/dehydration of fruits and vegetables – Spoilage of dried fruits and vegetables - Freezing – Methods of freezing.
16. Canning of fruits and vegetables – Selection of fruits and vegetable - Causes of spoilageof canned foods – Testing for defects - Containers for packing of canned products – Tin containers, glass containers.
17. Quality standards – Packages, Canning - Processing Quality control – Storage - cold chain management and Packaging

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Practical Schedule

1. Applications of different types of packaging containers for shelf life extension.
2. Effect of temperature on shelf life and quality of produce.
3. Demonstration of chilling and freezing injury in vegetables and fruits.
4. Extraction and preservation of pulps and juices.
5. Preparation of jam.
6. Preparation of jelly.
7. Preparation of RTS.
8. Preparation of nectar.
9. Preparation of squash.
10. Preparation of osmotically dried products.
11. Preparation of fruit bar and candy.
12. Preparation of tomato sauce.
13. Preparation of tomato ketchup.
14. Preparation of canned products.
15. Quality evaluation of products - (physic-chemical and sensory).
16. Visit to processing unit/ industry.
17. **FINAL PRACTICAL EXAMINATION**

Text Book

1. Rathore, N.S., Mathur, G.K., Chasta, S.S. 2012. Post-harvest Management andProcessing of Fruits and Vegetables. ICAR, New Delhi.
2. Srivastava, R.P. and Sanjeev Kumar. 2002. Fruit and Vegetable Preservation: Principles and Practices. International Book Distribution Company, Lucknow.
3. Giridharilal, G.S., Siddappa and Tondon, G.L. 2007. Preservation of Fruits and Vegetables. ICAR, New Delhi.
4. Mitra, S.K. 2005. Post Harvest Physiology and Storage of Tropical and Subtropical Fruits. CABI Publishers, Kolkatta.

Reference Book

1. Hui, Y.H. (2008). Handbook of fruit and vegetable processing. Wiley India Pvt. Ltd., New Delhi.
2. Sharma, S.K. (2010). Postharvest management and processing of fruits and vegetables. New India Publishing Agency, New Delhi.
3. Sharma, S.K. and Nautiyal, M.C. (2009). Postharvest technology of horticultural crops. New India Publishing Agency, New Delhi.

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4. Wills, R.B.H, McGlasson, W.S, Graham, D. and Joyce, D.C. (2009). Postharvest: An introduction to the physiology and handling of fruits, vegetables and ornamentals. CABI International, Cambridge, USA.

e-Reference

1. https://www.youtube.com/channel/UCBWSYpP57pe_z9cXz25Qj7g
2. https://youtu.be/BMIUAVhzRuc

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U21APATB610 **DISEASES OF FIELD AND HORTICULTURAL CROPS AND THEIR MANAGEMENT-II** **(2+1)**

Theory

Etiology, symptoms, mode of spread, survival, epidemiology and integrated management of important diseases of the following crops

Unit I: Diseases of cereals, pulses and oil seed crops **(3 hrs)**

Cereals: Wheat - Pulses: Chick pea and lentil - Oil seeds - Sunflower and mustard

Unit II: Diseases of cash crops and fruit crops **(7 hrs)**

Cash crops: Cotton and sugarcane - Fruit crops: Mango, citrus, grapevine, apple, peach, plum and pear

Unit III: Diseases of vegetable and spice crops **(10 hrs)**

Vegetable crops: Cucurbits, peas, potato, cassava, colacasia and yam - Post harvest diseases of fruits and vegetables - Spice crops: Chillies, ginger, turmeric, onion, garlic, coriander, cardamom

Unit IV: Diseases of plantation and flower crops **(5 hrs)**

Plantation crops: Black pepper and betelvine - Flower crops: Rose, jasmine, marigold, crossandra, chrysanthemum, tube rose, carnation, lillium and orchids

Unit V: Mushroom cultivation **(9 hrs)**

Importance of mushroom - Cultivation of oyster mushroom, milky mushroom, paddy straw mushroom and button mushroom – Constraints in mushroom cultivation - Post harvest technology

Practical **(17 hrs)**

Study of symptoms and host parasite relationship of the important diseases of wheat, chick pea, lentil, sunflower, mustard, cotton, sugarcane, mango, citrus, grapevine, apple, peach, plum, pear, cucurbits, potato, peas, cassava, colacasia, yam, chillies, turmeric, ginger, onion, garlic, coriander, cardamom, black pepper, betelvine, rose, jasmine, marigold, crossandra, chrysanthemum, tube rose, carnation, lillium, orchids and cultivation of button mushroom, oyster mushroom, milky mushroom and paddy straw mushroom.

Assignment: Students should submit 50 well preserved diseased specimens in 2 phases during the semester.

Lecture Schedule

Etiology, symptoms, mode of spread, survival, epidemiology and integrated management of

1. Diseases of wheat
2. Diseases of chickpea and lentil
3. Diseases of sunflower and mustard
4. Diseases of cotton

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5. Diseases of sugarcane
6. Diseases of mango
7. Diseases of citrus
8. Diseases of grapevine
9. Diseases of apple
10. Diseases of peach, plum and pear
11. Diseases of cucurbits
12. Diseases of potato
13. Diseases of peas
14. Diseases of cassava, colacasia and yam
15. Post-harvest diseases of fruits and vegetables
16. Diseases of chillies
17. **MID SEMESTER EXAMINATION**
18. Diseases of turmeric and ginger
19. Diseases of onion and garlic
20. Diseases of cardamom and coriander
21. Diseases of black pepper and betel vine
22. Diseases of rose and jasmine
23. Diseases of marigold, crossandra and chrysanthemum
24. Diseases of tube rose and carnation
25. Diseases of lillium and orchids
26. Mushroom - Medicinal and nutritional values of mushroom
27. Mushroom spawn preparation
28. Cultivation of oyster mushroom
29. Cultivation of milky mushroom
30. Cultivation of paddy straw mushroom
31. Substrates for button mushroom - Compost preparation
32. Cultivation of button mushroom
33. Constraints in mushroom cultivation
34. Post-harvest technology in mushroom

Practical Schedule

Study of symptoms and host-parasite relationship of:

1. Diseases of wheat
2. Diseases of chick pea, lentil, sunflower and mustard
3. Diseases of cotton and sugarcane
4. Diseases of mango
5. Diseases of citrus and grapevine
6. Diseases of apple, peach, plum and pear
7. Diseases of cucurbits
8. Diseases of potato and peas
9. Diseases of cassava, colacasia and yam
10. Field visit/ exposure visit to fruits , vegetables and plantation crops / mushroom unit

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11. Diseases of chillies, turmeric and ginger
12. Diseases of onion and garlic
13. Diseases of coriander, cardamom, black pepper and betelvine
14. Diseases of flower crops
15. Cultivation of oyster, milky and paddy straw mushroom
16. Cultivation of button mushroom
17. **FINAL PRACTICAL EXAMINATION**

Text Books

1. Singh.R.S.2021.Plant Diseases, Medtech Science Press, NewDelhi.
2. Rangasawmi ,G and Mahadevan, A. 1998. Diseases of crop Plants in India, Prentice Hall of India Pvt. Ltd., New Delhi.
3. Agrios, G.N. 2008. Plant Pathology, Academic Press, New York.

Reference Books

1. Arjunan.G. Karthikeyan, G, Dinakaran ,D. Raguchander,T. 1999 Diseases of Horticultural Crops, AE Publications, Coimbatore.
2. Prakasam, V., Valluvaparidasan, V., Raguchander, T. and K.Prabakar. 1997. Field crop diseases, AE Publication, Coimbatore.
3. Rangaswami, G. 2005. Diseases of Crop plants in India. Prentice Hall of India Pvt. Ltd., New Delhi.
4. Thakur, B.R. 2006. Diseases of field crops and their management.

e- References

1. www.plantdisease.com
2. www.apsnet.org
3. www.ipm.ucdavis.edu
4. www.nhb.gov.in
5. www.umain.edu
6. www.farmers.gov.in
7. www.nrcb.res.in

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U21AAGME611 BIOPESTICIDES AND BIOFERTILIZERS (2+1)

Theory

Unit I: History and Development of Biopesticides (4 hrs)

History and concept of biopesticides, importance-scope and potential of biopesticides, Definition, concept and classification of biopesticides viz., entomopathogens, Botanical pesticides. Botanicals and their uses.

Unit II: Mass Production of Biopesticides. (9 hrs)

Mass production technology of biopesticides (Trichoderma, Pseudomonas Bacillus, Metarhizium etc.,) - virulence-pathogenicity and symptoms of entomopathogens - biocontrol of nematodes- uses of biopesticides- method of application of biopesticides. Quality control and limitations in production.

Unit III: Importance of Biofertilizers (8 hrs)

Biofertilizer -Introduction, scope, concept and development. Characteristic features of bacterial biofertilizers, *Azospirillum, Azotobacter, Azolla, Pseudomonas, Rhizobium* and *Frankia* -Fungal biofertilizers-current scenario-list of cyanobacterial biofertilizers- Anabaena, Nostoc- AM mycorrhiza and ectomycorrhiza.

Unit IV: Mass Production of Biofertilizers (6 hrs)

Phosphate solubilizing biofertilizer. Mechanism of phosphate solubilization and phosphate mobilization, K solubilizer, Zinc solubilizer. Production technology- strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers.

Unit V: Formulations and Delivery System of Biofertilizers (7 hrs)

Formulation– types– carrier based and liquid inoculants. Equipment's–tangential flow filtration (TFF) – centrifugation - freeze drying. Application technologies- dosage, method and time of application of biofertilizers for different crops. FCO specifications and quality control of biofertilizers. Liquid bio inoculant preservatives

Practical (17hrs)

Isolation and purification of important biopesticides. Trichoderma, Pseudomonas Bacillus, Metarhizium etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities field condition. Quality control of biopesticides. Isolation and purification of Azospirillum, Azotobacter, Rhizobium, P-Solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi wet sieving method and sucrose gradient method. Mass production of AM inoculants.

Lecture Schedule

1. History and concept of biopesticides
2. Importance of biopesticides

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3. Classification of biopesticides.
4. Botanical pesticides and their uses.
5. Mass production technology of biopesticides
6. Virulence and Pathogenicity of biopesticides
7. Symptoms of entomopathogens
8. Biocontrol of nematodes.
9. Microbial management of pests.
10. Mode of entry and mode of action biopesticides.Uses of biopesticides
11. Method of application of biopesticides.
12. Quality control of biopesticides
13. Limitations in biopesticides production.
14. Introduction to biofertilizer.
15. Scope and development of biofertilizers
16. Bacterial biofertilizers.
17. **MID SEMESTER EXAMINATION.**
18. Current scenario of biofertilizers
19. Algal biofertilizers.
20. Fungal biofertilizers
21. Phosphate solubilizing biofertilizers.
22. Potassium and zinc releasing biofertilizers and their mechanism
23. Production technology of biofertilizers.
24. Strain selection
25. Sterilization, growth media and fermentation.
26. Formulations in biofertilizers
27. Techniques in carrier and liquid based biofertilizers.
28. Equipment's in biofertilizer production.
29. Equipment'stangential flow filtration (TFF) centrifugation-freeze drying.
30. Method of application of biofertilizers.
31. Dosageand time of application of biofertilizers for different crops.
32. FCO specifications of biofertilizers
33. Quality control of biofertilizers.
34. Preparation of biofertilizers projects

Practical Schedule

1. Isolation and purification of *Trichoderma sp.*
2. Isolation and purification of *Pseudomonas* and *Bacillus sp.*
3. Isolation and purification of *Beauveria bassiana.*
4. Isolation and purification of Metarhizium
5. Identification of important botanicals.
6. Field visit to explore naturally infected cadavers.
7. Identification of entomopathogenic entities in field condition.
8. Quality control of biopesticides.

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9. Isolation and purification of *Azospirillum,*
10. Isolation and purification of *Azotobacter,*
11. Isolation and purification of *Rhizobium,*
12. Isolation and purification of P-solubilizers.
13. Mass production of bacterial biofertilizers.
14. Isolation of AM fungi – wet sieving method.
15. Mass production of AM inoculants.
16. Visit to biopesticide and biofertilizer laboratory in nearby area
17. **FINAL PRACTICAL EXAMINATION.**

Text Book:

1. Somani L.L. P, Shilkar& D. Shilpkar 2011. Biofertilizers Commercial Production Technology & Quality control. Agro Publishing Acadamy, Udaipur.
2. DeshMukh, AM, R.M. Khobragade and P.P. Dixit 2007. Handbook of Biofertilizers and Biopesticides. Oxford Book Company, Jaipur, India.

Reference

3. Acharya, K. Surjith Sen and Manjula Rai. 2019. Biofertilizers and Biopesticides Techno world.
4. Chanda J. K. 2008. Biofertilizer Statistics 2006-07. Fertilizer Association of India, New Delhi.
5. Gupta R.P., AnuKalia and Shammi Kapoor 2007. Bioinoculants a step towards Sustainable Agriculture, NIPA, New Delhi

E-resources

1. www.geocites.com
2. www.insectariumvirtual.com
3. www.nabard.org
4. http://www.greenpeace.org
5. www.hortsorb.com

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U21AGPBE611 MICRO PROPAGATION TECHNOLOGIES (2+1)

Theory

Unit I: Concept of *in vitro* culture and micro-propagation (4 hrs)

Meaning and concept of *in vitro* culture and micro-propagation. Different concepts employed in micropropagation. Historical mile stones, advancement and future prospects of micropropagation; totipotency, dedifferentiation. Applications, advantages and limitations of tissue culture techniques. Tissue culture methodology: Sterile techniques, synthetic and natural media components, growth regulators, environmental requirement, genetic control of regeneration. Techniques of sterilization/asepsis for glass and metal ware, liquids both thermo stable and thermolabile and disposal of remnants of culture. Laboratory organization, requirements, layout of small, medium and large scale Tissue culture laboratories.

Unit II: Components of the tissue culture media and stages (7 hrs)

Components of the tissue culture media – Inorganic nutrients, vitamins, amino acids and other organic supplements, carbon source, hormones/ plant growth regulators, pH of the media, gelling agents. Different types of media. Preparation of media – Stocks and working media, preparation and storage. Plant regeneration pathways - Organogenesis and Somatic embryogenesis. Organo genesis - Purpose, methods and requirements for organogenesis, indirect and direct organogenesis. Somatic embryo genesis – Procedures and requirements for organogenesis, indirect and direct embryogenesis; Somatic and Gametic embryogenesis,

Unit III: Different Culture Methods (6 hrs)

Haploid culture- Anther culture, pollen culture and Ovary culture- applications and limitations. Synthetic seed- Concepts, necessity, procedure and requirements for production of synthetic seeds. Artificial seed. Micro-propagation – Definition, methods, stages of micro-propagation and its significance. Axillary bud proliferation approach – Shoot tip and meristem culture. Factors affecting micropropagation-applications and limitations. Advancements and future prospects of *in vitro* culture – Techniques of single cell culture, suspension cultures. Applications of organ culture - Meristem tip culture (virus free plants) and anther culture (doubled haploids). Production of secondary metabolites through cell culture techniques.

Unit IV: Micropropagation techniques for different crops (10 hrs)

Micropropagation-Definition, stages of micropropagation - Factors affecting micropropagation –applications and limitations. Micropropagation techniques in Banana, Neem, Bamboo, Casuarina, Sugarcane, *Eucalyptus*, *Aloe vera*, *Phyllanthus*, Gerbera, Coleus, Rose, Chrysanthemum and Orchids.

Unit V: Hardening certification and Quality management of TC plants. (7 hrs)

Primary hardening of tissue cultured plants –requirements and layout of polyhouse. Secondary hardening of Tissue cultured plants- Requirements and layout of shade net provision. National certification and Quality management of TC plants. Genetic fidelity test and virus indexing in TC plants. Production of secondary metabolites through cell culture techniques.

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Public and private organizations involved in Plant Tissue culture in India. Preparation of Project proposal forestablishing a commercial Tissue culture lab.

Practical **(17 hrs)**

Laboratory organization, Laboratory organization small, medium and large scale laboratories. Sterilization techniques for explants, glassware, plasticwares, labwares and working platform. Preparation of stocks and working solution. Preparation and sterilization of growth regulators. Preparation of working medium and Experimentation on determining optimum concentration of growth regulators. Callus induction and regeneration of whole plants from different parts of plants. Direct regeneration into whole plants using bud, node and other tissues. Induction of somatic embryos. Experiments of synthetic seeds production and testing storability and germination efficiency.

Lecture Schedule:

1. Meaning and concept of *in vitro* culture, micropropagation, totipotency, dedifferentiation. Different concepts employed in tissue culture. Scope of Plant Tissue culture.
2. Historical mile stones, advancement and future prospects of micropropagation; totipotency,dedifferentiation.
3. Different tissue culture techniques- applications, advantages and limitations.
4. Layout of Tissue culture, requirements and types- small, medium and large scale laboratories.Environmental requirements of Tissue culture unit.
5. Techniques of sterilization/asepsis for glass and metal ware, liquids both thermo stable andthermo labile, disposal of remnants of culture.
6. Components of the tissue culture media – Inorganic nutrients, vitamins, amino acids andother organic supplements.
7. Components of the tissue culture media- carbon source, hormones/ plant growth regulators,pH of the media, gelling agents.
8. Preparation of media – Stocks and working media, preparation and storage.
9. Genetic control of regeneration. Pathways of regeneration of plants and Regeneration methods- morphogenesis, organogenesis and embryogenesis.
10. Organogenesis-Purpose, methods and requirements for organogenesis, indirect and directorganogenesis.
11. Somatic embryogenesis and factors affecting somatic embryogenesis - Differences betweengametic and somatic embryos.
12. Culture types - callus culture and cell suspension culture; shoot tip and meristem tip culture.Applications and limitations.
13. Auxillary bud proliferation, shoot tip and meristem culture- application and limitations.
14. Anther culture, pollen culture and ovary culture- applications and limitations.
15. Production of virus free plants through Meristem tip culture.
16. Synthetic seeds and Artificial seed – Concept, necessity, procedure and requirements ofsynthetic seeds.
17. **MID SEMESTER EXAMINATION**

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18. Micropropagation-Definition, stages of micropropagation - Factors affecting micropropagation –applications and limitations.
19. Micropropagation techniques in Banana and Neem
20. Micropropagation techniques Bamboo and Cassuarina
21. Micropropagation techniques in Sugarcane
22. Micropropagation techniques in *Eucalyptus*
23. Micropropagation techniques in *Aloe vera* and *Phyllanthus*
24. Microprpagation techniques in Gerbera and Coleus
25. Micropropagation techniques in Rose
26. Micropropagation techniques in Chrysanthemum
27. Micropropagation techniques in Orchids
28. Primary hardening of tissue cultured plants –requirements and layout of polyhouse.
29. Secondary hardening of Tissue cultured plants- requirements and layout of shade net provision.
30. National certification and Quality management of TC plants
31. Genetic fidelity test and virus indexing in TC plants.
32. Production of secondary metabolites through cell culture techniques.
33. Public and private organizations involved in Plant Tissue culture in India.
34. Preparation of Project proposal for establishing a commercial Tissue culture lab.

Practical schedule

1. Organization of tissue culture laboratory- small, medium and large scale laboratory layout.
2. Sterilization techniques used in tissue culture laboratory – Glass, plastic and metal ware.
3. Study and use of laminar flow unit for tissue culture.
4. Study and use of autoclaves for tissue culture.
5. Preparation of stock and working solutions of tissue culture media.
6. Sterilization techniques used in tissue culture laboratory media.
7. Filter Sterilization thermo labile compounds-Hormones and Vitamines and Aminoacids.
8. Preparation and inoculation of explants for direct organogenesis – Shoot tip, nodalexplants.
9. Preparation and inoculation of explants for callus production – Leaf, stem and rootexplants.
10. Determination of optimum concentration of hormones/ growth regulators for directorganogenesis – Shoots.
11. Determination of optimum concentration of hormones/ growth regulators for directorganogenesis – Roots.
12. Sub culturing for multiple shoots and calli produced in vitro.
13. Determination of optimum concentration of auxins to generate shoots from *in vitro* generated calli.
14. Preparation of synthetic seeds from somatic embryos and its storage.
15. Visit to commercial Tissue culture lab.

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16. Visit to Accreditated Tissue Culture lab/NRC Banana, Trichy

17. FINAL PRACTICAL EXAMINATION

Text Books

1. R C Dubey, 1993, Text Book of Biotechnology: S. Chand Publishing, NewDelhi.
2. B K Patnaik, 2014, Textbook of Biotechnology: Mc Graw Hill Education India, NewDelhi

References Books

1. Gamborg, O.L. and Phillips, G.C. 1995. Plant Cell Tissue Organ Culture: FundamentalMethods. Springer, Berlin.
2. Keshavachandran, R. and Peter, K.V. 2008. Pant Biotechnology: Methods in Tissue Cultureand Gene Transfer. Universities Press, Hyderabad. 224
3. Smith, R.H., 2013. Plant Tissue Culture : Techniques and Experiments. 3rd ed. AcademicPress, San Diego, CA, USA.
4. Bhojwani, S.S. and Razdan, M.K. 1996. Plant Tissue Culture, Theory and Practice. Elsevier,Netherlands.
5. Bhojwani, S.S. and Dantu, P.K. 2013. Pant Tissue Culture: An Introductory Text. Springer,India, New Delhi.

E- reference

1. https://doi.org/10.1007/978-981-15-1906-2
2. http://www.agbiotechnet.com.
3. http://www.agbioworld.org
4. http://www.agbiosafety.unl.edu/
5. http://www.edugreen.teri.res.in/explore/bio/breed.html
6. http://cuke.hort.ncsu.edu/gpb

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U21AHORE611 HI-TECH HORTICULTURE (2+1)

Theory

Unit I: Introduction and importance of hi-tech horticulture

Introduction & importance; Management and mechanization in horticultural nursery; Micro propagation of horticultural crops

Unit II: Protected cultivation

Modern field preparation and planting methods, Protected cultivation: advantages, controlled conditions, method and techniques. Urban farming - Hydroponics, aerophonics - Vertical farming - ERPs in Hi-tech Horticulture – Decision support system

Unit III: Irrigation system and components

Micro irrigation systems and its components - Fertigation system; EC, pH based fertilizer scheduling, canopymanagement, high density orcharding

Unit IV: Components of precision farming

Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate Applicator (VRA)

Unit V: Application and uses

Application of precision farming in horticultural crops (fruits, vegetables, micro-greens and ornamental crops); mechanized harvesting of produce.

Practical

Types of Polyhouses and shade net houses, intercultural operations, tools and equipments identification and application, micro propagation, nursery-portrays, microirrigation,EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

Lecture Schedule:

1. Hi-tech horticulture – Introduction - Scope and importance – Perspectives of Hi-tech horticulture in India.
2. Nursery management – Quality control of planting material- Plastics in nursery management
3. Advantages of plant propagation under green houses (Hi-tech nursery).
4. Mechanization – Importance of mechanisation in Hi-tech horticulture – Mechanisation of nursery, sowing and transplanting, plastic mulching, irrigation, fertigation, pest and disease control, weed control, harvesting etc.
5. Micro propagation of horticultural crops – Meristem culture - Various approaches of shoot multiplication – Applications of micro propagation – Problems in micropropagation - Advantagesand limitations – Micro-grafting.
6. Modern field preparation methods – Raised bed preparation – Plastic mulching.
7. Modern planting methods – Container planting - Soil less culture – Hydroponics, aerophonics.
8. Protected cultivation
9. Types of protected structures - Glass house, poly house, rain shelters, poly tunnels, hotbeds and cold flames, shade nets etc.

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10. Greenhouse – Advantages- Controlled conditions – Light, Humidity, Temperature, CO2
11. Ventilation and cooling in a green house – Naturally ventilated, fan and pad cooling, forced air cooling etc. – Relative humidity, carbon-di-oxide level.
12. Micro irrigation systems and its components – Methods of micro irrigartion (Surface drip, sub-surface drip irrigation, Bubblers, micro sprinkler etc.) - Maintenance of micro irrigation system.
13. Fertigation – Advantages –Limitations - Method of fertilizer injection (Fertilizer injection system, Pressure differential injection system, Venturi injection system) – Selection of fertilizers-Solid fertilizers & liquid fertilizers.
14. EC, pH based fertilizer scheduling – Site specific nutrient management – Advantages and disadvantages.
15. Canopy management – Importance of canopy management- principles of canopy management –
16. Tools of canopy management (Rootstocks, plant density, training and pruning, nutrient management, growth retardants etc.).
17. **MID SEMESTER EXAMINATION**
18. High Density orcharding – Concept – HDP systems – Components of HDP (use of genetically dwarf scion cultivars, dwarf rootstocks, pruning and training, use of growth retardants, inductionof viral infection, use of incompatible rootstocks etc.)
19. Impact of HDP- Advantages- Constraintsin HDP.
20. Precision farming – Definition – Scope and status of precision farming in India- Perspectives and potentials of precision farming in India
21. Components of precision farming.
22. Remote sensing – Role of remote sensing in precision farming
23. Application of remote sensing in the field of horticulture.
24. Geographical Information System (GIS) – Role of GIS in precision farming.
25. Differential Global Positioning System (DGPS) – GPS introduction - Types of GPS
26. DGPS uses in Agriculture - Yield monitoring, field mapping, precision crop input application (fertilizers, pesticides, weedicides etc.).
27. Variable Rate applicator (VRA) – Introduction – Variable rate application methods – map based VRA and Sensor based VRA
28. VRA management zones – Seeding VRA, Weed control VRA, Lime VRA, Fertilizer VRA.
29. Precision farming – Applications of precision farming in horticultural crops (fruits, vegetables and ornamental crops)
30. Strategic approaches of precision technology forimprovement of fruit production.
31. Mechanized harvesting of produce – Advantages and disadvantages
32. Mechanical harvesters developed for different horticultural crops – Robots in harvesting.
33. Green food production – Approaches – Biodynamic farming – Biodynamic preparations- Cosmic integration – Biodynamic calendar
34. Strategies for green food production.

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Practical Schedule

1. Study of types of polyhouses.
2. Study of shade net houses.
3. Intercultural operations in Hi – tech horticulture.
4. Identification and application of tools and equipments.
5. Micro propagation.
6. Nursery raising in portrays.
7. Study of Micro-irrigation system and its components.
8. Problems of micro irrigation system.
9. Estimation of EC of soil and water.
10. Estimation of pH in soil and water.
11. Fertilizer scheduling.
12. Canopy management for HDP in Mango.
13. Canopy management for HDP in Guava.
14. Canopy management for HDP in Grapes.
15. Visit to Hi-Tech orchard.
16. Visit to Hi-Tech nursery.
17. **FINAL PRACTICAL EXAMINATION**

Text books

1. Singh, H.P., Singh, G., Samuel, J.C., and Pathak, R.K.. 2003. *Precision Farming in Horticulture*.NCPAH, MOA, PFDC, CISH, Lucknow
2. T.A.More, MPKV,Rahuri Balraj Singh,2005: Protected cultivation of vegetable crops.Kalyani publication
3. Joe.J.Hanan.1998.Greenhouses:AdvancedTechnologyforProtectedHorticulture,CRC Press,LLC.Florida.
4. Srivasthava, K.K.. 2007. *Canopy Management of Fruit Crops*. International book distributingco., Lucknow
5. Sahu, K.C. 2008. *Text Book of Remote Sensing and Geographical InformationSystems*. Atlantic publishers & Distributors

References

1. Prasad, S. And Kumar, U. 2012. *Greenhouse Management of Horticultural Crops*. 2nd edition,Agribios publishers, New Delhi.
2. Adams, C.R.K.M. Bandford and M.P.Early. 1996 Principles of Horticulture. CBS publishers and distributors. Darya ganj, New Delhi.
3. PaulV.Nelson.1991.Greenhouse operation and management. Ball publishing USA.

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e-Reference

1) www. icar.org.in/ciphet.html
2) www. jains.com
3) www. gisdevelopment.net
4) www. anz.ipni.net
5) www.agritech.tnau.in
6) www.ncpahindia.com
7) www.iasri.res.in

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2.6.16

U21ASACE611 AGROCHEMICALS (2+1)

Theory

Unit I: Agrochemicals and Fungicides (7 hrs)

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture.

Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride. Organic fungicides- Mode of action- Dithiocarbamates -characteristics, preparation and use of Zineb and maneb. Systemic fungicides - Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use.

Unit II: Insecticides (7 hrs)

Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals.

Unit III: Herbicides, Bio pesticides and Insecticide Act (9 hrs)

Herbicides-Major classes, properties and important herbicides. Fate of herbicides. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses. Plant bio-pesticides for ecological agriculture, Bio- insect repellent.Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant.

Unit IV: Fertilizers (4 hrs)

Fertilizers and their importance. Nitrogenous fertilizers: Feedstocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow-release N-fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate.

Unit V: Mixed, complex fertilizers and FCO (7 hrs)

Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitro phosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing.

Practical

Sampling of fertilizers and pesticides. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. To study and identify various formulations of insecticide available kin market. Estimation of nitrogen in Urea. Estimation of water soluble P_2O_5 and citrate soluble P_2O_5 in single super

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phosphate. Estimation of potassium in Muraite of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride. Determination of sulphur content in sulphur fungicide. Determination of thiram. Determination of ziram content.

Lecture Schedule

1. An introduction to agrochemicals, their type and role in agriculture.
2. Effect of agro chemicals on environment, soil, human and animal health, merits and demerits of their uses in agriculture.
3. Management of agrochemicals for sustainable agriculture.
4. Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride
5. Inorganic fungicides - Mode of action - Bordeaux mixture and copper oxychloride
6. Organic fungicides- Mode of action- Dithiocarbamates-characteristics, preparation and use of Zineb and maneb.
7. Systemic fungicides - Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use.
8. Introduction and classification of insecticides: inorganic and organic insecticides.
9. Organochlorine insecticides: properties and mode of action.
10. Organophosphates- properties and mode of action.
11. Carbamates- properties and mode of action.
12. Synthetic pyrethroids- properties and mode of action.
13. Neo nicotinoids- properties and mode of action.
14. Biorationals- mode of action, toxicity, formulation and use
15. Herbicides- Definition, advantage and limitation of their usage, classification.
16. Major classes, properties and important herbicides, Fate of herbicides
17. **MID - SEMESTER EXAMINATION**
18. IGRs - mode of action, toxicity, formulation and use
19. Bio pesticides and Reduced risk insecticides.
20. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.
21. Insecticide Act and rules, Insecticides banned, withdrawn and restricted use.
22. Fate of insecticides in soil & plant.
23. Botanicals, plant and animal systemic insecticides their characteristics and uses.
24. Fertilizers and their importance, classification, Nitrogenous fertilizers: Feedstock and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride
25. Feedstock and Manufacturing of urea and Slow-release N-fertilizers.
26. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag.
27. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate
28. Mixed and complex fertilizers: Sources, advantages and disadvantages over straight fertilizers.
29. Compatibility of fertilizer physical and chemical problems associated with bulk blending of fertilizers.

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30. Complex fertilizers: Manufacturing of ammonium phosphates, nitro phosphates.
31. Complex fertilizers - NPK complexes.
32. Preparation of major, secondary, micronutrient mixtures and multi nutrientfertilizers.
33. Fertilizer control order – fertilizer storage standards
34. Fertilizer logistics and marketing.

Practical Schedule

1. Sampling of fertilizers and pesticides.
2. Study and identification of various agrochemicals and its formulation available inmarket.
3. Calculation of doses of fertilizers.
4. Calculation of doses of herbicides and fungicides.
5. Calculation of doses of insecticides.
6. Application technology to study about various pesticides appliances.
7. Quick tests for identification of common fertilizers.
8. Identification of anion and cation in fertilizers.
9. Estimation of Nitrogen in Urea.
10. Estimation of water soluble P_2O_5 in single super phosphate and citrate soluble P_2O_5 in phosphatic fertilizer
11. Estimation of potassium in Muriate of Potash/ Sulphate of Potash by flame photometer.
12. Determination of copper content in copper oxychloride.
13. Determination of Sulphur content in Sulphur fungicide.
14. Determination of active ingredient content in Thiram and ziram
15. Visit to fertilizer manufacturing unit / fertilizer testing labs /
16. Visit to pesticide testing labs.
17. **FINAL PRACTICAL EXAMINATION**

Text Books

1. Dipak Ranjan Biswas. 2021. A Textbook of Fertlizers: New India Publishing Agency, New Delhi.
2. Himadri Panda. 2022. The Complete Technology book on Pesticides, Insecticides, Fungicides and Herbicides (Agrochemicals): Niir Project Consultany Services, New Delhi.
3. Anatoly N. Boyandin, Ekaterina I. Shishatskaya and Natalia O. Zhila. 2021. New Generation Formulations of Agrochemicals : Current trends and Future Priorities: Apple Academic Press Inc., New Delhi.

Reference Books

1. Handa.S.K.2004. Principles of Pesticide Chemistry. Agrobios
2. Cremlyn, R.J. 1991. Agrochemicals Preparation and mode of action. John Wiley and sons, Newyork.
3. George W.Ware, 1986. Fundamentals of Pesticides - A Self Instruction Guide ThomasPublications, PO Box.9335, Freno, California 93791.
4. Robert White, Stevens, 1971. Pesticides in the Environment Vol.I and Part I Marcel DekkerInc., New York.

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5. Sree Ramulu, U.S. 1979. Chemistry of Insecticides and Fungicides Oxford and IBH PublishingCo., New Delhi.
6. Gupta,A. 2006. Pesticide Residue in Food commodities. Agrobios
7. John Havlin, James Beaten, Samuel Tisdale, Werner Nelson, 2014.Soil Fertility and Fertilizers - An Introduction to Nutrient Management. 8th Edition, Prentice Hall. Upper Saddle River,NJ.
8. Yawalkar, K.S., J.P. Agarwal and S.Bokde.1972. Manures and Fertilizers Third revised editionAgri Horticultural Publishing House, Nagpur.
9. Tandon, H.L.S. 1994. Fertilizer, Organic Manures, Recyclable Wastes and BiofertilizersFertilizer Development and Consultation Organization, New Delhi.

e-References

1. www.fspublishers.org/ijab/past-issues/IJABVOL_5_NO_3/47.pdf
2. www.springerlink.com/index/l011256h8t325054.pdf
3. www.fao.org/wairdocs/ilri/x5546e/x5546e08.html
4. www.energy.ca.gov/process/agriculture/ag_pubs/fertigation.pdf
5. www.soilandhealth.org/.../010117attrasoilmanual/010117attra.html

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SCHOOL OF AGRICULTURAL SCIENCES

4th Board of Studies

Annexure – III

Curriculum and syllabi of VI semester for B.Sc. (Hons.) Horticulture

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B.Sc. (Hons.) HORTICULTURE DEGREE PROGRAMME
DEPARTMENT WISE DISTRIBUTION OF COURSES
ABSTRACT

Sl.No.	Department / Discipline	No. of courses	Credit hours	Total Credits
Agricultural Economics				
1.	Agricultural Economics	2	4+1	5
Agricultural Extension				
2.	Agricultural Extension	3	3+3	6
Basic Sciences and Languages				
3.	Computer Science	1	0+1	1
4.	Elementary Mathematics	1	0+1	1
5.	Statistics	1	1+1	2
6.	English	1	0+1	1
Agricultural Entomology				
7.	Agricultural Entomology	4	7+4	11
Agronomy				
8.	Agronomy	5	6+5	11
9.	Agricultural Engineering	1	1+1	2
Horticulture				
10.	Basic Horticulture	4	6+4	10
11.	Floriculture and Landscape Gardening	4	6+4	10
12.	Fruit Science	4	6+4	10
13.	Post-Harvest Technology	3	4+4	8
14.	Spices, Plantation, Medicinal & Aromatic crops	3	6+3	9
15.	Vegetable Science	4	5+5	10
16.	Forestry	1	1+1	2
Plant Breeding and Genetics				
17.	Genetics and Plant Breeding	3	5+3	8
18.	Seed Science and Technology	1	2+1	3
19.	Crop Physiology	2	2+2	4
Plant Pathology and Agricultural Microbiology				
20.	Plant Pathology	3	6+3	9
21.	Agricultural Microbiology	1	1+1	2
22.	Nematology	1	1+1	2
Soil Science & Agrl. Chemistry				
23.	Soil Science & Agrl. Chemistry	3	4+3	7
24.	Biochemistry	1	1+1	2
25.	Environmental Science	1	2+1	3
	Total	**58**	**80+59**	**139**
Student READY				
Rural Horticultural Work Experience (RHWE)				
26.	RHWE – Placement in Villages	1	0+10	10
27.	RHWE – Placement in Industries	1	0+10	10
28.	Experiential Learning Programme	2	0+20	20
	Total	**4**	**0+40**	**40**

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Non Gradial courses				
29.	NSS /NCC	1	0+1	1
30.	PED	1	0+1	1
31.	Educational Tour	2	0+2	2
	Total Non-Gradial courses	**4**	**0+4**	**4**
	Grand Total	**66**	**80+103**	**183**
Remedial Course				
	Introductory Biology	1	0+1	1

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B.Sc. (Hons.) HORTICULTURE

DEPARTMENT WISE DISTRIBUTION OF COURSES

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Agricultural Economics				
1.	U21HAECB101	Economics and Marketing	2+1	I
2.	U21HAECT601	Horti-Business Management	2+0	VI
		TOTAL	**4 + 1=5**	
Agricultural Extension				
1.	U21HAEXB201	Fundamentals of Extension Education	1+1	II
2.	U21CAEXB502	Communication Skills and Personality Development	1+1	V
3.	U21HAEXB602	Entrepreneurship Development and Business Management	1+1	VI
		TOTAL	**3 + 3=6**	
Computer Science, Statistics and English				
1.	U21CENGP105	Comprehension & Communication Skills in English	0+1	I
2.	U21CMATP109	Elementary Mathematics	0+1	I
3.	U21HCOMP304	Computer Applications in Horticulture	0+1	III
4.	U21CSTAB410	Statistical Methods	1+1	IV
		TOTAL	**1 + 4=5**	

DEPARTMENT OF AGRICULTURAL ENTOMOLOGY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21CAENB202	Fundamentals of Entomology	2+1	II
2.	U21HAENB302	Apiculture, Sericulture and Lac culture	1+1	III
3.	U21HAENB401	Insect Pests of Fruit, Plantation, Medicinal & Aromatic Crops	2+1	IV
4.	U21HAENB501	Insect Pests of Vegetable, Ornamental and Spice Crops	2+1	V
		TOTAL	**7 + 4=11**	

DEPARTMENT OF AGRONOMY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Agronomy				
1.	U21HAGRB203	Weed Management in Horticultural Crops	1+1	II
2.	U21HAGRB303	Agro-meteorology and Climate Change#	1+1	III
3.	U21HAGRB402	Water Management in Horticultural Crops	1+1	IV
4.	U21HAGRB603	Introduction to Major Field Crops	1+1	VI
5.	U21HAGRB604	Organic Farming	2+1	VI
		TOTAL	**6 + 5=11**	
Agricultural Engineering				
1.	U21HAEGB301	Farm Power and Machinery	1+1	III
		TOTAL	**1 + 1=2**	

Team teaching course

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DEPARTMENT OF HORTICULTURE

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Basic Horticulture				
1.	U21HHORB107	Introduction to Horticulture	2+1	I
2.	U21HHORB208	Plant Propagation and Nursery Management	1+1	II
3.	U21HHORB310	Dry land Horticulture#	1+1	III
4.	U21HHORB608	Precision Farming and Protected Cultivation	2+1	VI
		TOTAL	**6 + 4=10**	
Floriculture and Landscape Architecture				
1.	U21HFLAB305	Commercial Floriculture	2+1	III
2.	U21HFLAB404	Ornamental Horticulture	1+1	IV
3.	U21HFLAB503	Principles of Landscape Architecture	1+1	V
4.	U21HFLAB606	Breeding and Seed Production of Flower and Ornamental Plants	2+1	VI
		TOTAL	**6 + 4=10**	
Fruit Science				
1.	U21HFSCB207	Tropical and Subtropical Fruits	2+1	II
2.	U21HFSCB209	Orchard and Estate Management	1+1	II
3.	U21HFSCB306	Temperate Fruit Crops	1+1	III
4.	U21HFSCB405	Breeding of Fruit and Plantation Crops	2+1	IV
		TOTAL	**6 + 4=10**	
Post-Harvest Technology				
1.	U21HPHTB309	Fundamentals of Food Technology	1+1	III
2.	U21HPHTB505	Postharvest Management of Horticultural Crops	2+1	V
3.	U21HPHTB607	Processing of Horticultural Crops	1+2	VI
			4 +4=8	
Spices, Plantation, Medicinal & Aromatic crops				
1.	U21HSPCB407	Spices and Condiments	2+1	IV
2.	U21HSPCB409	Plantation Crops	2+1	IV
3.	U21HSPCB506	Medicinal and Aromatic crops	2+1	V
		TOTAL	**6 + 3=9**	
Vegetable Science				
1.	U21HVSCB210	Tropical and Subtropical Vegetables	2+1	II
2.	U21HVSCB311	Temperate Vegetable Crops	1+1	III
3.	U21HVSCP507	Crop Production in Vegetable Crops	0+2	V
4.	U21HVSCB508	Breeding of Vegetable, Tuber and Spice Crops	2+1	V
		TOTAL	**5 + 5=10**	
Forestry				
1.	U21HFORB104	Introductory Agroforestry	1+1	I
		TOTAL	**1 + 1=2**	

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DEPARTMENT OF PLANT BREEDING AND GENETICS

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Genetics and Plant Breeding				
1.	U21CGPBB106	Fundamentals of Genetics	2+1	I
2.	U21HGPBB206	Elementary Plant Biotechnology	1+1	II
3.	U21CGPBB307	Fundamentals of Plant Breeding	2+1	III
		TOTAL	**5 + 3=8**	
Seed Science and Technology				
1.	U21HSSTB609	Seed production of Vegetable, Tuber and Spice Crops	2+1	VI
		TOTAL	**2 + 1=3**	
Crop Physiology				
1.	U21HCRPB103	Introductory Crop Physiology	1+1	I
2.	U21HCRPB204	Growth and Development of Horticultural Crops	1+1	II
		TOTAL	**2 + 2=4**	

DEPARTMENT OF PLANT PATHOLOGY & AGRICULTURAL MICROBIOLOGY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Plant Pathology				
1.	U21HPATB308	Introduction to Plant Pathology	2+1	III
2.	U21HPATB406	Diseases of Fruit, Plantation, Medicinal and Aromatic Crops and Their Management	2+1	IV
3.	U21HPATB504	Diseases of Vegetable, Ornamental and Spice Crops and Their Management	2+1	V
		TOTAL	**6 + 3=9**	
Agricultural Microbiology				
1.	U21HAGMB102	Introductory Microbiology	1+1	I
		TOTAL	**1 + 1=2**	
Nematology				
1.	U21HANMB403	Nematode Pests of Horticultural Crops and Their Management	1+1	IV
		TOTAL	**1 + 1=2**	

DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Soil Science and Agricultural Chemistry				
1.	U21CSACB108	Fundamentals of Soil Science	2+1	I
2.	U21HSACP408	Soil, Water and Plant Analysis	0+1	IV
3.	U21CSACB509	Manures, Fertilizers and Soil Fertility Management	2+1	V
		TOTAL	**4 + 3=7**	
Biochemistry				
1.	U21CBICB205	Fundamentals of Biochemistry	1+1	II
		TOTAL	**1 + 1=2**	

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Environmental Science				
1.	U21HENSB605	Environmental Studies and Disaster Management#	2+1	VI
		TOTAL	**2 + 1=3**	

STUDENT READY

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
Rural Horticultural Work Experience Programme				
1.	U21HAEXP701	Placement in Villages	0+10	VII
2.	U21HHORP702	Placement in Industries	0+10	VII
		TOTAL	**0 + 20=20**	
Experiential Learning Programme				
1.	U21HELPP8XX	Experiential Learning Programme-1	0+10	VIII
2.	U21HELPP8XX	Experiential Learning Programme-2	0+10	VIII
		TOTAL	**0 + 20=20**	

LIST OF EXPERIENTIAL LEARNING PROGRAMME COURSES

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21HELPP801	Commercial Beekeeping	0+10	VIII
2.	U21HELPP802	Commercial Sericulture	0+10	VIII
3.	U21HELPP803	Urban Entomology and Pest Management	0+10	VIII
4.	U21HELPP804	Production Technology for Bio-control Agents#	0+10	VIII
5.	U21HELPP805	Organic Production Technology	0+10	VIII
6.	U21HELPP806	Commercial Horticulture	0+10	VIII
7.	U21HELPP807	Floriculture and Landscape Architecture	0+10	VIII
8.	U21HELPP808	Plant Tissue Culture	0+10	VIII
9.	U21HELPP809	Mushroom Cultivation Technology	0+10	VIII
10.	U21HELPP810	Bio-inoculants Production Technology	0+10	VIII
11.	U21HELPP811	Agriculture Waste Management	0+10	VIII
12.	U21HELPP812	Protected Cultivation of High Value Horticulture Crops	0+10	VIII
13.	U21HELPP813	Processing of Fruits and Vegetables for Value Addition	0+10	VIII

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NON-GRADIAL COURSES

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21CNCCP110 / U21CNSSP110	National Cadet Corps / National Service Scheme	0+1	I
2.	U21CPEDP111	Physical Education & Yoga Practices	0+1	I
3.	U21HMVEP411	Educational tour - I (State)	0+1	IV
4.	U21HMVEP703	Educational tour - II (All India)	0+1	VII
		TOTAL	**0 + 4=4**	

REMEDIAL COURSE

Sl.No.	Course No.	Course Title	Cr.Hr.	Semester
1.	U21HREMP112	Introductory Biology	0+1	I
		TOTAL	**0 + 1=1**	

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B.Sc. (Hons.) Horticulture

VI semester

S. No	Course Code	Course Title	Credit
1	U21HAECT601	Horti-Business Management	2+0
2	U21HAEXB602	Entrepreneurship Development and Business Management	1+1
3	U21HAGRB603	Introduction to Major Field Crops	1+1
4	U21HAGRB604	Organic Farming	2+1
5	U21HENSB605	Environmental Studies and Disaster Management	2+1
6	U21HFLAB606	Breeding and Seed Production of Flower and Ornamental Plants	2+1
7	U21HPHTB607	Processing of Horticultural Crops	1+2
8	U21HHORB608	Precision Farming and Protected Cultivation	2+1
9	U21HSSTB609	Seed production of Vegetable, Tuber and Spice Crops	2+1
		TOTAL	**15 + 9 = 24**

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U21HAECT601 **HORTI-BUSINESS MANAGEMENT** **(2+0)**

Theory

Unit 1: Farm Management **(3 hrs)**

Farm Management: Definition, nature, characteristics and scope- objectives and relationship with other sciences – Production Economics vs Farm Management – Farm management decisions – decision-making process. Scope of farm management. Types of farming: Specialized, Diversified, and Mixed farming – Systems of farming. Principles of farm management

Unit II: Factor-Product, Factor-Factor and Product-Product Relationships **(10 hrs)**

Factor-Product relationship - Laws of returns – Classical production function and three stages of production – Elasticity of production–Types/Forms of production functions – use of production function in decision-making. Cost concepts, curves and functions - shut down and break- even points – CACP cost concepts - importance of cost in managing farm business and estimation of farm incomes. Economies of scale – Determination of optimum input and output.

Factor-Factor relationship– isoquant – definition and types – isocost line - Principle of factor substitution and least cost combination of inputs - expansion path – isocline – ridge line – Returns to scale - Elasticity of factor substitution – Effect of change in prices on least cost combination. Product-product relationship: Meaning – Production possibility curve – Enterprise relationship – iso revenue line –optimum combination of products. Principle of Opportunity Cost – equi-marginal returns - Minimum Loss Principle. Law of Comparative Advantage.

Unit III: Farm planning and Budgeting **(4 hrs)**

Farm planning: importance – characteristics of good farm plan – farm planning procedure – Budgeting: definition and types – complete budgeting – partial budgeting – enterprise budgeting –cash flow budgeting – limitations of budgeting. Risk and uncertainty: definition – types of risk and uncertainty – safeguards against risk and uncertainty.

Unit IV: Agri/Horti-business **(10 hrs)**

Agribusiness – Definition – Structure of Agribusiness (input, farm and product sectors) – Agribusiness Management – Importance of Agribusiness in Indian Economy. Management – Definition and Importance – Management functions – Nature. Management – Roles, Skills, Levels and functional areas of management. Forms of Business Organisations.

Planning: meaning – Types of plans. Steps in planning – characteristics of effective plans. Objectives – MBO. Organizing – Principles of organizing – Concept of Departmentation – Delegation – Centralization – Decentralization.

Staffing – Concept – Human Resource Planning – Process. Directing – Concept – Principles – Maslow's Need Hierarchy Theory – Difference between leadership and management. Controlling – Concept – Steps – Types – Importance – Process - Control system and Devices – Budgeting as a tool of planning and control – Record keeping as a tool of control.

Unit V: Functional areas of Management **(7 hrs)**

Functional areas of management – Operations management – physical facilities, implementing the plan, scheduling the work, controlling production in terms of quantity and quality. Materials management – types of inventories, inventory costs, managing the inventories,

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economic order quantity (EOQ). Personnel Management – recruitment, selection and training, job specialization. Marketing management – definitions, planning the marketing programmes - 4Ps of marketing mix. Financial management – financial statements and ratios – capital budgeting. Project management – project preparation – evaluation measures.

Lecture Schedule

1. Production Economics: Meaning – definition - Nature and Scope – Farm Management: definition - Objectives - Relationship with other sciences – Production Economics vs Farm Management.
2. Farm management decisions – Decision making process – Scope of farm management.
3. Types of farming: Specialized, Diversified, and Mixed farming – Systems of farming: Peasant Farming, State Farming, Capitalistic, Collective and Co – operative Farming.
4. Principles of farm management: Factor – Product relationship: Meaning – Agricultural production function: Meaning – Definition - Laws of Returns: increasing, decreasing and constant returns.
5. Classical production function and three stages of production – Elasticity of production.
6. Types of production function – Linear, Cobb-Douglas and Quadratic - use of production function in decision making
7. Cost concepts, cost curves and cost functions – total, average and marginal cost concepts and curves - shut down and breakeven point – importance of cost in managing farm business
8. CACP cost concepts – Cost of cultivation andproduction - Estimation of gross farm income, net farm income, family labour income and farm business income.
9. Economies of Scale – Economies of Size - Determination of Optimum Input and Output: input approach and output approach – Physical and Economic Optimum.
10. Factor – Factor relationship: Meaning – Isoquant – definition and types – isoquant map – MRTS – Isocost line - Least Cost Combination of inputs – Effect of input price changes on the least cost combination.
11. Expansion path - Factor intensity – isocline – ridge line - Returns to scale – Elasticity of Factor Substitution.
12. Product – Product relationship: Meaning – Production Possibility Curve – MRPT – Enterprise relationship: Joint products, complementary, supplementary and competitive products. Iso revenue line - Optimum Combination of Products
13. Principle of Equi –Marginal Returns – Principle of Opportunity Cost and Minimum Loss Principle. Law of Comparative Advantage. Time value of money – compounding and discounting.
14. Farm planning: importance – characteristics of good farm plan – farm planning procedure.
15. Budgeting: definition and types - partial and complete budgeting - steps in farm planning andbudgeting – enterprise budgeting – cash flow budgeting – limitations of budgeting.
16. Concept of risk and uncertainty in agriculture production, nature and sources of risks and itsmanagement strategies.
17. **MID SEMESTER EXAMINATION.**
18. Agribusiness – Definition – Structure of Agribusiness (input, farm and product sectors).
19. Agribusiness Management - Special features - Importance in Indian Economy.

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20. Management – Definition and Importance – Management functions. Management – Roles, Skills, Levels and functional areas of management.
21. Forms of Business Organisation – Sole Proprietorship – Partnership –Private and Public Limited, Cooperatives.
22. Planning – Definition – Types of plans (Purpose or Mission, Goals or Objectives, Strategies, Policies, Procedures, Rules, Programmes, Budget).
23. Planning - Steps in planning – Characteristics of Sound plan. Objectives – MBO.
24. Organizing – Principles of Organizing – Organisation structure – Formal and Informal Organisation. Concept of Departmentation. Unity of command, scalar pattern, job design, span of control, responsibility, power, authority and responsibility –Delegation-Centralization – Decentralization.
25. Staffing – Concept – Human Resource Planning – Process – recruitment – selection and training – job specialization – division of labour.
26. Directing – Concept – guiding, leading, motivating, supervising, coordination.
27. Controlling – Concept - Steps – Types – Importance – Process – Control systems and devices. Budgeting – Record keeping as a tool of control.
28. Functional areas of management: Operations management: meaning – operating system – physical facilities – implementing the plan – scheduling the work – controlling production in terms of quantity and quality.
29. Materials management: Inventory –types – inventory costs – inventory management – EOQ.
30. Financial management: Financial statements – importance– Balance sheet and ratio analysisand cash flow analysis.
31. Marketing management: meaning, definition – planning the marketing programmes - marketsegmentation, targeting and positioning – 4Ps of marketing mix and strategies.
32. Project management: Project – meaning – types of agricultural projects – project cycle. Preparation of bankable project.
33. Project appraisal and project evaluation measures – undiscounted and discounted measures.
34. Laws and policies related to agri-business in India.

Text Books

1. S.S.Johl, J.R.Kapur, 2006, Fundamentals of Farm Business Management. Kalyani Publishers,New Delhi.
2. Amarnath, J.S. and Samvel, A.P.V., 2008. Agri-Business Management, Satish Serial Publishing House, New Delhi.
3. Philip Kotler, Kevin L. K, Swee H. A, Chin T. T, Siew M. L, 2018 Marketing Management: An Asian Perspective, Pearson Education Ltd, UK,.

References Books

1. Prasad, L. M., 2005. Principles and Practices of Management, Sultan Chand and Sons Educational Publishers, New Delhi.
2. Chandra Prasanna. 2019. Projects: Planning, Analysis, Selection, Financing, Implementation, and Review, McGraw-Hill Education.
3. Gittinger, J. P., 1982, Economic analysis of agricultural projects. The John Hopkins University Press, Baltimore, USA.

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e-References

1. http://agcollegejagtial.weebly.com/uploads/4/6/5/5/46554149/aeco_342.pdf
2. https://www.hzu.edu.in/agriculture/Agribusiness-Management-and-Trade.pdf
3. https://agrimoon.com/wp-content/uploads/Agricultural-Business-Management.pdf
4. https://zalamsyah.files.wordpress.com/2018/02/6-agribusiness-management.pdf

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U21HAEXB602 **ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS MANAGEMENT** **(1+1)**

Theory

Unit I : Entrepreneurship **(3 hrs)**

Concept of entrepreneurship; entrepreneurial and managerial characteristics; Assessing overall business environment in the Indian economy. Globalisation and the emerging business / entrepreneurial environment. Overview of Indian social, political and economic systems and their implications on agricultural entrepreneurs.

Unit II: Managing enterprise **(4 hrs)**

Managing an enterprise; motivation and entrepreneurship development; importance of planning, monitoring, evaluation and follow up; SWOT analysis and Market Survey, Generation, incubation and commercialization of ideas and innovations.

Unit III: Programmes / Schemes for Entrepreneurship development **(4 hrs)**

Entrepreneurship development initiatives of the Government – SSIB, SIDO, NSIC, KVIC, NISIET, NIESBUD, IIE, SSIDC, SDI, DIC, SIDBI, Commercial banks, SFC. Schemes and incentives for promotion of entrepreneurship - Agri Clinic and Agri Business Centre – ACABC. Startups for Horti-business - EXIM bank, Special Economic Zones, Food parks. Government policies related to horticulture and food processing sector. Export and Import policies of government of India.

Unit IV: Functional Areas of Management **(4 hrs)**

Venture capital. Contract farming and joint ventures, public, private partnerships. Supply chain management and total quality management. Overview of horti inputs industry. Characteristics of Indian horticultural processing and export industries. Social Responsibility of Business.

Unit V: Business Communication **(2 hrs)**

Communication skills for entrepreneurs – Meaning, definition, process and importance, types of communication skills. Leadership – Definition, styles, difference between leaders and Managers.

Practical **(17 hrs)**

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, précis writing, summarizing, abstracting; news writing, preparing project proposals, individual, group presentation, features of oral presentation, presentation, evaluation of presentation and evaluation of sheet, dyadic communication-face to face conversation, telephone conversation, rate of speech and clarity of voice, speaking and listening politeness, telephone etiquettes, organising general and group meeting, salient features of participation in seminars and conferences, conducting and participating in mock interviews.

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Lecture Schedule

1. Concept of entrepreneurs and entrepreneurship, entrepreneurial and managerial traits.
2. Entrepreneurship Development: Assessing overall business environment in the global and Indian economy.
3. Implication of Indian social, political and economic systems and their implications for decision making by agricultural entrepreneurs.
4. Entrepreneurship development process – generation, incubation and commercialization of ideas and innovations.
5. Managing enterprise – planning, monitoring, evaluation and follow-up.
6. Motivation – meaning, definition, importance, motivating factors of entrepreneurship development.
7. SWOT analysis, concept, meaning, advantages. Market survey – meaning, importance, types of survey.
8. Entrepreneurship development initiatives of the government. – SSIB, SIDO, NSIC, KVIC, NISIET, NIESBUD, IIE, SSIDC, SDI, DIC, SIDBI, Commercial banks, SFC
9. **MID SEMESTER EXAMINATION**
10. Government schemes and incentives for promotion of entrepreneurship. Agri Clinic and Agri Business Centre – ACABC.
11. Startups for Horti-business in India - EXIM bank, Special Economic Zones, Food parks.
12. Export and Import Policies relevant to agriculture sector, Government policies related to horticulture and food processing sectors.
13. Venture capital – concept, features, sources, criteria. Supply chain management and total quality management.
14. Overview - Contract farming, Joint venture, PPP model. Agri inputs industry, Characteristics of Indian.
15. Horticultural processing and export industries & Social responsibility of business.
16. Communication skills for entrepreneurs – Meaning, definition, process and importance, types of communication skills.
17. Leadership – Definition, styles, difference between leaders and Managers.

Practical Schedule

1. Exercise on reading and comprehension of general and technical articles, précis writing, summarizing, abstracting.
2. Exercise on listening and note taking, writing skills - field diary and lab record; indexing, footnote and bibliographic procedures.-I (Manual method)
3. Exercise on listening and note taking, writing skills - field diary and lab record; indexing, footnote and bibliographic procedures.-II (Digital method)
4. Visit to agri clinic/ industries

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5. Visiting institution supporting entrepreneurship development
6. Analysing case study of successful enterprise by SWOC
7. Understanding oral presentation skills
8. Preparing project proposal
9. Preparing advertisements for popularization of product and news writing
10. Individual Presentation of project and evaluation –I
11. Individual Presentation of project and evaluation - II
12. Group presentation and evaluation of project – I & II
13. Practice on face to face conversation and telephone conversation
14. Conducting and participating in mock interviews- I
15. Conducting and participating in mock interviews- II
16. Visit to Horti-business startups center
17. **FINAL PRACTICAL EXAMINATION**

Text book

1. Yuvaraja, N. 2020. Entrepreneurship Development and Agri Business Management, Brillion Publishing, New Delhi.
2. Sagar Mondal and G.L. Ray. 2009. Text Book of Entrepreneurship and Rural Development, Kalyani Publishers, Ludhiana.
3. Gupta, C.B. 2001. Management: Theory and Practice. Sultan Chand and Sons, New Delhi.

Reference Books

1. Vasant Desai. 2000. Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, New Delhi.
2. Khanka, S.S.1999. Entrepreneurial Development. S. Chand and Co., New Delhi.
3. Vasant Desai. 1997. Small Scale Industries and Entrepreneurship. Himalaya Publishing House, New Delhi.

E- References

1. www.ediindia.org
2. www.iie.nic.in
3. www.msme.gov.in
4. www.niesbudtraining.org
5. www.nimsme.org
6. www.nsic.co.in
7. www.nabard.org

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2.G.108

U21HAGRB603 INTRODUCTION TO MAJOR FIELD CROPS (1+1)

Theory:

Unit I: Introduction **(2 hrs)**

Classification and distribution of field crops (Cereals, Pulses, Oilseeds and Fodder crops); definitions and concepts of multiple cropping, mixed cropping, intercropping, relay and alleycropping and crop rotation

Unit II: Cereals **(4 hrs)**

Cereals: Rice, Maize, Wheat, Barley, Sorghum, Pearl millet, Finger millet and Minor millets -Cultural practices: Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield

Unit III: Pulses **(3 hrs)**

Pulses: Red gram, Black gram, Green gram, Bengal gram, Horse gram, Cowpea and Soybean - Cultural practices: Field preparation – Season - Sowing – Water management – Weedmanagement – Nutrient management – Harvesting and yield

Unit IV: Oil seeds **(4 hrs)**

Oil seeds: Ground nut, Sesame, Sunflower, Castor, Safflower, Rape seed and mustard – Cultural practices: Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield

Unit V: Fodder Crops and Green Manuring **(4 hrs)**

Fodder Crops: Fodder Sorghum, Fodder Maize, Fodder Cowpea, Bajra-Napier Hybrid grass, Guinea grass, Lucerne, and Berseem - Cultural practices: Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting – Preservation of fodder Green Manuring: Importance and classification

Practical: **(17 hrs)**

Identification of crop plants, seeds and weeds -Calculation of seed rate - Seed treatment techniques – Nursery preparation and management for Rice, Sorghum and Finger millet - Raising of crop cafeteria - Estimation of plant population – Nutrient management - Weed management - Application of herbicides in field crops - Study of growth and yield parameters - Harvesting of major field crops and Yield estimation– Preservation of fodder -Preparation of cropping scheme.

Lecture Schedule:

1. Classification and distribution of major field crops (Cereals, Pulses, Oilseeds and Foddercrops)
2. Definitions and concepts of multiple cropping, mixed cropping, intercropping, relay andalley cropping and crop rotation and its principles
3. Rice - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management –Harvesting and yield
4. Maize, Wheat and Barley- Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield

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5. Sorghum, Pearl millet and Finger millet - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield
6. Minor millets - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management — Harvesting and yield
7. Red gram, Black gram, Green gram and Cowpea - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield
8. Bengal gram, Horse gram and Soybean - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield
9. **MID SEMESTER EXAMINATION**
10. Ground nut - Cultural practices : Field preparation – Season - Sowing – Water management
    – Weed management – Nutrient management –Harvesting and yield
11. Sesame and Sunflower - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management –Harvesting and yield
12. Castor, Safflower - - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management –Harvesting and yield
13. Rape seed & Mustard - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management –Harvesting and yield
14. Fodder Sorghum, Fodder Maize and Fodder cowpea - Cultural practices : Field preparation
    – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield
15. Bajra-Napier Hybrid grass, Guinea grass, Lucerne and Berseem - Cultural practices : Field preparation – Season - Sowing – Water management – Weed management – Nutrient management – Harvesting and yield
16. Preservation of fodder – Hay and Silage making
17. Green Manuring: Importance and classification

Practical Schedule:

1. Identification of seeds of major field crops
2. Calculation of seed rate for major field crops
3. Acquiring skill on different seed treatment techniques
4. Acquiring skill on nursery preparation and management for Rice
5. Acquiring skill on nursery preparation and management for Sorghum and Finger millet
6. Lay out and raising of crop cafeteria
7. Estimation of plant population per unit area for major field crops
8. Acquiring skill on nutrient management practices for major field crops
9. Identification of weeds and acquiring skill on application of herbicides in major field crops
10. Study on growth parameters of major field crops
11. Study on yield parameters of major field crops

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12. Study on maturity indices and harvesting of major field crops
13. Estimation of theoretical yield of major field crops
14. Working out the economics of cultivation of major field crops
15. Acquiring skill on preservation of fodder
16. Preparation of cropping Scheme
17. **FINAL PRACTICAL EXAMINATION**

Text Books

1. S.R.Reddy. 2009. Agronomy of Field Crops. Kalyani Publishers, New Delhi.
2. Rajendra Prasad. 2004. Text Book on Field Crop Production – Vol.I. Indian Council of Agrl. Research, New Delhi.
3. Rajendra Prasad. 2004. Text Book on Field Crop Production – Vol.II Indian Council of Agrl. Research, New Delhi.

Reference Books:

1. Crop Production Guide. 2020. Directorate of Agriculture, Chennai and Tamil Nadu Agricultural University, Coimbatore.
2. B. Gururajan, R.Balasubramanian and V.Swaminathan. 2008, Recent Strategies on Crop Production. Kalyani Publishers, New Delhi.
3. Hand Book of Agriculture. 2006. Indian Council of Agrl. Research, New Delhi.
4. S.S.Singh. 2005. Crop Management. Kalyani Publishers, New Delhi.
5. Chidda Singh, Prem Singh and Rajbir Singh 2003. Modern Techniques of Raising Field Crops. Oxford and IBH Pub. Co. Pvt. Ltd., New Delhi.
6. Massod Ali, S.K.Chaturvedi and S.N.Gurha.2001. Pulses for sustainable agriculture and nutritional security.Indian Institute of Pulses Research, Kanpur, India.
7. Subhash Chandra Bose, M. and Balakrishnan, V. 2001. Forage Production South. Asian Publishers, New Delhi Ahlawat, I.P.S., Om Prakash and G.S. Saini. 1998. Scientific Crop Production in India. Rama publishing House, Meerut
8. Singh. S.S. 1997. Crop management under irrigated and rainfed conditions. Kalyani Publishers, New Delhi
9. Palaniappan, S.P. and K. Sivaraman, 1996. Cropping Systems in Tropics. Principles and Management, New Age Intel (P) Ltd., Publication.

e-References

1. www.irri.org
2. www.tnau.ac.in/agriportal
3. http://sugarcane.tn.nic.in
4. http://fibre.tn.nic.in

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U21HAGRB604 **ORGANIC FARMING** **(2+1)**

Theory

Unit I: Types of farming and impacts of green revolution farming **(6 hrs)**

Types of farming – Impacts of green revolution farming – Natural Nutrient cycles – Fate ofagro chemicals in ecosystem.

Unit II: Sustainable farming practices **(4 hrs)**

Sustainable farming – Definition, Concept and practices. Sustainable Farming methods – Bio-dynamic farming, Permaculture, Organic Farming, IFS, LEISA *etc.*

Unit III: Organic farming – concepts and principles **(7 hrs)**

Ecology and Principles of ecology. Biodiversity: importance and measure to preserve biodiversity. Organic farming: Definition - Scope - Principles and concepts - History of organic farming - global scenario –pre requisites for Organic farming: Integrated Farming System approach – organic carbon: status and improvement strategies – conservation tillage.

Unit IV: Nutrient and pest management in organic farming **(9 hrs)**

Principles of nutrient management in organic farm - Organic sources and potentials – on farm and off farm sources – organic waste recycling methods - Soil and crop management - inter cropping, crop rotation, green manures, cover crops, mulching - bio fertilizers. Panchakavya and other organic solutions – Preparation and usage - Principles of pest management in organic farm - Bio intensive pest and diseases management - physical, cultural, mechanical and biological methods – non-chemical weed management methods: preventive, physical, cultural, mechanical and biological control measures.

Unit V: Certification, Exports and ITK **(8 hrs)**

Organic certification – NPOP guidelines - Certification agencies in India – crop production standards - Quality considerations - labeling and accreditation process - marketing and export opportunities. Indigenous Technical Knowledge (ITK) in organic agriculture – rationale and principles - Benefits and problems of organic farming: promotional activities – economic evaluation of organic production systems

Practical **(17 hrs)**

Experiencing organic farming practices – soil, seed, nutrient, weed, water, pest and diseases, post-harvest management - hands on experience on bio composting, vermicomposting, ITK based biological preparations, bio-fertilizers bio-inoculants - quality analysis of inputs and products - grading, packaging, post-harvest management – visit to organic farms, market outletsand organic certification centers.

Lecture Schedule:

1. Farming – types of farming
2. Impacts of green revolution farming
3. Natural Nutrient cycles
4. Fate of agro chemicals in ecosystem.
5. Ecology and Principles of ecology.
6. Biodiversity: importance and measure to preserve biodiversity

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7. Sustainable farming – Definition, concept and practices
8. Sustainable Farming methods – Bio-dynamic farming
9. Sustainable Farming – Permaculture
10. Sustainable Farming - IFS, LEISA *etc.*
11. Organic farming: Definition - Scope - Principles and concepts
12. History of organic farming – Global and Indian Scenario of organic faming
13. Organic carbon: status and improvement strategies – conservation tillage.
14. Principles of nutrient management in organic farm - Organic sources and potentials
15. On farm and off farm sources – organic waste recycling methods
16. Soil and crop management - inter cropping, crop rotation
17. **MID SEMESTER EXAMINATION**
18. Green manures, cover crops, mulching, bio fertilizers
19. Principles of pest management in organic farm – physical and cultural methods
20. Pest management - Mechanical and biological methods
21. Non-chemical weed management methods: preventive, physical and cultural methods
22. Non-chemical weed management - mechanical and biological control measures.
23. Principles and Disease management in organic farm
24. Benefits and problems of organic farming
25. Factors influencing adoption of organic farming
26. Organic crop management techniques – Warm season vegetables
27. Organic crop management techniques – Cool season vegetables
28. Organic crop management techniques – Fruit trees
29. Organic Allied enterprises - honey bees and livestock production
30. Processing, Transport, Storage of Organic products - Export Avenues, Marketing
31. Organic certification – NPOP guidelines
32. Certification agencies in India – crop production standards
33. Quality considerations - labeling and accreditation process - marketing and export opportunities.
34. Economic evaluation of organic production systems

Practical Schedule:

1. Global and Indian scenario of organic farming
2. Principles of Organic farming
3. Organic management of crops
4. Hands on experience on bio composting
5. Hands on experience on vermicomposting,
6. Hands on experience on ITK based biological preparations,
7. Hands on experience on Bio-dynamic preparations
8. Seed treatment practices in organic management
9. Bio fertilizers and bio-inoculants usage in organic farming.
10. Nutrient management and Nutrient budgeting in organic farming
11. Weed management in organic farming
12. Insect management in organic farming

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13. Disease management in organic farming
14. Bio-diversified Integrated farming practices for different ecosystems
15. Organic certification procedures
16. Visit to organic farms, market outlets and organic certification centers
17. **FINAL PRACTICAL EXAMINATION**

Text books

1. Reddy, S.R., 2017. Principles of organic farming. Kalyani Publishers.
2. Dahama, A.K., 2009. Organic farming for sustainable agriculture, Agrobios publishers.
3. Sharma, A.K., 2008. A Hand book of organic farming, Agrobios Publishers.
4. Palaniappan, S.P., and Annadurai, K. 2008. Organic Farming: Theory and Practice, Scientific Publishers.
5. Lampkin, N., 1994. Organic farming. Farming press London.

References books

1. Veeresh, G.K., 2010. Organic farming, Cambridge university press.
2. Stockdale, E., 2000. Agronomic and environmental implications of organic farming systems. Advances in Agronomy.
3. Kannaiyan, S., 2003. Biotechnology of Biofertilizers, CHIPS, Texas.
4. Reddy, S.R. 2011. Principles of Agronomy Kalyani Publishers, Ludhiana, India
5. Panda, S.C., 2006. Agronomy, Agribios Publication, New Delhi

E - References

1. https://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Compilation_techniquesorganic_agriculture_rev.pdf
2. https://eorganic.org/node/10805
3. https://www.nabard.org/demo/auth/writereaddata/File/OC%2038.pdf
4. https://apeda.gov.in/apedawebsite/Announcements/NPOP_Training_Manual_English_E_Book.pdf
5. https://www.manage.gov.in/publications/eBooks/Organic%20Agriculture.pdf

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U21HENSB605 ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT (2+1)

Theory

Unit 1: Natural Resources (6 hrs)

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources - Renewable and non-renewable resources Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.

Unit 2: Ecosystem and Biodiversity (6 hrs)

Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following ecosystem. a. Forest ecosystem. b. Grassland ecosystem. c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit 3: Human Population, Social Issues and the Environment (6 hrs)

Social Issues and the Environment: From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.

Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.

Unit 4 : Environmental Pollution, Laws and Regulations (7 hrs)

Environmental Pollution - Definition, cause, effects and control measures of : a. Air pollution. b. Water pollution. c. Soil pollution. d. Marine pollution. e. Noise pollution. f. Thermal pollution. g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.

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Environmental Laws and regulations - Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit 5: Disaster and its management **(7 hrs)**

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.

Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community - based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations

Practical: **(17 hrs)**

Field work: Visit to a local area to document environmental assets river / forest / grassland / hill / mountain, visit to a local polluted site –Urban / Rural / Industrial / Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

Lecture Schedule

1. Multidisciplinary nature of environmental studies - Definition, scope and importance - Natural Resources: Renewable and non-renewable resources - Natural resources and associated problems
2. Forest resources: Use and over-exploitation, deforestation, case studies - Timber extraction, mining, dams and their effects on forest and tribal people
3. Water resources: Use and over-utilization of surface and ground water - Floods, drought, conflicts over water, dams - benefits and problems
4. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies - Food resources: World food problems, changes caused by agriculture and overgrazing
5. Effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies.
6. Land resources: Land as a resource, land degradation, man induced landslides - Soil erosion and desertification - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles
7. Ecosystems - Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids
8. Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem and Desert ecosystem

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9. Introduction, types, characteristic features, structure and function of Aquatic ecosystems : ponds, streams, lakes - Rivers, oceans, estuaries
10. Biodiversity and its conservation - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
11. Biodiversity at global, National and local levels - India as a mega-diversity nation - Hotspots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts
12. Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
13. Social Issues and the Environment - From Unsustainable to Sustainable development - Urban problems related to energy.
14. Water conservation, rain water harvesting, watershed management - Environmental ethics: Issues and possible solutions, climate change, global warming
15. Acid rain, ozone layer depletion, Nuclear accidents and holocaust - Wasteland reclamation-Consumerism and waste products
16. Human Population and the Environment: Population growth, variation among nations, population explosion, Family Welfare Programme
17. **MID SEMESTER EXAMINATION**
18. Environment and human health: Human Rights, Value Education, HIV/AIDS - Women andChild Welfare - Role of Information Technology in Environment and human health - CaseStudies
19. Environmental Pollution - Definition, cause, effects and control measures of Air pollution and Noise pollution.
20. Definition, cause, effects and control measures of Water pollution and Soil pollution
21. Definition, cause, effects and control measures of Marine pollution, Thermal pollution and Nuclear hazards
22. Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution - Pollution case studies.
23. Environment Protection Act - Air (Prevention and Control of Pollution) Act –
24. Water (Prevention and control of Pollution) Act - Wildlife Protection Act - Forest Conservation Act
25. Issues involved in enforcement of environmental legislation - Public awareness
26. Disaster Management - Natural Disasters - Meaning and nature of natural disasters, their types and effects - Floods, drought, cyclone, earthquakes, Landslides, avalanches
27. Volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise,ozone depletion
28. Man Made Disasters - Nuclear disasters, chemical disasters, biological disasters, Building fire, coal fire, forest fire, oil fire,
29. Air pollution, water pollution, deforestation, industrial waste water pollution
30. Road accidents, rail accidents, Air accidents, sea accidents
31. Disaster Management - Effect to migrate natural disaster at national and global levels
32. International strategy for disaster reduction. Concept of disaster management, national

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disaster management framework; financial arrangements

33. Role of NGOs, community - based organizations and media in disaster management
34. Central, state, district and local administration in disaster management. Armed forces in disaster response; Disaster response; Police and other organizations

Practical Schedule

1. Visit to a local area to document environmental assets river / forest / grassland / hill / mountain
2. Energy: Biogas production from organic wastes
3. Visit to wind mill / hydro power / solar power generation units
4. Biodiversity assessment in farming system
5. Floral and faunal diversity assessment in polluted and un polluted system
6. Visit to local polluted site-Urban/Rural/Industrial/Agricultural to study of common plants, insects and birds
7. Environmental sampling and preservation
8. Water quality analysis: pH, EC and TDS
9. Estimation of Acidity, Alkalinity
10. Estimation of water hardness
11. Estimation of DO and BOD in water samples
12. Estimation of COD in water samples
13. Enumeration of E. coli in water sample
14. Assessment of Suspended Particulate Matter (SPM)
15. Study of simple ecosystem – pond/river/hills
16. Visit to areas affected by natural disaster
17. **FINAL PRACTICAL EXAMINATION**

Text book:

1. Dhar Chakrabarti. P.G., 2011. Disaster management - India's risk management policy frameworks and key challenges. Published by Centre for Social Markets (India), Bangalore.

References books:

1. De. A.K., 2010. Environmental chemistry. Published by New Age International Publishers, New Delhi.
2. Cunningham 2005. Principles of Environmental science. Tata MCG raw-hill publishing company limited, New Delhi
3. Proceedings of 2nd India disaster management congress, New Delhi. organized by National Institute of Disaster Management, New Delhi during 4 – 6, Nov 2009.
4. Tyler Miller and Scot Spoolman. 2009. Living in the Environment (Concepts, Connections, and Solutions). Brooks/cole, Cengage learning publication, Belmont, USA
5. P.D. Sharma, 2009, Ecology and Environment, Rastogi Publications, Meerat, India
6. Erach Bharucha, 2004 Text book for Environmental studies. University Grants Commission, New Delhi
7. Diwan, P. and P. Diwan. 1998. Environmental Management Law and Administration. Variety Books International, New Delhi.

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E- References

1. www.ediindia.org
2. www.iie.nic.in
3. www.msme.gov.in
4. www.niesbudtraining.org
5. www.nimsme.org
6. www.nsic.co.in
7. www.nabard.org

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U21HFLAB606 **BREEDING AND SEED PRODUCTION OF FLOWER AND ORNAMENTAL PLANTS** **(2+1)**

Theory

Unit-I: Introduction and methods of breeding of flower and ornamentals

History of improvements of ornamental plants, Centre of origin of flower crops and ornamental crops, objectives and techniques in ornamental plant breeding. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental and flowercrops, Breeding for disease resistance. Role of heterosis and its exploitation, production of F1 hybrids and utilization of male sterility, production of open pollinated seed. Harvesting, seed production, seed processing and storage of seeds, seed certification

Unit-II: Breeding and seed production of of Jasmine, Rose, Chrysanthemum, Tube rose, Gerbera, and Gaillardia

Objectives and techniques in breeding - Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental and flower crops. Breeding for diseas resistance. Role of heterosis and its exploitation, productionof F1 hybrids andutilization of male sterility, production of open pollinated seed. Harvesting, seed production, seed processing and storage of seeds, seed certification in Jasmine, Rose, Chrysanthemum, Tube rose, Gerbera, and Gaillardia

Unit-III: Breeding and seed production of Petunia, Dahlia, Hibiscus – Bougainvillea – Zinnia – Cosmos

Objectives and techniques in breeding. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental and flower crops, Breeding for diseaseresistance. Role of heterosis and its exploitation, production of F1 hybrids and utilization of male sterility, production of open pollinated seed. Harvesting, seed production, seed processing and storage of seeds, seed certification in Petunia, Dahlia, Hibiscus – Bougainvillea – Zinnia - Cosmos

Unit-IV: Breeding and seed production of Dianthus - Marigold and Geranium - Antirrhinum and China aster - Orchids

Objectives and techniques in breeding. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental and flower crops, Breeding for disease resistance. Role of heterosis and its exploitation, production of F1 hybrids andutilization of male sterility, production of open pollinated seed. Harvesting, seed production, seed processing and storage of seeds, seed certification in Dianthus - Marigold and Geranium - Antirrhinum and China aster - Orchids

Unit-V: Breeding and seed production in Gladiolus – Heliconia – Anthurium - Carnation - Dahlia

Objectives and techniques in breeding. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental and flower crops, Breeding for disease resistance. Role of heterosis and its exploitation, production of F1 hybrids and

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utilizationof male sterility, production of open pollinated seed. Harvesting, seed production, seed processing and storage of seeds, seed certification in Gladiolus – Heliconia – Anthurium - Carnation - Dahlia

Practical

Study of floral biology and pollination in important species and cultivars. Techniques of inducing polyploidy and mutation. Production of pure and hybrid seeds. Harvesting, conditioningand testing of seeds. Practice in seed production methods.

Lecture Schedule

1. History and development of hybrids, different breeding methods for self & cross pollinated crops.
2. Important concepts of breeding of ornamental crops.
3. Breeding for disease resistance in flower and ornamental crops
4. Role of heterosis in F1 hybrids development and use of mail sterility
5. Breeding objectives, breeding methods and achievements in rose
6. Breeding objectives, breeding methods and achievements jasmine
7. Breeding objectives, breeding methods and achievements in Chrysanthemum
8. Breeding objectives, breeding methods and achievements in tuberose
9. Breeding objectives, breeding methods and achievements in Gerbera and Gladiolus
10. Breeding objectives, breeding methods and achievements in Dahlia and Heliconia
11. Breeding objectives, breeding methods and achievements in Dahlia and Gaillaidia and Petunia
12. Breeding objectives, breeding methods and achievements in Dahlia and Hibiscus
13. Breeding objectives, breeding methods and achievements in Bougainvillea
14. Breeding objectives, breeding methods and achievements in Zinnia
15. Breeding objectives, breeding methods and achievements in Cosmos
16. Breeding objectives, breeding methods and achievements in Dianthus
17. **MID SEMESTER EXAMINATION**
18. Breeding objectives, breeding methods and achievements in Marigold and Geranium
19. Breeding objectives, breeding methods and achievements in Antirrhinum and China aster
20. Breeding objectives, breeding methods and achievements in Orchids
21. Breeding objectives, breeding methods and achievements in Carnation
22. Introduction to Commercial Flower Seed Production – Flower Seeds and Flower Seed Industry
23. Scope and Importance of Commercial Floriculture and Seed Production techniques of ornamental plants
24. Factors considered for efficient seed programme in Ornamental seed production methodsof seed production in marigold and Zinnia
25. Methods of Seed production techniques in marigold, zinnia and Chrysanthemum(including processing, storage and seed certification)
26. Methods of Seed production techniques in Dahlia, Petunia and Phalsa (including processing, storage and seed certification)
27. Methods of Seed production techniques in Cockscomb, Cosmos and Hollyhock (including

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processing, storage and seed certification)

28. Methods of Seed production techniques in Gaillardia and Gomphrena (includingprocessing, storage and seed certification)
29. Methods of seed / vegetative plant production technique in rose and jasmine (including processing, storage and seed certification)
30. Methods of Seed / vegetative plant production technique in hibiscus and Bougainvillea (including processing, storage and seed certification)
31. Methods of Seed / vegetative plant production techniques in Orchids (including processing, storage and seed certification)
32. Methods of Seed / vegetative plant production technique in Gerbera and Anthurium (including processing, storage and seed certification)
33. Methods of Seed / vegetative plant production technique in Gladiolus and Carnation (including processing, storage and seed certification)
34. Classification of Seeds based on longevity – Seed storage and Storage conditions for some flower crops – Conserving the Germplasm of Herbaceous Ornamental Plants.

Practical Schedule

1. Selfing, emasculation and crossing techniques in ornamentals
2. Introduction, selection, hybridization - technique for improvement of ornamental plants
3. Mutation and Polyploidy breeding - technique for improvement of ornamental plants
4. Biotechnological breeding - technique for improvement of ornamental plants
5. Floral biology, selfing, emasculation and crossing technique in Rose, Jasmine, Marigold andAnthurium
6. Floral biology, selfing, emasculation and crossing technique in Gladiolus and Orchids
7. Floral biology, selfing, emasculation and crossing technique in Gaillardia and Gerbera
8. Floral biology, selfing, emasculation and crossing technique in Zinnia, Ageratum, Alyssum,Aster and Calendula
9. Seed collection in ornamental plants (annuals, perennials and tree crops)
10. Methods of seed extraction in ornamental plants
11. Identification of seed and seed structure of ornamental plants
12. Seed germination and viability testing in ornamental plants
13. Seed Dormancy & Methods of breaking of seed dormancy in ornamental plants
14. Seed germination, test evaluation and seed enhancement techniques (Seed Priming, Pre-germination, Pelleting and Coating) in ornamental plants
15. Study of seed storage, seed package and packaging materials in ornamental plants
16. Visit to ornamental seed production plots and Commercial flower seed production industries
17. **FINAL PRACTICAL EXAMINATION**

Text books

1. Arora, J.S . 2017 Introductory ornamental Horticulture-Publishers, Ludhiana
2. A. K. Singh. 2014. Breeding and Biotechnology of Flowers of Commercial Flowers.
3. D.J.Callaway and M.B.Callaway. 2000. Breeding Ornamental Plants. Timber Press

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4. P.K. Agarwal. 1994. Principles of Seed Technology. ICAR Publication, New Delhi
5. J.Harding, F.Singh and J.N.Mol. 1991.Genetics and Breeding of ornamental Species. Springer Publishers
6. S.K.Bhattacharjee and L.C.De. 2003. Advanced Commercial Floriculture. Aavishkar Publisheres, Distributors, Jaipur (Rajasthan) India

References books

1. Singh, B.D. (2018) Plant Breeding. Kalyani Publishers. New Delhi/Ludhiana.
2. Anderson N,O. 2014. Flower Breeding and Genetics, Issues, Challenges and Opportunities for the 21st Century. ND Publishing Agency, New India.
3. Bose, T.K. and L.P.Yadav 1988. "CommercialFlowers" – Naya Prakash Calcutta.
4. Swarup, V andL.P.Yadav.1988. Ornamental Horticulture–Naya Prakash, Calcutta.
5. Salunkhe, D.K., B.B. Desai and N.R Bhat. 1987. Vegetable and flower seed production
6. Chadha,K.L. (1993) Advances in Horticulture - Ornamnetal plants.Vol.12 Part I & II – edited by Malhotra Publishing House, New Delhi

e-Reference

1. www.iasri.res.in
2. www.icar.org.in/ciphet.html
3. www.agritech.tnau.in
4. www.jains.com
5. www.gisdevelopment.net

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U21HPHTB607 PROCESSING OF HORTICULTURAL CROPS (1+2)

Theory

Unit-I: Scope of fruit and vegetables preservation (4 hrs)

Importance and scope of fruits and vegetable preservation industry–principles and guidelines for location of units and setting up of processing units – canning and dehydration industries. Food pipeline, losses in postharvest operations, unit processing during post harvest handling (sorting, Grading, Packaging), unit operations in food processing – Primary and secondary processing

Unit-II: Principles and methods of food preservation (4 hrs)

Storage system of fruit and vegetable products. Principles and methods of preservation by heat–bottling of fruits and vegetables. Methods of preparation of beverages–fermented beverages–wine and vinegar. Non-fermented beverages–syrups and cordials. Minimal Processing of Fruits and vegetables.

Unit-III: Value addition of fruits (2 hrs)

Traditional and novel methods of food preservation and its importance - preservation by using sugar – crystallised fruits and toffees. Preservation with salt and vinegar – chutney and sauces –tomato and mushroom sauce. Spoilage identification in processed fruits and vegetables.

Unit-IV: Preservation by freezing (1 hrs)

Freezing preservation–frozen orange slices and peas. Freeze drying of horticultural crops. Individual Quick Freezing, Freezing methods and equipments

Unit-V: Processing of plantation crops and food laws (5 hrs)

Processing of plantation crops and products. Spoilage in processed foods. Quality control in processed products-government policy on import and export of processed fruits. Food laws and quality control. FSSAI, ISO, BIS, Codex, Alimentarius, HACCP. Fruit and vegetable processing industry-costs, contribution and break even analysis. Spoilage Identification

Practical

Equipment used in food processing units. Physico-chemical analysis of fruits and vegetables. Canning of fruits and vegetables – preparation of cordial, syrup, chutneys, and pickles (hot and sweet).Dehydration of fruits and vegetables sapota and tomato product dehydration, refrigeration and freezing. Cut out analyses of fruit and vegetable based processed foods. Processing of plantation crops. Visit to processing units.

Lecture Schedule

1. Importance and scope of fruit and vegetable in world agriculture and preservation industry in India.
2. Food pipeline loss of fruit and vegetables from farm to for k-losses in post-harvest operations.
3. Unit operations during post harvest handling (sorting, grading, packging) Primary and secondary processing. Unit processing in fruit and vegetable processing industry.
4. Principles and guidelines for setting up of fruit and vegetable processing units.
5. Storage system of Fruit and Vegetable products

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6. Principles and methods of preservation by heat–bottling of fruits and vegetables.
7. Methods of preparation of beverages–fermented beverages–wine and vinegar. Non-fermented beverages–syrups and cordials.
8. Minimal Processing of fruits and vegetables
9. **MID SEMESTER EXAMINATION**
10. Traditional and Novel Methods of food preservation and its importance Preservation by using sugar – crystallised fruits and toffees.
11. Preservation with salt and vinegar– pickling, chutney and sauces–tomato and mushroom sauce. Spoilage identification in processed fruits and vegetables.
12. Freeze preservation – Freezing drying of horticultural crops, Frozen peas.
13. Individual quick Freezing, Freezing methods and equipment.
14. Processing of coffee and tea. Cocoa processing and chocolate manufacture process. Spoilage of processed plantation food products.
15. Role of ingredients used in chocolate manufacturing-honey, molasses, cream, milk products, egg, aerating agents, additives, starches, fruits and nuts.
16. Government policy on import and export of processed fruits and vegetables –APEDA.
17. Quality control and safety of processed products – FSSAI, ISO, BIS, Codex, Alimentarius, Hazard Analysis Critical Control Point (HACCP). Fruit and Vegetable processing industry costs, contribution and Break even analysis.

Practical Schedule

1. Market survey of fruit and vegetable based processed products.
2. Introduction to equipment used in food processing units.
3. Physico-chemical analysis of fruits.
4. Physico-chemical analysis of vegetables.
5. Bottling of fruits
6. Bottling of vegetables
7. Preparation of lime juice cordial
8. Preparation of clarified sapota juice
9. Preparation of nannari syrup
10. Preparation of hot chutneys and sweet chutneys
11. Preparation of pickles
12. Preparation of candy
13. Preparation of jam
14. Preparation of squash
15. Preparation of RTS beverages
16. Preparation of banana based babyfood
17. Dehydration of fruits–sapota product dehydration
18. Dehydration of fruits–mango product dehydration
19. Dehydration of fruits –banana fig production
20. Dehydration of vegetable –Brinjal
21. Dehydration of vegetables –cluster bean and bitter gourd

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22. Dehydration of vegetables –tomato product dehydration
23. Dehydration of Moringa pod and leaf
24. Preparation of frozen orange slices
25. Cut out analyses of canned processed foods
26. Preparation of chocolate bars
27. Preparation of hot chocolate.
28. Preparation of palmyrah based value added products
29. Processing of spice based masala powders
30. Spoilage studies of processing products
31. Visit to tea processing and spice processing units
32. Visit to fruit and vegetable processing unit with HACCP program
33. Visit to an Export Promotion Center
34. **FINAL PRACTICAL EXAMINATION**

Text Book:

1. Srivastava, R.P. and Sanjeev Kumar. 2002. Fruit and Vegetable Preservation: Principles and Practices. International Book Distributing Company.
2. Verma, L.R and V.K.Joshi. 2000 Post Harvest Technology of Fruits and Vegetables Vol I & II, Published by Indus Publishing Company, New Delhi.

References

1. Giridharilal. Sidappa.G.S and Tandon.G.L. 1979. Preservation of fruits and vegetables. ICAR, New Delhi.
2. Pandey, P.H.1997. Post-harvest technology of fruits and vegetables 1997. Technical publishers of India, Allahabad.
3. Mircae Enachesu Deuby Fruit and Vegetable processing 2004 FAO Agricultural Service Bulletin Rome.

E- References

1. www.cellinteractive.com
2. www.nutrition.org.uk
3. www.fnic.nal.usda.gov
4. www.myfooddiary.com
5. www.rapidmicrobiology.com

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U21HHORB608 PRECISION FARMING AND PROTECTED CULTIVATION (2+1)

Theory

Unit-I: Concepts and introduction to precision horticulture

Scope and importance of precision horticulture - principles and concepts –lazer leveling, mechanized direct seed sowing - seedling and sapling transplanting – Soil mapping and plant attributes, remote sensing, sensors, role of Geographic Information Systems (GIS), Global Positioning Systems (GPS), thematic maps, spatial variability, mobile mapping system and its application in precision farming -Site Specific Nutrient Management (SSNM), weed management, insect pests and disease management, yield mapping in horticultural crops. Decision support system - ERPs.

Unit-II: Precision farming techniques for horticultural crops

Precision farming techniques -protray seedlings - field preparation - raised bed forming- row planting - drip irrigation - mulching- fertigation system - training systems – growth regulators – plant protection – harvesting – grading and packing system. **Crops:** Mango, banana, guava, tomato, chilli, bitter gourd, turmeric and marigold.

Unit-III: Scope, importance and methods of protected cultivation

Scope and importance - different growing structures of protected culture *viz*., green house, poly house, net house, poly tunnels - Influence of environmental factors on green house production –planning, design and materials of construction for traditional and low cost green house –Heating, cooling systems, passive and hot air and drying and CO_2 enrichment- Growing media- different types, soil culture, Sterilization of media, drainage, flooding and leaching - Irrigation systems in green house -Cost estimation and economic analysis - Constraints of green house cultivation and future strategies -Nutrient film technique / hydroponics / aeroponic culture

Unit-IV: Protected cultivation technology for vegetable and fruit crops

Hi-tech protected cultivation techniques - soil sterilization - growing media preparation - bed formation - special horticultural practices - drip and fertigation –mulching- plant growth regulators - harvest and yield - storage - postharvest management **Crops:** Tomato, capsicum, cucumber, melons, strawberry

Unit-V: Protected cultivation technology for flower crops

Hi-tech protected cultivation techniques - soil sterilization - growing media preparation - bed formation - special horticultural practices - drip and fertigation –mulching- plant growth regulators - harvest and yield - storage - post harvest management **Crops:** Cut roses, chrysanthemum, carnation, gerbera, anthurium, orchids

Practical

Precision farming - positioning systems understanding of GPS, positioning accuracy specifications and utilization of GIS software - protected cultivation - study of different kinds of protected structures - designs, components and construction – types and structures of auto control systems in green house –calculation of air rate exchange in active summer, winter

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cooling system –different media, pasteurization / sterilization - estimation of drying rate of agricultural products inside green house – testing of soil and water to study the suitability for growing crops – study the fertigation requirements for green house crops and estimation of EC in the fertigation solution – special horticultural practices for vegetables / flowers under protected cultivation - visit to protected cultivation units -project preparation for precision farming and protected cultivation of vegetable and flower crops.

Lecture Schedule

1. Scope and importance, principles and concepts of precision horticulture
2. Lazer leveling, mechanized direct seed sowing, seedling.
3. Sapling transplanting of horticultural crops
4. Soil mapping and plant attributes, remote sensing and use of sensors in precision farming
5. Geographic information system (GIS) and its application in precision farming.
6. Global positioning system (GPS) and its application in precision farming.
7. Thematic maps, spatial variability, mobile mapping systems and its application in precisionfarming.
8. Site specific nutrient management (SSNM) system weed management in horticultural crops.
9. Insect pests anddisease management, yield mapping in horticultural crops
10. Design, layout and installation of drip and fertigation in precision farming
11. Precision farming techniques for mango.
12. Precision farming techniques for banana.
13. Precision farming techniques for guava
14. Precision farming techniques for tomato and chilli.
15. Precision farming techniques for bitter gourd
16. Precision farming techniques for turmeric and marigold
17. **MID SEMESTER EXAMINATION**
18. Scope and importance, principles and concepts of protected cultivation.
19. Different growing structures of protected culture viz., green house, poly house, net house and poly tunnels
20. Study of environmental factors influencing protected culture
21. Planning, design and materials of construction for traditional and low cost green house
22. Heating, cooling systems, passive and hot air and drying and CO_2 enrichment
23. Growing media - different types, soil culture, pasteurization of media, drainage, floodingand leaching
24. Irrigation systems in green house
25. Cost estimation and economic analysis - Constraints of green house cultivation and futurestrategies
26. Nutrient film techniques, hydroponics and aeroponic culture
27. Micro irrigation and fertigation management in protected culture.
28. Protected cultivation techniques for tomato and capsicum
29. Protected cultivation techniques for cucumber and melons.
30. Protected cultivation techniques for strawberry

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31. Protected cultivation techniques for Dutch roses and chrysanthemum
32. Protected cultivation techniques for gerbera and carnation.
33. Protected cultivation techniques for anthurium and orchids
34. Integrated pest and disease management for vegetable and flower crops in protectedcultivation.

Practical Schedule

1. Positioning systems understanding of GPS
2. Positioning accuracy specifications and utilization of GIS software
3. Study of different kinds of protected structures – designs, components, orientation.
4. Types and structures of auto control system in green house.
5. Calculation of air rate exchange in active summer, winter cooling system
6. Study of heating and cooling systems in green house.
7. Study of different media, sterilization methods for green house
8. Estimation of drying rate of agricultural products inside green house
9. Testing of soil and water to study the suitability for growing crops
10. Study the fertigation requirements for green house crops and estimation of EC in thefertigation solution
11. Study of special cultural practices for production of vegetable crops under protectedcultivation.
12. Study of special cultural practices for flower crops under protected cultivation.
13. Project preparation of protected cultivation of important horticultural crops.
14. Visit to protected cultivation units.
15. Visit to commercial precision farming fields.
16. Visit to remote sensing and GIS unit.
17. **FINAL PRACTICAL EXAMINATION**

Text Book

1. Upadhyay, T.K. and Sharma, S.K. 2020. A Textbook on Geoinformatics, Nanotechnology and Precision Farming. ND Publishers, New Delhi.
2. Adams, C.R. K.M. Bandford and M.P. Early. 1996. Principles of Horticulture. CBSpublishers and distributors. Darya ganj, New Delhi.
3. Joe.J.Hanan. 1998. Green houses: Advanced Technology for Protected Horticulture, CRCPress, LLC. Florida.
4. Paul V. Nelson. 1991. Green house operation and management. Ball publishing USA.

Reference Book

1. Sekhar and Vidhyavathi, 2018. Economics of precision farming. MJP Publishers, Chennai.
2. David Reed. 1996. Water, media and nutrition for green house crops. Ball publishing USA.
3. Lyn. Malone, Anita M. Palmer, Christine L. V Ioghat Jach Dangeermond. 2002. Mapping out world: GIS lessons for Education. ESRI press.

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e-References

1. www.icar.org.in/ciphet.html
2. www.jains.com
3. www.gisdevelopment.net
4. www.lasercladding.com

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U21HSSTB609 **SEED PRODUCTION OF VEGETABLE, TUBER AND SPICE CROPS** **(2+1)**

Unit I: Introduction to Seed Production **(5 Hrs)**

Seed - definition - importance -quality characteristics -Seed and grain - Seed quality - Definition, Characteristics of good quality seed –Different classes of seed – Generation system of seed multiplication- Seed Multiplication ratio - Seed Replacement Rate- Deterioration of crop varieties – Factors affecting deterioration and their control- Maintenance of genetic purity during seed production

Unit II: Principles of Seed Production **(8 Hrs)**

Seed Production- Principles – Importance and scope of vegetable seed production-Factors affecting vegetable seed production - Methods of seed production in Solanaceous vegetables-Tomato-Brinjal-Chillies-Okra-leguminous vegetables- Cluster Bean-Cowpea-French bean-Dolichos lab lab-Garden pea- Cucurbits-Cucumber-Gourds-Pumpkin-Musk melon-Water melon-Root vegetables-Carrot-Radish-Turnip-Beet root-Cole crops-Cabbage- Cauliflower-Knol Khol-Tuber- Potato-Bulb crop-Onion-Leafy vegetables-Palak-Fenugreek- Amaranthus, Moringa-Exotic-Baby corn.

Unit III: Post Harvest Handling and Management **(7 Hrs)**

Seed Drying – Principles- moisture equilibrium between seed and air –Types of Drying – Seed Driers-Seed processing – Air screen machine and its working principle, different upgrading equipments and their use –Seed extraction- Seed treatment –Importance- types- Equipments used (Slurry and Mist –O-matic treater) - Seed packing– Seed quality enhancement - Establishing Seed Testing Laboratory-Grow Out Test.

Unit IV: Seed quality control **(8 Hrs)**

Seed Certification, Phases of Certification, Procedure for seed certification, Field inspection and Field counts etc. -Seed Policy - Seed Act and Rules - Central Seed Committee, Central Seed Certification Board, State Seed Certification Agency, Central and State Seed Testing Laboratories. Seed Law Enforcement - Duties and Powers of Seed Inspectors, offences and penalties. Seed Control Order 1983, New Seed Bill 2004 and other issues related to seed quality regulation – Intellectual property rights, patenting, WTO, PPV & FR Act-Varietal Identification through Grow- out Test and Electrophoresis.

Unit V: Seed Storage and Marketing **(6 Hrs)**

Types of containers-Seed storage- Principles of seed storage - Stages of seed storage - factors affecting seed longevity during storage - conditions required for good storage – Seed godown sanitation— History of Indian Seed Industry - Seed marketing – Seed demand forecasting and planning- marketing structure - marketing organizations- sales generation activities, promotional media, pricing policy-Factors affecting seed marketing.

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Practical **(17 hrs)**

Identification of seed and seed structure - Seed quality analysis in Horticultural crops - Principles and procedures - Seed sampling –Physical purity analysis- Germination testing- Moisture determination - Viability test - Vigour tests - Seed dormancy and breaking methods – Seed health test - Studies on Physiological maturity, Harvesting, Threshing & Seed Extraction-techniques- Seed Quality enhancement - Visit to seed production plots and examining field standards - Varietal identification- Emasculation & pollination, Planting ratios, isolation distance, roguing, yield assessment, etc. in seed production plots- Grow out tests and electrophoresis for varietal identification - Seed production planning- Visit to Seed Processing Unit - Visit to seed testing laboratory and Seed Certification Agency.

Lecture Schedule

1. Seed - definition - importance -Seed and grain - Seed quality - Definition, Characteristics ofgood quality seed. Factors affecting vegetable seed production-role of temperature, humidity and light invegetable seed production.
2. Classes of seed – Generation system of seed multiplication- Seed Multiplication ratio - SeedReplacement Rate
3. Deterioration of crop varieties – Factors affecting deterioration and their control-Maintenanceof genetic purity during seed production
4. Seed production in Tomato and brinjal
5. Seed production in Chillies and Okra
6. Seed production in Cluster Bean-Cowpea-French bean, Dolichos lab lab-Garden pea
7. Seed production in Cucurbits-Cucumber-Gourds (bitter gourd, snake gourd, ridge gourd, ashgourd and bottle gourd)-Pumpkin- musk melon-water melon
8. Seed production in Carrot-Radish
9. Seed production in Turnip-Beet root
10. Seed production in Cabbage- Cauliflower-Knol Khol
11. Seed production in Potato and Onion
12. Seed production in Palak- Amaranthus- Moringa- Baby corn
13. Seed production in Corriander, Fennel and Fenugreek
14. Seed production in Pepper, Turmeric and Ginger.
15. Methods of hybrid seed production in vegetables
16. Seed Drying – principles, moisture equilibrium – Types of drying- Seed driers-types-management of seed drying
17. **MID SEMESTER EXAMINATION**
18. Seed processing – air screen machine and its working principle, different upgrading equipments (specific gravity separator, indented cylinder separator, inclined draper, magnetic separator, spiral separator) and their use
19. Seed treatment –Importance of seed treatment, types of seed treatment, equipment used for seed treatment (Slurry and Mist – O-matic treater) -Seed packaging-packaging materials.
20. Seed quality enhancement (coating, pelleting, encrusting, treatments to remove dormancy, seed hardening, priming – sand, PEG, solid matrix and osmotic, fortification),

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21. Establishing a seed testing laboratory.
22. Seed certification, phases of certification, procedure for seed certification
23. Field inspection and field counts.
24. Seeds Act, 1966 and Seeds Rules ,1968
25. Central Seed Committee, Central Seed Certification Board, State Seed Certification Agency,
26. Central and State Seed Testing Laboratories
27. Seed law enforcement -Duties and powers of seed inspectors, offences and penalties
28. Seed Control Order 1983 –PPV & FR Act- New Seed Bill 2004-IPR, Patenting, WTO.
29. Varietal Identification through Grow Out Test and Electrophoresis
30. Seed storage - Principles of seed storage - Stages of seed storage
31. Factors affecting seedlongevity during storage and conditions required for good storage.
32. Seed storage godown sanitation - Mid storage correction.
33. History of seed industry in India-Seed marketing-Seed Demand forecasting
34. Seed marketing –structure, organization, pricing policy-Factors affecting seed marketing.

Practical Schedule

1. Identification of seed and seed structure in Horticultural crops
2. Seed sampling and physical purity analysis
3. Seed Germination testing
4. Seedling evaluation and Moisture testing methods
5. Viability testing & Vigour testing (Electrical conductivity, Accelerated Ageing, Mean Germination Time, Vigor Index)
6. Seed dormancy and breaking methods
7. Seed health testing
8. Seed Quality enhancement (IDS, pelleting, priming, hardening, fortification, coating)
9. Studies on Physiological maturity, Harvesting, Threshing & Seed Extraction
10. Visit to seed production plots- examining field standards -Field count- Roguing
11. Emasculation, Dusting & pollination techniques in Horticultural crops
12. Visit to seed production plots- Varietal identification
13. Yield assessment and seed production planning for different classes of seeds
14. Grow out tests and electrophoresis for varietal identification
15. Visit to seed processing Unit
16. Visit to seed testing laboratory and Seed Certification Agency
17. **FINAL PRACTICAL EXAMINATION**

Text Books

1. Pranab Hazra 2021 Seed Production Technology of Vegetable, spice and Tuber crops, Brillion Publishers, New Delhi
2. M. Jeyanthi, Sumathi, Vasudevan 2018 Seed Production of Horticultural crops, New India Publishing agency, New Delhi
3. S.P.Singh. 1999. Seed production of commercial vegetables. Agrotech Publications, New Delhi.

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4. Agrawal PK. (Ed.). 1993. Handbook of Seed Testing. Ministry of Agriculture, GOI, New Delhi.

References Books

1. Bhaskaran, M. A.Bharathi, K.Vanangamudi, N.Natarajan, P.Natesan, R.Jerlin and K.Prabakar. 2003. Principles of seed production. Kaisher Graphics, Coimbatore.
2. Singhal NC. 2003. Hybrid Seed Production in Field Crops. Kalyani Publishers, New Delhi.
3. Copeland LO & McDonald MB. 2001. Principles of Seed Science and Technology. 4 th Ed. Chapman & Hall
4. Ramalingam, C., K. Sivasubramnaiam and A. Vijayakumar. 1997. A guide to seed legislation. Rassi Computers, Madurai.
5. Agrawal, R.L. 1996. Seed Technology, Oxford & IBH Publishing Co., New Delhi.
6. P.S.Arya. 1995. Vegetable seed production principles. Kalyani Publishers. New Delhi.
7. Tunwar NS & Singh SV. 1988. Indian Minimum Seed Certification Standards. Central Seed Certification Board, Ministry of Agriculture, New DelhiAnon, 1965. Field Inspection Manual and Minimum Seed Certification Standards, NSC Publication, New Delhi.
8. Raymond A.T. George. 1985. Vegetable seed production. Longman and Londen,New York.

E- References:

1. www.fao.org
2. www.seednet.gov.in
3. www.agricoop.nic.in
4. www.agri.nic.in

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4th Board of Studies

Annexure – IV

External Examiners for

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B.Sc. (Hons.) Horticulture

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