

U. P. RajarshiTandon Open University Allahabad



ORDINANCE

of

School of Agricultural Sciences

**Academic building, Saraswati Campus
Sector-F, Shantipuram Colony
Phaphamau, Allahabad – 211021
Uttar Pradesh, India**

The School of Agricultural Sciences (SOAS), established under UP Rajarshi Tandon Open University, Allahabad in January 2005 is trying to fulfill its objectives framed for the wellbeing of rural people of Uttar Pradesh. Enhancing the level of education of rural people especially of those who are engaged in farm business, through ODL system is the major objective of establishing this school. Rural people, farmers and landless labourers are the main stake holders but learners of other areas are also welcome equally if they need to enrich their knowledge and skills in agriculture and its subsidiary business. Such education would refine their decision making process and increase their risk taking ability. The school since its establishment tries hard for a flagship role in turning the rural youth to become successful agricultural entrepreneur and agri-business manager. This in turn would reduce the rural migration through generation of gainful employment and better work environment in the rural sector of the state. This will help ensure livelihood security and sustainable productivity to change the quality of life in rural areas. The school has been focusing on academic and extension activities in agriculture at the State and the national levels with the following mission, vision and objectives:

MISSION

The School of Agricultural Sciences will make every effort to make the rural people aware of the benefits of agricultural education and impart/infuse the knowledge through ODL system for promotion of entrepreneurial and managerial zeal among its learners.

VISION

The School will work with a vision of extension of agricultural education and making stakeholders capable enough to make use of their knowledge and skill in prospective area. It will also try to harness convergence between ODL and conventional system through national and international linkages.

OBJECTIVES

1. To make people aware of the benefits of education in general and agricultural education in particular and encourage them to enroll themselves and their family members in the desired field;
2. To develop skill and entrepreneurship among learners for strengthening the human resource base in agriculture through distance education;
3. To use technological innovations for improving outreach and effectiveness of distance education in agriculture;
4. To provide quality, relevant and equitable education through ODL system and develop an inter sectorial interface; and
5. To establish inter institutional linkages between India and other countries having expertise and experience in Distance Education especially in the field of agriculture and agri-business.

Programmes Offered by the School

List of Programmes

1. Awareness Programme:

- i. Awareness Programme in Dairy Farming (APDF)

2. Certificate Programmes:

- i. Certificate in Post Harvest Technology and Value addition (CPHT&VA)
- ii. Certificate in Cultivation of Medicinal and Aromatic Plants (CCMAP)
- iii. Certificate in Livestock Production System (CLPS)
- iv. Certificate in Poultry Farming (CPF)
- v. Certificate in Bee Keeping (CIB)
- vi. Certificate Programme in Gardening (CPIG)
- vii. Certificate in Organic Farming (COF)

3. Diploma Programmes:

- i. Diploma in Dairy Technology (DDT)
- ii. Diploma in Value Added Products from Fruits and Vegetables (DVAPFV)
- iii. Diploma in Watershed Management (DWM)

4. Post Graduate Diploma Programme:

- i. PG Diploma in Agricultural Extension (PGDAE)

Ordinances and Programme Details

A. Awareness Programmes:

In rural India the agriculture and its subsidiary activities can be helpful to generate regular income and employment if they are adopted with a business mindset. But, in absence of awareness and basic know how people hesitate to make an investment considering them uneconomic. Basic purpose of offering awareness programmes is to make people aware of the events and activities that are naturally happening in their surroundings. Such programmes would make significant contribution in encouraging prospective learners to go for further knowledge and training so that they may revive/establish a subsidiary occupation to get regular income from within the agriculture sector and make it a profitable venture. U. P. Rajarshi Tandon Open University offers some awareness programmes under its School of Agricultural Sciences in which a rigorous study is needed. For certification of his/her knowledge the learner is required to follow the general norms of university laid down for Awareness Programme:

- 1. Examination:** As per University norms the candidate will be required to complete assignment work only.
- 2. Assessment:** 100% weightage will be given through evaluation of assignment work. Depending on the marks scored/obtained by the learner grades will be awarded. Grades A, B, C and are different levels of satisfaction while E is unsatisfactory.
- 3. Criteria for Grading:**

Literal Grade	Qualitative Level	Equal Percentage of Marks
A	Excellent	80% or above of the total marks
B	Very Good	60% to 79.90% of the total marks
C	Good	50% to 59.90% of the total marks
D	Satisfactory	40% to 49.90% of the total marks
E	Unsatisfactory	Below 40% of the total marks

Some of the programmes designed and offered in the School of Agricultural Sciences are as under.

I. Awareness Programme in Dairy Farming (APDF)

Introduction: Dairy Farming has been one of the most important subsidiary occupations of the farming community in India. It is a remunerative business both in rural and urban areas because of its demand and availability of consumers. Capital investment in this business generates quick and regular income and employment throughout the year. It has a significant role in the eradication of malnutrition and poverty especially in the rural area. However, due to extensive use of days old primitive technology on most of the farms this business still remains low productive and economically less viable. The present programme aims to create awareness with imparting basic knowledge among the people regarding viability dairy farming as a business. The target group includes existing dairy Farmers, unemployed or underemployed rural youth, Women, other farmers and entrepreneurs.

Objectives:

Main objectives of the programme are to;

- to make people aware of the dairy farming as a business;

- to infuse/impart basic knowledge in dairy farming through Open and Distance Learning (ODL) Mode;
- to create awareness about the opportunities of employment and livelihood in dairy sector; and
- to impart basic knowledge in feeding dairy animals, breeding, nursing, and management.

Details of the programme are as under:

- 1. Programme Code** :803
- 2. Programme Duration** :Minimum 02 Months Maximum 01 Year
- 3. Eligibility for Admission:**8th Pass or Equivalent
- 4. Admission Procedure** : Open
- 5. Medium** : Hindi
- 6. Assignment Work** :Essential
- 7. Programme Fee** : 1,000/-
- 8. Programme Structure** : It is a Non Credit Programme.Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	Credit
APDF-01	Dairy Farming: Introduction and Significance	-
APDF-02	Animal Reproduction	-
APDF-03	Milk Production, Testing and Storage	-
APDF-04	Animal Shelter and Health Management	-
APDF-05	Dairy Farm-Instruments and Waste disposal	-
APDF-06	Dairy Economics and Development	-
Total Credits		-

- 9. SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

B. Certificate Programmes:

Most of the rural people in our country especially those who are engaged in agriculture and subsidiary activities are well aware of the practices and problems of this sector. But, because of one reason or other most of them use of days old primitive technologies and hence cannot exploit its full potential. Some of them are hesitant to adopt new business within this sector or expand the size of their existing business because of lack of proper technical knowledge. Imparting/infusing proper knowledge and training in such activities would increase their skill. It in turn can be helpful to generate regular income and employment in agriculture itself as well as check the rural migration. Short duration programmes of studies like awareness, Certificate, Diploma and PG Diploma are such courses which would cater the purpose if they are designed on the basis of local needs.

A certificate programme paves the way for desired modifications or addition in the existing store of knowledge of eligible practitioners and its certification. These programmes may be offered as add-on courses by the other learners/students also which would increase the value of their degrees. Such programmes would make significant contribution in reviving/establishing subsidiary occupations as a profitable venture in farming community of India. U. P. Rajarshi Tandon Open University offers some certificate programmes under its School of Agricultural Sciences in which a rigorous study is needed. For certification of his/her knowledge the learner is required to appear in the examinations and pass it successfully. To pass the examinations and getting awarded the divisions criteria laid down by the University are as under:

1. **Examination:** As per University norms
2. **Assessment:** In theory papers 100% weightage will be given through Terminal examination and its external evaluation while in practical papers equal weightage (50% each) will be given through internal and external evaluations of performance in practical work.
3. **Passing Marks:** 36% of the total marks scored in assessment of each paper separately.
4. **Division:** I Division – 60% or above of the total marks.
II Division – 48% or above but below 60% of the total marks.
III Division – 36% or above but below 48% of the total marks.

Some of the programmes designed and offered in the School of Agricultural Sciences are as under.

i. Certificate in Post Harvest Technology and Value addition (CPHT&VA)

Introduction: Agricultural products are perishable in nature. Generally, faulty methods of harvesting and lack of post-harvest care results in heavy losses. To prevent such losses it is necessary to make farmers aware of it and impart them a basic know how and training in this regard. The certificate programme designed on this subject would modify the existing store of the learners' knowledge and certify it. It may be offered by the stake holders or by any learner who is eager to get knowledge about this practice.

Objectives:

Main objectives of the programme are:

- to develop and strengthen Human Resource by infusing/imparting knowledge and skill in Post-harvest Management and Value addition through Open and Distance Learning (ODL) Mode;
- to create awareness about the opportunities of employment and livelihood in this particular sector; and
- to impart basic knowledge and technical proficiency in basic methods of harvesting and post-harvest management.

Details of the programme are as under:

1. **Programme Code** :401
2. **Programme Duration** :Minnimun 06 Months Maximum 02 Year
3. **Eligibility for Admission:**10+2 Pass or Equivalent
4. **Admission Procedure** : Open
5. **Medium** : Hindi
6. **Assignment Work** : Not Essential
7. **Programme Fee** : 3,000/-
8. **Programme Structure:** Programme will be of 12 credits.Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	
CPHT&VA-01	Post Harvest Management: Concepts and Process	4
CPHT&VA-02	Post Harvest Processing: Technology Development	4
CPHT&VA-03	Value Addition: Process and Products	4
Total Credits		12

9. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

ii. **Certificate in Cultivation of Medicinal and Aromatic Plants (CCMAP)**

Introduction: Cultivation of Medicinal and Aromatic Plants has emerged as one of the most important subsidiary occupations in farming business in India. It is a remunerative business both in rural and urban areas due to the requirement of small space, low capital investment and generates sufficient income and employment throughout the year. It has a significant role in the eradication of malnutrition and poverty especially in the rural area. The present programme aims to impart knowledge and skill to the poultry farmers to make this activity a profitable business. The target group includes existing farmers, unemployed or underemployed rural youth, women, and entrepreneurs.

Objectives:

Main objectives of the programme are:

- to develop and strengthen Human Resource by infusing/imparting knowledge and skill in cultivation of medicinal and aromatic plants through Open and Distance Learning (ODL) mode;
- to create awareness about the opportunities of employment and livelihood in farm Sector; and

- to impart basic knowledge and technical proficiency in raising nursery, cultivation practices, post-harvest management and marketing.

Details of the programme are as under:

1. **Programme Code** : 402
2. **Programme Duration** : Minimum 06 Months Maximum 02 Year
3. **Eligibility for Admission:** 10+2 Pass or Equivalent
4. **Admission Procedure** : Open
5. **Medium** : Hindi
6. **Assignment Work** : Not Essential
7. **Programme Fee** : 3,000/-
8. **Programme Structure:** Programme will be of 12 credits. Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	
CCMAP-01	Medicinal Plants: Introduction and Significance	4
CCMAP-02	Major Medicinal Plants: Cultivation and Economy	4
CCMAP-03	Other Medicinal and Aromatic Plants: Product Manufacture and Marketing	4
Total Credits		12

9. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

iii. Certificate in Livestock Production System (CLPS)

Introduction: Livestock are part and partial of agriculture which are reared on a farm to make use of them for varied purposes such as for draught power, milk, meat, wool etc. In early days they were reared as a supplementary activity but now these days this activity has become a subsidiary occupation on some of the farms. It shall be a remunerative business because of the low capital investment and quick and regular income and employment generation throughout the year. It has a significant role in the eradication of malnutrition and poverty especially in the rural area. However, due to extensive use of days old primitive technology on most of the farms this business still remains unproductive and economically unviable. The present programme aims to impart knowledge and skill to the farmers to make livestock production a viable business. The target group includes Existing Farmers, unemployed or underemployed Rural youth, Women, other Farmers and Entrepreneurs.

Objectives:

The main objectives of the programme are:

- to develop and strengthen Human Resource by infusing/imparting knowledge and skill in Livestock Production System through Open and Distance Learning (ODL) Mode;
- to create awareness about the opportunities of employment and livelihood in Livestock Production; and
- to impart basic knowledge and technical proficiency in Livestock Production, Breeding, Nursing, and Management.

Details of the programme are as under:

1. **Programme Code** :403
2. **Programme Duration** :Minnimun 06 Months Maximum 02 Year
3. **Eligibility for Admission:**10+2 Pass or Equivalent
4. **Admission Procedure** : Open
5. **Medium** : Hindi
6. **Assignment Work** : Not Essential
7. **Programme Fee** :3,000/-
8. **Programme Structure** : Programme will be of 12 credits.Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	Credits
CLPS-01	Livestock: Significance in Agriculture	4
CLPS-02	Animal Nutrition: Feed and Fodder Management	4
CLPS-03	Animal Husbandry: Management and Reproduction	4
Total Credits		12

9. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

iv. **Certificate Programme in Poultry Farming (CPF)**

Introduction:Poultry Farming has been one of the most important subsidiary occupations of the farming community in India. It is a remunerative business both in rural and urban areas due to the requirement of small space, low capital investment and generates quick and regular income and employment throughout the year. It has a significant role in the eradication of malnutrition and poverty especially in the rural area. However, due to extensive use of days old primitive technology on most of the farms this business still remains unproductive commercially unviable. The present programme aims to impart knowledge and skill to the poultry farmers to make Poultry Farming a viable business. The target group includes Existing Poultry Farmers, unemployed or underemployed Rural youth, Women, other Farmers and Entrepreneurs.

Objectives:

The main objectives of the programme are:

- to develop and strengthen Human Resource by infusing/imparting knowledge and skill in Poultry Farming through Open and Distance Learning (ODL) Mode;
- to create awareness about the opportunities of employment and livelihood in Poultry Sector; and
- to impart basic knowledge and technical proficiency in Poultry Housing, Breeding, Nursing, and Management.

Details of the programme are as under:

1. **Programme Name** : 1051
2. **Programme Duration** :Minnimun 06 Months Maximum 02 Year
3. **Eligibility for Admission:** 10th Pass or Equivalent or Professional Poultry Farmers
4. **Admission Procedure** : Open
5. **Medium** : Hindi and English
6. **Assignment Work** :Not Essential

7. **Programme Fee** : 3000/-

8. **Programme Structure:** Programme will be of 16 credits. Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	
CPF -01	Introduction to Poultry Farming	4
CPF -02	Poultry Housing and Management	4
CPF -03	Poultry Feeds and Feeding	4
CPF -04	Poultry Health Care and Bio-security Measures	2
CPF -05	Practical Work	2
Total Credits		16

9. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

v. **Certificate in Bee Keeping (CIB)**

Introduction: Honey production provides nutritional and economic security to the farmers and their family members, and rural youth who are directly or indirectly engaged in farming business. Because of nutritional and medicinal values of honey it has an ever increasing demand across the world. Honey in India is mostly being collected from the wild sources and a very little is produced through rearing honey bees. There exists a great potential in this area which can be tapped through imparting improved technical knowhow and skill to the traditional beekeepers, rural youth and others interested in this business. The certification may be required to the beekeepers to seek any financial help from any bank, non-governmental or governmental agencies, etc.

Objectives:

The main objectives of the programme are:

- to impart education about modern methods of beekeeping through ODL mode and hence build human resource in the beekeeping sector;
- to create awareness about apiculture and its benefits as a supplementary business to increase income and employment; and
- to develop entrepreneurial skills in the existing beekeepers.

Details of the programme are as under:

1. **Programme Name** : 1052

2. **Programme Duration** : Minimum 06 Months Maximum 02 Year

3. **Eligibility for Admission:** 8th Pass or Equivalent or Professional Bee Keepers

4. **Admission Procedure** : Open

5. **Medium** : Hindi and English

6. **Assignment Work** : Not Essential

7. **Programme Fee** : 3000/-

8. **Programme Structure:** Programme will be of 16 credits. Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	Total Credits
CIB -01	Introduction to Bee Keeping	4

CIB -02	Management of Honey Bee Colonies	6
CIB -03	Hive Products and Economics of Bee Keepings	4
CIB -04	Practical Work	2
Total Credits		16

9. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

vi. Certificate Programme in Gardening (CPIG)

Introduction: Maintaining gardens now a day has become hobby of some of the citizens specially hailing in cities. It creates demand for trained personnel, ornamental plants as well as inputs like fertilizers and pesticides. Further, on larger scale development of parks, personal and institutional gardens also requires expertise in this field. Thus, the gardening these days has been one of the most important globally recognized occupations. It is a remunerative business both in rural and urban areas because of its increasing demand and availability of consumer base. Capital investment in this business generates quick and regular income and employment throughout the year. It has a significant role in the eradication of poverty both in rural and the urban areas. Rational use of modern technology makes this business highly productive and economically viable. The present programme aims to create awareness with imparting basic knowledge to the people regarding viability gardening as a business. The target group includes existing untrained gardeners, unemployed or underemployed rural youth, other farmers and entrepreneurs.

Objectives:

The main objectives of the programme are:

- to make people aware of the gardening as an occupation;
- to infuse/impart basic knowledge of practices and operations in gardening through Open and Distance Learning (ODL) Mode;
- to create awareness about the opportunities of employment and livelihood in horticultural sector; and
- to impart basic knowledge in nursery raising and its management.

Details of the programme are as under:

1. **Programme Code** :.....
2. **Programme Duration** :Minnimun06 Months Maximum 02 Year
3. **Eligibility for Admission:**8th Pass or Equivalent
4. **Admission Procedure** :Open
5. **Medium** :HindiProgramme
6. **Assignment Work** :Not Essential
7. **Programme Fees** : 3000/-
8. **Programme Structure:** Programme will be of 16 credits. Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course/ पाठ्यक्रमका शीर्षक	
CPIG -01	बागवानी के मूलतत्व	4
CPIG -02	फल, सब्जी एवंपुष्पों की खेती	4
CPIG -03	पौधशालाव्यवस्थापन एवंप्रबन्धन	4
CPIG -04	वाटिकाव्यवस्थापन : प्रायोगिककार्य	4

9. SLM-प्रस्तावितपुस्तकें :-

1. उद्याननर्सरी-आयोजन एवंकार्यप्रणाली : लेखक- श्यामसुन्दरश्रीवास्तव
प्रकाशक-किताबमहल एजेन्सीज 22, सरोजनीनायडूमार्ग, इलाहाबाद
2. आधुनिक शाक एवंपुष्पउत्पादन : लेखक- जी0एस0 सैनी
प्रकाशक-रामापब्लिषिंगहाउस,अग्रवालकालोनी (राम लीलामैदानके सामने) दिल्लीरोड़, मेरठ
(उ0प्र0)
3. फलोत्पादन-लेखक- डॉ0 हरेन्द्र सिंह सेठी एवं डॉ0 कृष्णपाल सिंह
प्रकाशक-भारतीभण्डार, 6 सुनीलकाम्प्लैक्स, बैस्टर्नकचहरीरोड़, मेरठ, (उ0प्र0)

vii. Certificate in Organic Farming (COF)

Introduction: Organic Farming is an approach of agricultural production system wherein agronomic operations do not make use of chemical fertilizers and synthetic pesticides. The food items produced in this system are hygienic, safe to consume and nutritionally secure. Thus, the organic farming is considered a socially desirable and environmentally conscious approach to agriculture. Hence it is currently experiencing rapid growth in the sector. India is fast becoming a major base for production and supply of organically produced agricultural products to the world market. The programme has been launched on the lines of the Indira Gandhi National Open University (IGNOU) to maintain the uniformity in Syllabus.

Objectives:

Main objectives of the programme are:

- To impart knowledge and proficiency in organic production practices in agriculture, it's certification process and marketing;
- To promote self-employment and income generation through organic farming.

Details of the programme are as under:

1. **Programme Name** : Certificate in Organic Farming (COF)
2. **Programme Duration** : Minimum 06 Months Maximum 02 Year
3. **Eligibility for Admission** : 10+2 Pass or Equivalent
4. **Admission Procedure** : Open
5. **Medium** : Hindi and English
6. **Assignment Work** : Not Essential
7. **Programme Fee** : 4,000/-
8. **Programme Structure:** Programme will be of 16 credits. Course Design will be such as decided by the board of studies time to time.

Course Code	Title of the Course	Credit
COF-01	Introduction to Organic Farming	4
COF-02	Organic Production System	4
COF-03	Inspection and Certification of Organic Produce	4

COF-04	Economic and Marketing of Organic Produce	4
Total Credits		16

9. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

C. Diploma Programmes:

Diploma programmes in the discipline of Agriculture are designed in such a way that it may impart knowledge and skill of related field to its learners. A diploma programme also modifies/updates the existing store of knowledge of its learners and certifies it. After successful completion one shall be capable to use modern technologies rationally and exploit the full benefits of his investment in related agro-enterprise. Learners may be encouraged to adopt new business or expand the size of their existing ones. Basic purpose of offering diploma programmes in ODL mode is to make people aware of the events and if interested get enrolled for getting knowledge and skill. Such programmes would make significant contribution in reviving/establishing subsidiary occupations as a profitable venture in farming community of India. These programmes may be offered in addition to a degree programme for enhancing the value of a degree. For certification of his/her knowledge the learner is required to appear in the examinations and pass it successfully. To pass the examinations and getting awarded the divisions criteria laid down by the University are as under:

1. **Examination:** As per University norms
2. **Assessment:** In theory papers 100% weightage will be given through Terminal examinations, while in Practical examinations equal weightage (50% each) will be given through internal and external evaluations.
3. **Passing Marks:** 36% marks in external assessments of each paper separately.
4. **Division:** I Division – 60% or above of the total marks.
II Division – 48% or above but below 60% of the total marks.
III Division – 36% or above but below 48% of the total marks.

Some of the programmes designed and offered in the School of Agricultural Sciences are given on pages to come.

i. Diploma in Dairy Technology (DDT)

1. **Programme Name** :
2. **Programme Duration** : Minimum 01 year Maximum 03 Year
3. **Nature of Programme** : Semester System
4. **Eligibility for Admission** : 10+2 Pass or Equivalent
5. **Admission Procedure** : Open
6. **Medium** : Hindi and English
7. **Assignment Work** : Not Essential
8. **Programme Fee** : 12,000/-
9. **Programme Structure** : Programme will be of 32 credits. Course Design will be such as decided by the board of studies time to time.

Duration	Course Code	Title of the Course	
Semester-I	DDT-01	Milk Production and Quality of Milk	4 (2+2)
	DDT-02	Dairy Equipment and Utensils	4 (2+2)
	DDT-03	Milk Processing and Packing	4 (2+2)

	DDT-04	Dairy Products-I	4 (2+2)
	Total Credits		16
Semester-II	DDT-05	Dairy Products-II	4 (2+2)
	DDT-06	Dairy Products-III	4 (2+2)
	DDT-07	Quality Testing and Assurance	4 (2+2)
	DDT-08	Dairy Management and Entrepreneurship	4 (2+2)
	Total Credits		16
Total Credits of both semester			32

Note – Numbers in brackets indicate the credits for theory and practical respectively.

10. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

ii. **Diploma in Value Added Products from Fruits and Vegetables (DVAPFV)**

- Programme Code** :.....
- Programme Duration** :Minnimun01 year Maximum 03 Year
- Nature of Programme** : Semester System
- Eligibility for Admission:** 10+2 Pass or Equivalent
- Admission Procedure** : Open
- Medium** : Hindi and English
- Assignment Work** :Not Essential
- Programme Fee** :12,000/-
- Programme Structure** : Programme will be of 32 credits. Course Design will be such as decided by the board of studies time to time.

Duration	Course Code	Title of the Course	
Semester I	DVAPFV-01	Food Fundamentals	4 (2+2)
	DVAPFV-02	Principles of Post-Harvest Management	4 (2+2)
	DVAPFV-03	Food Chemistry and physiology	4 (2+2)
	DVAPFV-04	Food Processing and Engineering –I	4 (2+2)
	Total Credits		16
Semester II	DVAPFV-05	Food Microbiology	4 (2+2)
	DVAPFV-06	Food Processing and Engineering –II	4 (2+2)
	DVAPFV-07	Food Quality and Valuation	4 (2+2)
	DVAPFV-08	Entrepreneurship and Marketing	4 (2+2)
	Total Credits		16
Total Credits of both semester			32

Note – Numbers in brackets indicate the credits for theory and practical respectively.

10. **SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

iii. Diploma in Watershed Management (DWM)

Introduction: Diploma Programme in Watershed Management aims at developing competent human resource in the field of Watershed Management. In addition to extension and communication skills for long term socio-economic development of the society, this programme intends to impart basic knowledge and skills for water harvesting and its conservation and utilization; basics of soil erosion and its control measures; integrated farming systems including crop husbandry, animal husbandry, agro-forestry and fish farming; and funding, monitoring, evaluation and capacity building of watershed programmes. It will pave the ways for capacity building and developing human resources in different aspects of watershed management for overall socio-economic development of rainfed regions where people are bound to face problems like low agricultural productivity and economic deprivation. The programme also intends to address the workforce requirement of the watershed management and focus on upgrading the knowledge and skills of existing personnel in the watershed development.

Objectives:

Specific objectives of the programme are as under:

- To generate awareness about the importance of sustainable development and conservation of natural resources like soil, water etc;
- To delineate different techniques for accessing and predicting physical, chemical and socio-economic conditions within a watershed including water quality;
- To mobilize rural people and educate them for capacity building in soil and water conservation practices; and
- To develop skills for development of small scale irrigation and water supply structures for human being and livestock through water and soil conservation strategies.

Details of the programme are as under:

1. **Programme Code** :
2. **Programme Duration** : Minimum 01 Year Maximum 03 Year
3. **Nature of Programme** : Semester System
4. **Eligibility for Admission** : 10+2 (Senior Secondary) Pass outs are or Equivalent
5. **Admission Procedure** : Open
6. **Medium** : English
7. **Assignment Work** : Not Essential
8. **Programme Fee** : 11,000/-
9. **Programme Structure:** Programme will be of 32 credits. Course Design will be such as decided by the board of studies time to time.

Duration	Course Code	Title of the Course	Credit
Semester – I	DWM -01	Fundamental of Watershed Management	4 (2+2)
	DWM -02	Elements of Hydrology	6 (4+2)
	DWM -03	Soil and Water Conservation	6 (4+2)
	Total Credits		
Semester – II	DWM -04	Rainfed Farming	4 (2+2)
	DWM -05	Livestock and Pasture Management	4 (2+2)

	DWM -06	Horticulture and Agro-Forestry system	4 (2+2)
	DWM -07	Funding, Monitoring, Evaluation and Capacity Building	4 (2+2)
	Total Credits		16
Total Credits in both the semesters			32

Note – Numbers in brackets indicate the credits for theory and practical respectively.

- 10. SLM:**No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

Note:

This programme has been developed by IGNOU in collaboration with the Department of Land Resources, Ministry of Rural Development, Govt of India. School Board of Agricultural Sciences of UPRTOU has proposed to run this programme as such keeping in view the uniformity of syllabus in open universities. However the practical and projects will be based on the local conditions of UP state. In beginning the study materials of IGNOU is proposed to be used to start the programme else the books available in market will be used.

D. Post Graduate Diploma Programme:

Post Graduate Diploma Programmes are offered for such aspirants who after completing Bachelor Degree wish to get advance level of knowledge and skill in a particular field. In agricultural Sciences it requires some preliminary level of knowledge in specific field that is why the eligibility criteria for admission is different for different programmes.

- 1. Examination:**As per University norms
- 2. Assessment:**In theory 70% weightage will be given through Terminal examination and 30% through Assignment. In Practical examination 100% weightage will be given through terminal examination.
- 3. Passing Marks:** 36% marks in external assessments of each paper separately.
- 4. Division:** I Division – 60% or above of the total marks.
II Division – 48% or above but below 60% of the total marks.
III Division – 36% or above but below 48% of the total marks.

i. Post Graduate in Agricultural Extension (PGDAE)

The basic objective of Post Graduate Diploma programs in Agricultural Extension is to develop Scientific and Research minded human resource, personnel to handle new challenges of using Information Communication Technologies in Agricultural Development, while working in the Department of Agriculture, KrishiVigyanKendras, ZillaParishads, Nationalized Banks, Rural Development Banks, Non Governmental Organizations, State Agricultural Universities and the other stake holders.

- 1. Programme Name** : 1001
- 2. Programme Duration** : Minimum 01 Year Maximum 03 Year
- 3. Nature of Programme** : Semester System
- 4. Programme Fee** : 8000/-
- 5. Eligibility for Admission** : Graduate in Agriculture, Horticulture, Forestry, Fisheries, Animal Sciences, Veterinary Sciences, Agricultural Engineering, Agri-business Management, Agricultural Biotechnology, Food Sciences and Technology, Home Sciences, Information Communication Technology in Agriculture and Other Allied & Applied Agricultural Sciences listed in purview of Agricultural Universities and Open Universities in India.
- 6. Admission Procedure** : Open
- 7. Medium** : English
- 8. Programme Structure:** Programme will be of 48 credits. Course Design will be such as decided by the board of studies time to time.

Duration	Course Code	Title of the Course	Credit
Semester-I	PGDAE-01	Principles and Practices in Distance Education	8
	PGDAE-02	Agricultural Extension and Farm Journalism	8
	PGDAE-03	Agricultural communication and Mass Media	8
	Total Credits		
Semester-II	PGDAE -04	Agricultural Information Technology	8
	PGDAE-05	Research Methods & Statistical Analysis	8
	PGDAE-06	Field Practical	8
	Total Credits		
Total Credits in both the semesters			48

Note – Numbers in brackets indicate the credits for theory and practical respectively.

- 9. SLM-** No hard copies of SLM will be provided by the university to the learners. Only online links will be provided.

Detailed Syllabus

Awareness Programme:

Awareness Programme in Dairy Farming (APDF)

APDF-01- डेयरी उद्योग जागरुकता का कार्यक्रम

खण्ड—1 परिचय

प्रस्तावना, उद्देश्य, डेयरी फार्मिंग का महत्व, समन्वित कृषि पद्धति में डेयरी फार्मिंग, पूरक व्यवसाय में डेयरी फार्मिंग का सम्बन्ध, डेयरी फार्मिंग जैविक खेती के लिए वरदान, रेषम की खेती, खुम्बी (मषरुम) की खेती, पशु पालन में महिलाओं की भूमिका, रोजगार सृजन, पशुओं का दूध, मॉस एवं कृषि कार्य से सम्बन्ध, दूध एक पौष्टिक आहार, दूध लगभग एक सम्पूर्ण आहार, दूध के पोषक तत्व, दूध की प्रोटीन, दूध की वसा, दूध में जल, दूध में विटामिन, दूध में खनिज-लवण

APDF-02- डेयरी उद्योग जागरुकता का कार्यक्रम

खण्ड—1 जनन

प्रजनन— प्रजनन अंग, नर प्रजनन अंग, वीर्य, उत्तेजित नर के लक्षण, मादा प्रजनन अंग, मद चक्र में आई मादा के लक्षण, प्राकृतिक गर्भाधान, गर्भधारण की जांच, गर्भ की अविधि, प्रसव ब्याँत के लक्षण, प्रसव ब्याँत प्रक्रिया, प्रसव ब्यात के बाद सावधानियाँ, प्रसव ब्याँत उपरान्त मदचक्र

कृत्रिम गर्भाधान— कृत्रिम गर्भाधान के लाभ, कृत्रिम योनि, कृत्रिम गर्भाधान की विधि, वीर्य का संग्रह, गर्भाधान कराने के बाद गर्भ धारण न करने के कारण

भ्रूण प्रत्यारोपण— भ्रूण प्रत्यारोपण के लाभ, भ्रूण प्रत्यारोपण की विधि, भ्रूण प्रत्यारोपण की सीमाएं, परखनली निषेचन प्रक्रिया

प्रजनन सम्बन्धी समस्याएं एवं समाधान— मद (गर्मी) में न आना (मदहीनता), पशु का बार-बार गर्मी में आना (मद पुनरावृत्ति), पशु का जल्दी-जल्दी गर्मी में आना (कामोन्माद), गर्भ न ठहरना, बच्चा गिर जाना (गर्भपात), प्रसव ब्याने के बाद जेर न गिरना

बाझंपन— आनुवांषिक बाझंपन, प्रजनन अंगों की बनावट में विकार (जननांग विकृतियाँ), हार्मोनों में कमी अथवा असंतुलन (अन्तःस्रावी असामान्यताएं), नर व मादा बच्चे का एक साथ गर्भ में पलना (फ्री मार्टिन), पौष्टिक आहार में कमी (कृपोषण), जननांगों की बीमारियाँ, व्यवस्था की कमी (अव्यवस्था), औषधियों तथा हार्मोन का दुरुपयोग

ब्रीडिंग कलेंडर— विभिन्न पशु प्रजातियों के जनन चक्र, गर्भाधान के अनुसार प्रसव की अनुमानित-तिथि

खण्ड—2 गाभिन पशु एवं बछड़ा-बछिया की देखभाल

गाभिन पशु का प्रसव के पूर्व तथा पश्चात् प्रबन्धन— गर्भधारण का समय, प्रारंभिक महीनों में गाभिन पशु की देखभाल, गाभिन पशु का आहार, अंतिम महीनों में गाभिन पशु की देखभाल, ब्याते समय पशु की देखभाल, गर्भावस्था पूरा होने के लक्षण, पशु द्वारा बच्चा देने की अवस्था में ध्यान देने योग्य बातें, जेर गिराना, गर्भाषय का बाहर आना, दुधारु पशु का आहार, प्रसव के बाद पशु का रखरखाव

नवजात बछड़ा-बछिया का पालन— नवजात बछड़ा-बछिया को दूध पिलाने की विधि, जन्म के समय बछड़ा-बछिया की देखभाल, खीस पिलाना, दूध पिलाना, दूध छुड़ाना

बछड़ा-बछिया का आहार— छोटे बछड़ा-बछिया का आहार, नवजात बछड़ा-बछिया का आहार

आवास व्यवस्था व देखभाल— आवास व्यवस्था, देखभाल व पहचान के लिए नम्बर लगाना

सींग रोधन— रासायनिक विधि, लोहे के उपकरण अथवा विद्युत मशीन द्वारा

टीकाकरण, पेट के कीड़ों को मारना, बढ़ते बछड़ा-बछिया का वृद्धि एवं विकास

खण्ड—3 पशु पोषण—आहार एवं चारा प्रबन्धन

पशु पोषण—आहार एवं चारा प्रबन्धन — पशु आहार, रेषेदार चारा, दाना मिश्रण,

हरा चारा— खरीफ ऋतु की चारा फसलें, रबी ऋतु की चारा फसलें, वर्ष भर चारा उत्पादन

चारा संरक्षण— साइलेज बनाना, हे बनाना

संतुलित आहार— शुष्क पदार्थ देन के नियम, छोटे बछड़ा-बछिया व कटड़ों का आहार, दूधारु पशुओं के लिए आहार, गर्भित (गाभिनि) पशुओं के लिए आहार, साड़ों का आहार, दाना मिश्रण तैयार करना

फीड सप्लीमेंट्स (पूरक आहार)— बाई प्रोटीन पशु आहार, वाई पास वसा (बाई पास फैट) पशु आहार, यूरिया मोलासिस मिनरल ब्लॉक, खनिज मिश्रण

अमानक एवं सूखे चारे का पोषक मान बढ़ाना— सूखे चारे का यूरिया से उपचार, भूसे से सम्पूर्ण आहार का ब्लॉक

सानी बनाने के कुछ उदाहरण— गाय के लिए सानी बनाना, भैंस के लिए सानी बनाना

APDF-03- डेयरी उद्योग जागरुकता का कार्यक्रम

खण्ड-1 दुग्ध उत्पादन

दुग्ध उत्पादन-अयन संरचना तथा दुग्ध स्रवण, बाहरी संरचना, आन्तरिक संरचना, दुग्ध स्रवण विधि, दूध के संगठन को प्रभावित करने वाले कारक, अधिक गर्मी व अत्यधिक सर्दी से दुधारु पशुओं का बचाव

दूध उतरना तथा दूध दोहन की विधियाँ- दूध उतरना, दूध दोहने क विधियाँ, दूध दोहने में प्रयुक्त बर्तन और दोहने की मशीन का रखरखाव

दूध उत्पादन का लेखा-जोखा, दूध को ठंडा रखना

स्वच्छ दुग्ध उत्पादन- पशु स्वास्थ्य, दुग्ध दोहक का स्वास्थ्य, दुग्ध दोहने का स्थान, पशु का खान-पान, स्वच्छ दुग्ध उत्पादन हेतु कुछ आवश्यक बातें

थनैला रोग तथा जाँच की विधियाँ- थनैला रोग के प्रारंभिक लक्षण, थनैला रोग की अवस्थाएँ, उपचार, रोकथाम

खण्ड-2 दुग्ध परीक्षण, रखरखाव एवं भण्डारण

दुग्ध परीक्षण, रखरखाव एवं भण्डारण - दूध एवं उसका संगठन, दूध एवं उसके संघटकों की मात्रा को प्रभावित करने वाले कारक, दूध के भौतिक-रासायनिक गुण, रंग, विषिष्ट घनत्व, हिमांक, वर्तनांक सूचक, दूध का गाढ़ापन, पृष्ठ तनाव, विद्युत चालकता, बफर मान, अपचयन-उपचयन विभांकां

दूध एवं दूध पदार्थों का नमूना लेना, संग्रहण, ढलाई, आपूर्ति एवं वितरण- नमूना लेना, संग्रहण, परिवहन (ढुलाई), भण्डारण, आपूर्ति एवं वितरण

प्लेटफार्म परीक्षण- गंध परीक्षण, स्वरूप परीक्षण, तापमान, विषिष्ट घनत्व, अम्लीयता, पी0एच0, तलछट, वसा एवं वसा रहित ठोस का निर्धारण

दूध में अपमिश्रण एवं उनकी जाँच- सूक्रोज (चीनी), स्टार्च, दूध में सप्रेटा पाउडर, ग्लूकोज, यूरिया, अमोनिया सल्फेट, फारमेलिडहाइड, हाइड्रोपेरोक्साइड, बोरिक अम्ल या बोरेटस, अम्लता नाषक पदार्थ

दूध जाँचने की किट (यंत्र पेटी) एवं दूध जाँच के अभिकर्मक, दूध एवं जनस्वास्थ्य

दूध का परीक्षण - दूध को ठंडा करना, दूध का पाष्युराइजेशन

दूध उत्पादों का संगठन- क्रीम, मक्खन, बटर आयल, आईसक्रीम, खोवा, रबड़ी, दही, श्रीखंड वाडी एवं चक्का, छेना, पनीर, घी, लस्सी

भारतीय दूध उत्पाद-मक्खन, घी, दही, पनीर, छेना, खोवा, लस्सी, श्रीखंड

दूध एवं दूध उत्पादों के लिये निर्धारित वैद्यमानक

APDF-04- डेयरी उद्योग जागरुकता का कार्यक्रम

खण्ड-1 पशु आवास

पशु आवास—आवास व्यवस्था, आवास व्यवस्था के आधार, पशु आवास व्यवस्था के विभिन्न घटक, आवास की स्थिति, दिशा, दीवारें, छत, फर्ष, क्षेत्रफल

गर्मियों के लिए विशेष व्यवस्था

विभिन्न जलवायु वाले क्षेत्रों के आवास व्यवस्था— हिमालय क्षेत्र, सूखे उत्तरी क्षेत्र, उत्तरी पूर्वी क्षेत्र, दक्षिण क्षेत्र, तटवर्तीय क्षेत्र

आदर्श पशु आवास— बाजार के नजदीक, सड़क के नजदीक, पानी की आपूर्ति, धरातल की स्थिति, जल निकासी, सूरज की किरणों से सुरक्षा, टेलीफोन व बिजली व्यवस्था, तेज हवाओं से सुरक्षा, डेयरी पशुओं के आवास हेतु निर्धारित क्षेत्रफल

खण्ड—2 स्वास्थ्य प्रबन्धन

पशुआ का स्वास्थ्य प्रबन्धन—पशुओं की सफाई, खरेरा करना एवं नहलाना (स्नान कराना), सफाई एवं खरेरा करना, धोना एवं नहलाना, गौषाला की सफाई एवं विसंक्रमण, गैसीय विसंक्रमण, स्वच्छ वातावरण के लिए उपाय, बचाव कार्यक्रम, प्रक्षेत्र के कर्मचारियों का स्वास्थ्य परीक्षण

जानवरों की छंटनी— छंटनी के मुख्य कारण, वांछित हर्ड प्रतिस्थापन

खुर की देखभाल— खुर की बनावट, बिमारी के लक्षण, खुर शीथ के मुख्य कारण, पशुओं का रखरखाव एवं उपचार

बिमारी के सामान्य लक्षण—सामग्री प्राथमिक चिकित्सा की सामग्री एवं उपचार— बीमारी के सामान्य लक्षण, प्राथमिक चिकित्सा सामग्री, प्राथमिक चिकित्सा, प्राथमिक चिकित्सा के सामान्य सिद्धान्त, घाव का उपचार, विषाक्तता, प्रसूती सम्बन्धी समस्याएँ

खण्ड—3 पशु रोग, रोकथाम एवं नियंत्रण

जीवाणु से होने वाले रोग—गलघोटू रोग, लंगड़ी ज्वर, तिल्ली ज्वर (एन्थ्रैक्स रोग), थनैला रोग (मेस्टाइटिस), संक्रामक गर्भपात, पशुओं में क्षय रोग, नवजात बछड़ों में संक्रामक दस्त, निमोनिया रोग

विषाणु से होने वाले रोग— खुरपका—मुँहपका रोग, पोकनी (रिन्डर पेस्ट) रोग, रेबीज (पागलपन) रोग, चेचक (पॉक्स) रोग

परजीवी से होने वाले रोग— गेडुआ रोग, गोल कृमि रोग, जुकना रोग (लीवर फ्लू रोग), लाल पेषाब ज्वर (बेबेसियोसिस रोग), थिलेरियोसिस रोग, सर्रा रोग

फफूंद (फंगस) से होने वाले रोग, गैरसंक्रामक रोग—पेट फूलना, अफरा रोग, दुग्ध—ज्वर (मिल्क फीवर), सामान्य विषाक्तताओं (प्वाइजनिंग) का प्रबंधन, सामान्य शल्य चिकित्सा, टीकारण

APDF-05- डेयरी उद्योग जागरुकता का कार्यक्रम

खण्ड—1 गोबर तथा डेयरी अपशिष्ट का निस्तारण

गोबर व गोमूत्र-गोबर व मूत्र की खाद, उत्तम खाद बनाते समय ध्यान देने योग्य बातें, ताजा गोबर व सड़ी गोबर की खाद की उपयोगिता, गोबर की खाद के लाभ, गोबर की सफाई के तरीके

गोबर गैस संयंत्र एवं स्लरी का उपयोग- गोबर गैस, गोबर गैस संयंत्र लगाने की आवश्यकता, संयंत्र की संरचना, गोबर गैस संयंत्र के लाभ, विभिन्न कार्यों हेतु गोबर गैस की आवश्यकता, विभिन्न खादों का तुलनात्मक अध्ययन

केंचुए की खाद- केंचुओं का भोजन, केंचुओं का चयन, खाद बनाने की विधि, केंचुओं की देख-रेख, केंचुआ खाद के फायदें

मृत जानवरों से प्राप्त अपषिष्ट की उपयोगिता- मृत पशुओं से प्राप्त अपषिष्ट का उपयोग, पशुओं की खाल, खाल की बनावट, पशु खाल को निकालना, खाल का भण्डारण

खण्ड-2 डेयरी फार्म के उपकरण

कुट्टी काटने के उपकरण-चारा काटने के उपकरण, गण्डासा, हस्तचालित चारा काटने की मशीन (चैफ कटर), हस्तचालित चारा कटने की मशीन (चैफ कटर) की कार्य विधि, बैल चालित चारा काटने की मशीन, शक्ति चालक चारा काटने की मशीन, शक्ति चालित मशीन की कार्यविधि

डेयरी फार्म के अन्य उपयोगी उपकरण- स्प्रेयर, पानी निकालने का पम्प, सींग रोधन का उपकरण, कान में निषान लगाने का उपकरण, गोबर ढोने की ट्राली

दूध दुहने की मशीन- दूध दूहने की मशीन के मुख्य भाग, दूध दुहने की मशीन की कार्य विधि

प्रषीतन : दूध का ठण्डा करना- संपीडन प्रषीतन प्रणाली, संपीडन प्रषीतन प्रणाली की कार्य विधि

दूध परीक्षण के उपकरण- दूध का घनत्वमापी (लैक्टोमीटर), दूध में वसा परीक्षण के उपकरण, वसा रहित ठोस परीक्षण के उपकरण

खण्ड-3 डेयरी फार्म अर्थशास्त्र एवं लेखांकन

दूध उत्पादन लागत-दूध की लागत के घटक, अचल लागत, चल तथा परिवर्तनशील लागत, पशु आहार पर लागत, श्रमिकों पर होने वाले व्यय, औषधि एवं पशुचिकित्सा की लागत

दूध उत्पादन लागत ज्ञात करने विधि- अचल लागत ज्ञात करना, पशुओं पर मूल्य हास, आवास पर मूल्य हास, डेयरी फार्म के उपकरणों पर मूल्य हास, मूलधन पर ब्याज, चल लागत ज्ञात करना, दुग्ध उत्पादन लागत को कम करने के उपाय

विपणन अवधारणा- विपणन की परिभाषा, दुग्ध विपणन, दुग्ध विपणन का स्वभाव, दुग्ध विपणन की श्रृंखला, असंगठित क्षेत्र, संगठित क्षेत्र, दुग्ध विपणन की समस्याएँ एवं उनका समाधान

दूध का मूल्यन- दूध के मूल्य निर्धारण की दूधारी नीति, दूध के मूल्य निर्धारण की समस्याएँ

प्रक्षेत्र अभिलेख एवं खाते- अभिलेख का महत्व, प्रक्षेत्र अभिलेख का वर्गीकरण, फार्म सूची, वित्तीय-व्यवहार, प्रक्षेत्र आपूर्ति, चारा तथा आहार पर व्यय, मजदूरी पर व्यय, पशुधन पर विविध व्यय, प्रक्षेत्र उत्पादन पर व्यय, पशुधन से उत्पादन, फार्म बिक्री, व्यवसाय विप्लेषण

Detailed Syllabus of Certificate Programmes-

CPHT&VA-01 Post Harvest Management: Concepts and Processes

Block – 01: Post Harvest Management of Agricultural Products

- Unit – 01:** Introduction to Post-Harvest Management
- Unit – 02:** Importance of Post-Harvest Management
- Unit – 03:** Factors Responsible for Post-Harvest Losses

Block – 02: Post Harvest Processes/Operations

- Unit – 04:** General Principles of Post-Harvest Processing
- Unit – 05:** On farm Processes (Grading and Separations)
- Unit – 06:** Off farm Processes (Drying, storage, Transportation, Packaging)

CPHT&VA-02 Post Harvest Processing: Technological Development

Block – 01: Processing Technologies for Slow Degrading Agricultural Products

- Unit – 01:** Food grains
- Unit – 02:** Oilseeds
- Unit – 03:** Other Crop Products

Block – 02: Processing Technologies for Fast Degrading Agricultural Products

- Unit – 04:** Fruits and Vegetables
- Unit – 05:** Medicinal and Herbal Plant Products
- Unit – 06:** Other horticultural products

CPHT&VA-03 Value Addition: Processes and Products

Block – 01: Value Addition in Field Crops Products

- Unit – 01:** Food grains
- Unit – 02:** Oilseeds
- Unit – 03:** Other Crop Products

Block – 02: Value Addition in Horticultural Crop Products

- Unit – 04:** Fruits and Vegetables
- Unit – 05:** Medicinal and Herbal Plant Products
- Unit – 06:** Other Plant Products

CCMAP-01: औषधीय एवं संगधीय पौधों की खेती

औषधीय पौधों का महत्व, प्रमुख औषधीय पौधे (सफेद मूसली, अश्वगन्धा, सर्पगन्धा एवं सतावर) की प्रजातियों, खेती करने का तरीका, व्यवसायिक महत्व, आय-व्यय की आर्थिकी औषधीय पौधों का महत्व एवं आवश्यक जानकारी :

औषधीय पौधों का महत्व, औषधियों पौधों पर अनुसंधान का महत्व, पादपजन्य औषधियों पर खोज कार्य, स्वतंत्रता के बाद औषधीय पौधों की स्थिति, जलवायु की अनुकूलता, एलोपैथिक पद्धति में प्रयोग किये जा रहे कुछ महत्वपूर्ण पौधे, सम्यक जानकारी की आवश्यकता, विक्रय की व्यवस्था पहले से सुनिश्चित कर लें, बीजों का चयन, क्षेत्र की जलवायु तथा मिट्टी के अनुसार पौधों का चयन, पर्यावरण सुधार तथा मानव हित को सर्वोपरि मान कर चलें, राजस्व अभिलेखों की लिखित सूचना दें।

औषधीय खेती में जैविक पद्धति का महत्व तथा इससे जुड़े विभिन्न विधायें

जैविक पद्धति की उपयोगिता, औषधीय पौधों की खेती के संदर्भ में जैविक पद्धति का महत्व, जैविक पद्धति की प्रमुख विधायें, बायोडायनामिक (जैवगतिकीय) पद्धतियां जैविक खेती के मार्ग की प्रमुख बाधाएं।

सोने की जड़ों वाली औषधीय फसल : सफेद मूसली

सफेद मूसली की विभिन्न प्रजातियाँ, किस्में, औषधीय उपयोग, मूसली की खेती : आवश्यकता, खेती कैसे करें, उपयुक्त भूमि, पानी की आवश्यकता, प्रमुख लाभ, खेत की तैयारी, वेडस बनाना, प्रयुक्त होने वाला बीज अथवा प्लांटिंग मेटेरियल, जंगल से प्राप्त किये जाने वाले बीज, मूसली बिजाई, प्रमुख बीमारियां तथा प्राकृतिक आपदाएं पौधे/ कन्द : उखाड़ना, धुलाई, छिलाई सुखाना, पैकिंग, बीजों का संग्रहण मूसली का उत्पादन तथा अनुमानित लाभ, अश्वगन्धा : औषधीय उपयोग, खेती की विधि, जीवन चक्र, उपयुक्त जलवायु, भूमि का प्रकार, किस्म, रसायनिक संरचना, बिजाई से पूर्व खेत की तैयारी तथा विधि, पौधों का विरलन, नियंत्रण, खाद, बीमारियां तथा रोग, सिंचाई, फसल का पकना तथा जड़ों की खुदाई (हारवेस्टिंग), आर्थिक पहलू।

अन्तर्राष्ट्रीय स्तर पर भारत को प्रतिष्ठा दिलाने वाला पौध सर्पगन्धा।

सर्पगन्धा : रसायनिक संरचना, औषधीय उपयोग, खेती की विधि, उपयुक्त जलवायु, उपयुक्त मिट्टी उन्नत प्रजातियां, बिजाई की विधि, खेत की तैयारी, सिंचाई व्यवस्था, अंतर्वर्तीय फसल, प्रमुख रोग तथा बीमारियां, फसल की वृद्धि तथा परिपक्वता, जड़ें उखाड़ने में विशेष सावधानियाँ, खेती से कुछ प्राप्ति, आय-व्यय का विवरण।

औषधीय उपयोग का महत्वपूर्ण पौधों का सतावर-सतावर की प्रमुख किस्में, औषधीय उपयोग, कृषि तकनीक : जलवायु, मिट्टी, बिजाई की विधि, नर्सरी अथवा पौधशाला बनाने की विधि, खेत की तैयारी, पौधों को रोपाई, आरोहण की व्यवस्था, खरपतवार नियंत्रण तथा निराई गुड़ाई की व्यवस्था, सिंचाई की व्यवस्था, फसल का पकना अथवा फसल की परिपक्वता, जड़ों की खुदाई तथा उपज की प्राप्ति, कुल उत्पादन फसल से प्राप्ति, व्यय तथा लाभ।

CCMAP-02: औषधीय एवं संगधीय पाधों की खेती

प्रमुख औषधीय पौधे : खेती एवं आर्थिकी

शक्कर से कई गुना ज्यादा मीठा पौधा:

स्टीविया : औषधीय उपयोगिता, खेती की विधि जलवायु, मिट्टी की उपयुक्तता, पानी की आवश्यकता, स्टीविया की प्रमुख प्रजातियाँ, उपयुक्त पौध सामग्री का चयन, खेती हेतु स्टीविया के पौध लेने से पूर्व रखी जाने वाली सावधानियाँ, भूमि की तैयारी तथा पौध रोपड़ की विधि, सिंचाई की व्यवस्था, खरपतवार नियंत्रण तथा निराई गुड़ाई खाद एवं अन्य पोषक तत्वों की आवश्यकता, फसल से फूलों का हटना, प्रमुख रोग तथा उनका नियंत्रण, फसल की कटाई, कुल उपज तथा प्राप्तियाँ, स्टीविया की विपणन व्यवस्था, स्टीविया की खेती के लिए पौध सामग्री की व्यवस्था, स्टीविया की आर्थिकी

औषधीय एवं संगंध पौधों की खेती

लेमन ग्रास अथवा नींबू घास

लेमन ग्रास की रसायनिक संरचना, नींबू घास की खेती की विधि, भूमि एवं जलवायु भूमि की तैयारी, खाद की आवश्यकता, लेमनग्रास की बिजाई हेतु बीज अथवा प्लाटिंग मेटेरियल, बिजाई का समय, बिजाई की विधि, सिंचाई की आवश्यकता, निराई-गुड़ाई की आवश्यकता, प्रमुख रोग तथा इसकी कीट पतंगों से रक्षा, फसल की कटाई, पत्तियों से तेल निकालना, फसल से प्राप्त होने वाले तेल की मात्रा, लेमनग्रास की विभिन्न प्रजातियाँ/किस्में, खेती से प्राप्तियाँ, खेती हेतु प्लाटिंग मेटेरियल की प्राप्ति, तेल की बिक्री हेतु सम्पर्क, प्रति एकड़ आने वाली अनुमानित लागत तथा व्यय का विवरण

डीजल का विकल्प प्रदान करने में सक्षम एक उपयोगी वृक्ष- जैट्रोफा अथवा रतनजोत

इतिहास बायो डीजल का, जैट्रोफा तथा रतनजोत, जैट्रोफा के औषधीय एवं व्यवसायिक उपयोग, एक सौन्दर्यवर्धक पौधे के रूप में, औषधीय कार्यों हेतु उपयोग, विभिन्न औद्योगिक कार्यों हेतु जैट्रोफा का उपयोग, कीटनाशक के रूप में जैट्रोफा, खाद पदार्थ के रूप में, भूमि सुधार हेतु जैट्रोफा का उपयोग, रंगाई-फन्सिंग (बाड़) कार्य तथा डीजल के विकल्प के रूप में जैट्रोफा डीजल का सही विकल्प है अथवा नहीं, केरोसिन के विकल्प के रूप में जैट्रोफा की खेती की विधि, उपयुक्त जलवायु – मिट्टी, जैट्रोफा की बिजाई की विधि, खेत की रोपाई, जैट्रोफा की खेती से सम्बन्धित की जाने वाली विभिन्न कृषि क्रियाएं, पौधों की ट्रिमिंग अथवा प्रिन्टिंग। छटाई, खाद की व्यवस्था, पौधों का फलन, पौधों से उत्पादन जैट्रोफा की फसल के साथ हल जा सकने वाली अन्य फसलें अथवा अन्तर्वर्तीय फसलें, जैट्रोफा की खेती के संदर्भ में प्रमुख निष्कर्ष, आय-व्यय का विवरण।

कन्याओं का सौन्दर्य बढ़ाने वाल पौधा ग्वारपाठा

ग्वारपाठा के औषधीय उपयोग, ग्वारपाठा की प्रमुख जातियाँ अथवा किस्में, रसायनिक संरचना, उन्नत प्रजातियाँ, खेती की विधि, उपयुक्त मिट्टी, उपयुक्त जलवायु, भूमि की तैयारी, प्रवर्धन, बिजाई की विधि, सिंचाई की आवश्यकता तथा सिंचाई को व्यवस्था, निराई-गुड़ाई तथा खरपतवार नियंत्रण, खाद की आवश्यकता, प्रमुख रोग एवं बिमारियाँ, फसल की कटाई, उत्पादन की मात्रा, खेती के आर्थिक पहलू।

प्रत्येक गृहवाटिका में लगाये जाने योग्य उपयोगी औषधीय पौधा: कालमेघ

कालमेघ की रसायनिक संगठन, औषधीय उपयोगिता, कालमेघ तथा चिरायता एक हैं? कालमेघ की खेती की विधि : उपयुक्त जलवायु, उपयुक्त मिट्टी, प्रवर्धन, खेत की तैयारी, खेत में ट्रान्सप्लांटिंग, निराई-गुड़ाई तथा खरपतवार नियंत्रण, सिंचाई की व्यवस्था, खाद तथा कीटनाशकों की आवश्यकता, फसल की तैयारी तथा फसल का पकना, कालमेघ की बिक्री व्यवस्था, बीज प्राप्ति पुनर्खरीदी की सुविधा मुख्य समस्या, फसल से उत्पादन तथा प्राप्ति, अन्तर्वर्तीय फसलें, आय व्यय का विवरण।

CCMAP-03: अन्य औषधीय एवं सगन्धीय पौधे: उत्पाद निर्माण और विपणन

भारत में खेती के लिए उपयुक्त प्रमुख औषधीय पौधे— सफेद मुसली, कालमेघ, गुड़मार, अश्वगंधा, कोलियस, सर्पगंधा, लेमनग्रास, तुलसी, सतावर, स्टीविया, मुलैठी, मिल्क थिस्टल, भुई आमला, बेल, गुग्गुल, पिप्पली, सनाय, ब्राह्मी, इसबगोल, गिलोय, मकोय, चन्दन, कोकुम, बायबिंडग

भारत में खेती के लिए उपयुक्त अन्य औषधीय पौधे— अशोक, जैट्रोफा, ग्वारपाठा, चन्द्रशूर, सदाबहार, पपीता, सुरांजन, घतूरा, तिलपुष्पी, जायफल, कवाच, कुचला, कालादाना, खुरासानी अजवायन

पहाड़ी क्षेत्रों के लिए उपयुक्त औषधीय पौधे— कुटकी, दारूहल्दी, कूठ, वत्सनाभ, कुकंम (केसर), अतिविषा, चिरायता, एंजेलिका ग्लौका, आरनेबिया बैन्थामाई, हिडिक्यम स्पेकटम, हिरेक्विलयम केन्डीकंस, ससुरिया ओबवेलेटा, सेलिनम टेन्युफोलियम, बेलाडोना, एट्रोपा बेलाडोना, कुनैन

भारत में खेती के लिए उपयुक्त कुछ प्रमुख औषधीय पौधे— जापनी पोदीना, आर. आर.एल.एल.सी.एन.-5, पामारोजा अथवा रेशा घास, सिट्रोनेला, गुलाब, खस, पचौली, जिरेनियम

(1) Certificate in Livestock Production System (CLPS)

CLPS-01: पशुधन उत्पादन प्रणाली में प्रमाण-पत्र

खण्ड-01 कृषि एवं पशुपालन

इकाई-01 पशुपालन का कृषि में महत्व—कृषि में पशुपालन का योगदान, कृषि के विभिन्न चरण एवं पशुपालन का योगदान, खाद व उर्वरक के उत्पादन एवं प्रयोग में योगदान, कृषि से प्राप्त उप उत्पाद एवं अन्य पदार्थों का उच्च गुणवत्ता वाले पोषण तत्व के परिवर्तन के रूप में। कृषक के मूलभूत आवश्यकताओं की पूर्ति के रूप में सहायक पशुपालन, पशुओं के अन्य उपयोग, मृत जानवरों से प्राप्त अपशिष्ट को उपयोगिता, मानव उपयोगी दवाओं हेतु पशुओं का प्रयोग, कृषि अर्थव्यवस्था में पशुपालन, रोजगार सृजन एवं महिलाओं के श्रम का सदुपयोग से पशुपालन, भारत में मछली, अण्डा, दूध एवं ऊन का उत्पादन एवं आवश्यकता। भारत में पशुधन एवं उत्पादों से प्राप्त वार्षिक आय।

इकाई-02 पशुपालन एक व्यवसाय—पशुपालन एक व्यवसाय, पशुपालन से संबंधित विभिन्न इकाईयां, भारत में पशुधन एवं उत्पादों से प्राप्त वार्षिक आय।

इकाई-03 मिश्रित खेती—कृषि परिचय, उद्भव एवं विकास, कृषि के फार्मों पर विभाजन, मिश्रित खेती क्या है? मिश्रित खेती क्यों, कृषि के प्रकार को प्रभावित करने वाले कारक, पशुओं के साथ मिश्रित खेती के प्रकार, पशुपालन के साथ मिश्रित खेती की उपयोगिता, मिश्रित खेती के परम्परागत तकनीक, विषिष्ट खेती के लाभ, मिश्रित खेती के लाभ।

खण्ड-02 दुग्ध क्षरण, उत्पादन एवं दुग्ध जीवाणु

इकाई-04 दुग्ध क्षरण, उत्पादन एवं दुग्ध जीवाणु—दुग्ध क्षरण, स्तन ग्रन्थि की संख्या एवं स्थिति, गाय के ऐन की बाहरी एवं भीतरी बनावट, दुग्ध क्षरण दैहिकी, दुग्ध साव के बाद, दुग्ध क्षरण में हारमोन्स का महत्व, दूध कैसे बनता है। दूध के अवयवों का संश्लेषण, थनों में दूध का आना।

इकाई-05 स्वच्छ दूध का उत्पादन— स्वच्छ दुग्ध उत्पादन, दुग्धशाला, दुग्धारु पशुओं के रहने के स्थान की सफाई, रोगानुनषान, गायों को दोहन के लिए तैयार करना, गो दोहन की प्रविधि, गोधन की प्रविधि गो दोहन के सिद्धान्त, गो दोहन की विधिया, स्वच्छ दुग्ध उत्पादन में आने वाली गन्दगियाँ या बचाव के उपाय, अस्वस्थ दुग्ध उत्पादन के कारण। अस्वच्छ दुग्ध के सेवन से मनुष्य में होने वाली बीमारियाँ

इकाई-06 दुग्ध जीवाणु— दुग्ध जीवाणु, जीवाणुओं का वर्गीकरण, जीवाणुओं का दूध में क्रिया, प्रकिण्व, फफूंदी, किण्वन का अनुरूप, जीवाणु भोजी, दूध का जीवाणुनाश गुण, निसीन उत्पादन, दूध का जीवाणु दूषण होना।

खण्ड-03 दूध उसके अवसव एवं संगठन

इकाई-07 दूध एवं उसका संगठन— दूध की परिभाषा, दूध का सामान्चय संगठन, दूध का विस्तृत संगठन, दुग्ध प्रोटीन, दूध की शर्करा, दूध के खनिज लवण, दूध के विटामिन्स, दूध के किण्वन, दूध में उपस्थित अन्य पदार्थ। दूध एवं उसके संगठन को प्रभावित करने वाले कारक।

- इकाई-08 दूध के भौतिक एवं रासायनिक गुण- दूध के भौतिक एवं रासायनिक गुण, दूध की श्यानता तथा गाढ़ापन, वर्तमान सूचक, तल तनाव, अपचयन, उपचयन विभावांक, विद्युत संचालकता, दूध का पी0एच0 तथा प्रतिरोधक मान, दूध की झाग।
- इकाई-09 दूध का परीक्षण- दूध का नमूना लेना, प्लेट फार्म परीक्षण, प्रयोगशाला परीक्षण।
- खण्ड-04 दूध पौषणिक महत्व, अपमिश्रण एवं परिरक्षण**
- इकाई-10 मानव पोषण में दूध की महत्ता- दूध एवं दूध के अवयवा की सामान्यता पोषकता, दूध अवयवों के घटकों की विषिष्ट पोषण क्षमता (जल, दुग्ध वसा, दुग्ध प्रोटीन, दुग्ध शर्करा, खनिज पदार्थ, दूध के विटामिन), दूध के पौषणिक मान पर संसाधन का प्रभाव
- इकाई-11 दूध में अपमिश्रण एवं उसकी जांच- अपमिश्रण के प्रकार, दूध के कुछ असधारण अपमिश्रण एवं उनकी समस्याएं, दूध के वैधानिक मानक, दूध में अपमिश्रण ज्ञात करने की विधियाँ (दूध में पानी की मिलावट का पता करना, वसा परीक्षण, आपेक्षिक घनत्व परीक्षण, वसा रहित ठोस पदार्थ प्रतिषट निर्धारण, दूध का हिमांक परीक्षण, अपवर्तनांक परीक्षण, नाइट्रेट परीक्षण, वीथ अनुपात निर्धारण), दूध में सप्रेटा की मिलावट का पता करना, दूध में अपमिश्रित स्टार्च का पता करना, दूध में चीनी के अपमिश्रण का पता करना, दूध में ग्लूकोज की जांच, दूध में दुग्ध चूर्ण अथवा टोड दूध का पता करना, गाय एवं भैंस के दूध का अपमिश्रण ज्ञात करना, अभिरंजक पदार्थों का अपमिश्रण ज्ञात करना, दूध में यूरिया एवं अन्य नाइट्रेट उर्वरक की उपस्थिति ज्ञात करना।
- इकाई-12 दूध परीक्षण एवं निष्प्रभावक - दूध की रखाव क्षमता परिरक्षण एवं स्वच्छ दूध उत्पादन का संबंध, दूध तथा दूध से बने पदार्थों के परिरक्षण के कृत्रिम उपाय, प्रषीतन, ताप उपचार, पास्तुरीकरण, निर्जमीकरण, अतिउच्चतापीय उपचार, वाष्पीकरण एवं संघनन, शुष्कन, नमक या चीनी का मिलाना, किण्वन तथा प्रतिजैविकी, किरणन, अपकेन्द्रीय बल, रासायनिक परिरक्षण, निष्प्रभावक, रासायनिक परिरक्षण या निष्प्रभावक तथा दूध में उनकी उपस्थिति का परिचयन, फारमल्डिहाइड, हाइड्रोजन पराक्साइड, कार्बोनेट तथा बाइकार्बोनेट, बेन्जोइक अम्ल तथा सैलीसलिक अम्ल, मरक्युरिक क्योराइड, पोटैसियम डाइकोमेट

CLPS-02: पशु पोषण: पशु आहार एवं चारा प्रबन्धन

खण्ड-01 पशुपालन, खाद्य पदार्थ एवं आहार पूरक

इकाई-01 पशुपालन पालन के सामान्य सिद्धान्त— पशु पालन प्रबंध, पशुपालन प्रबंध के सामान्य सिद्धान्त, नवजात बछड़ों की देखभाल, गाय के साथ रखकर बछड़ों-बछियों का पालन पोषण, गाय से अलग रखकर बछड़ों-बछियों का पालन पोषण, बछड़े-बछियों की प्रबंध संबंधी कुछ महत्वपूर्ण बातें, पशुओं को चिन्हित करना, पशुओं को बधिया करना, पशुओं में सींग रोधन, गर्भवती गायों की देखभाल, बच्चा देते समय गर्भवती गाय की देखभाल व प्रबंध, हाल ब्यायी गायों की देखभाल, दूधारु गायों की देखभाल, साँड़ की देखभाल व प्रबंध

इकाई-02 पशुओं के खाद्य पदार्थ एवं उनके गुण— पशुओं के खाद्य पदार्थ, वर्गीकरण, मोटे चारे, बेफलीदार चारे, बेफलीदार सूखे चारे, बेफलीदार हरे चारे, फलीदार चारे, फलीदार सूखे चारे, फलीदार हरे चारे, जड़ें व गुठलियाँ, दाने, अधिक प्रोटीन वाले दाने, अधिक ऊर्जा वाले दाने, तिलहन, एवं खलियाँ, जन्तु उत्पत्ति की प्रोटीन, अप्रोटीन नाइट्रोजन यौगिक, अनाज के उपजात

इकाई-03 पशुओं के आहार पूरक— पशुओं के आहार पूरक, पशु पोषण में खनिज का महत्व, खनिजों के स्रोत, पशुपोषण में कैल्शियम, फास्फोरस, मैग्नीशियम, सोडियम, पोटैशियम, क्लोरीन लोहा, आयोडीन, गंधक, ताँबा, माल्डिडेनम, कोबाल्ट, जस्ता, मैंगनीज, खनिजों की न्यूनता एवं विषाक्तता का पता लगाना एवं उनका उपचार, गौ पशुओं में खनिज लवणों की विषाक्तता का पता लगाना, पशुओं के लिए विटामिन का महत्व, विटामिन का वर्गीकरण, वसा में विलेय विटामिन (ए, डी, ई, के), जल में विलेय विटामिन (बी1, बी2, नियासिन, विटामिन बी6, अन्य विटामिन बी एवं सी), जल में विलय विटामिन

खण्ड-02 चारा उत्पादन, संरक्षण एवं चारागाह प्रबन्धन

इकाई-04 चारा उत्पादन – पशुआहार, रेंगदार चारा, दाना मिश्रण— प्रोटीनयुक्त तथा ऊर्जायुक्त दाने, पशु आहार में मोटे चारे की उपयोगिता, हरा चारा, चारा उत्पादन के तरीके, सिंचित क्षेत्रों के चारे, बाराणी क्षेत्रों के चारे, बागवानी चारा पद्धति, बंजर भूमि तथा सीमांत भूमि का विकास, खाद्य चारा उत्पादन पद्धति, खरीफ ऋतु की फसलें, फलीदार (ग्वार, लोबिया), बिनाफली वाली फसलें (सामान्य ज्वार, बहुकटान वाली ज्वार, मक्का, बाजरा), राइजोबियम जीवाणु का प्रयोग, एजेटोबैक्टर कल्चर, कल्चर का प्रयोग विधि (टीकाकरण, गोली बनाकर, सीधे भूमि में प्रयोग), रबी ऋतु की फसलें— फलीदार (बरसीम, लूसर्न, लोबिया), बिना फलीदार (जई, रबी मक्का), जायद की फसलें (ज्वार, लोबिया, मक्का, बाजरा), घासकुल के अन्य महत्वपूर्ण चारे (नेपियर या हाथी घास, पैराघास या पानी वाला घास, नन्दी घास, गिनी घास, दीनानाथ घास), वर्षभर हरा चारा उत्पादन, चारा उत्पादन के लिए कुछ विविष्ट जानकारीयाँ

इकाई-05 चारा संरक्षण –साइलेज, साइलेज का महत्व, साइलेज की आवश्यकताएं तथा उपयुक्त फसल, साइलेज बनाने की मुख्य विधियां (खाई विधि, बुर्ज विधि, गर्त विधि), साइलेज के गड्डों के गुण तथा आकार, फसलों की कटाई-छंटाई, परिभक्षी तथा अन्य पूरक पदार्थ, गड्डे की भरायी, ढकना, देख-रेख, साइलेज की हानि, साइलेज के मुख्य लाभ, हे (चारा सूखा), हे का महत्व, हे की आवश्यकताएं तथा इसके लिए मुख्य चारे, फसलों की कटाई-छंटाई,

चारागाह के चारे, खेती से प्राप्त चारे, हे बनाने की विधियां (प्राकृतिक एवं कृत्रिम), हे बनाते समय कुछ विविष्ट जानकारीयाँ, हे से लाभ

इकाई-06 चारागाह प्रबन्धन-चारागाह, चारागाह का महत्व, चारागाह के प्रकार, मिश्रित घासों तथा उसका महत्व, चारे के गुणों में वृद्धि का तरीका, चारागाह में चरायी की विधियाँ, चारागाह व्यवस्था तथा उसका विकास, चारागाह में चरायी से लाभ तथा हानियाँ, अच्छे चारागाह के गुण

खण्ड-03 खाद्यमानक, पशुआहार तथा पोषणीय क्षमता व व्यतिक्रम

इकाई-07 खाद्य मानक – खाद्य मानकों का इतिहास, खाद्य मानकों के प्रकार, खाद्य मानकों का विकास, प्राचीन खाद्य मानक, मध्यकालीन खाद्यमानक, आधुनिक खाद्यमानक, खाद्यमानकों का परिसीमन, खाद्य मानकों की प्रयोगात्मक उपयोगिता, पशुओं के लिए आवश्यकतानुसार पोषक तत्वों की आवश्यकता का सारणीकरण

इकाई-08 पशुओं के लिए आहार बनाना- पशुओं के लिए आहार बनाना, आहार का पशु शरीर में कार्य, खाद्य पदार्थों के तत्व, पशुओं को प्रतिदिन पानी की आवश्यकता, आवश्यकता के आहार पर आहार की गणना, निर्वाह आहार, सन्तुलित आहार, आदर्श आहार, वर्धक आहार, पशुओं के लिये भोजन व्यवस्था करते समय ध्यान देने योग्य बातें, दुधारु पशुओं का आहार, युवा बछिया या बछड़े का आहार, दूध ना देने वाली गायों का आहार, साँड़ों का आहार, बैलों का आहार, गर्भवती गाय का आहार, गाय के ब्याने के बाद का आहार, छोटे बछड़े या बछिया का भरण पोषण, 3 माह तक के बच्चों (बछड़ा या बछिया) का आहार, खीस पिलाना, दुग्ध पिलाना, काफ स्टार्टर, खाद्य पदार्थों का वर्गीकरण, सन्तुलित आहार गणना के नियम, पशुओं के आहार सम्बन्धी कुछ गणनाये

इकाई-09 खाद्य योगज, विषाक्त तत्व तथा पोषणीय क्षमता व व्यतिक्रम- खाद्य योगज (एन्टीबायोटिक, आर्सेनिक यौगिक, एन्जाइम, काक्सीडियोस्टेट तथा कृमिहर औषधियाँ, एन्टीफंगस, प्रति आक्सीकारक, वर्णक यौगिक), पशु चारे में विषाक्त तत्व (विषाक्त पदार्थों का वर्गीकरण, विषाक्त तत्वों के श्रोत व उनका प्रभाव), पोषणीय व्यतिवम (दुग्ध ज्वर, ग्रास टिटैनी, कीटोसिस, मुर्गियों की गाउट, फ्लूरोसिस, पोषणीय कमियों से होने वाली व्याधियाँ)

खण्ड-04 आहार निर्धारण

इकाई-10 खाद्य पदार्थ तथा इसके मिश्रण की सीमायें- खाद्य पदार्थ, अधिक ऊर्जा वाले, अधिक प्रोटीन वाले, अधिक विटामिन वाले, अधिक खनिज वाले, प्रति जैविक पदार्थ, सह जैविक पदार्थ, पोषण रोधी कारक, खाद्य पदार्थों के सामान्य गुण, खाद्य पदार्थों का परिष्करण

इकाई-11 गोपशु तथा भैंस के लिए आहार – आहार (संतुलित एवं आदर्श), पशुओं की आवश्यकतानुसार आहार, निर्वाह आहार, उत्पादन आहार, पशुओं की श्रेणी, जुगाली करने वाले, जुगाली न करने वाले, गोपशु पोषण, जन्म से 6 माह तक आहार, वृद्धि आहार (6 माह से 2 वर्ष तक), जीवन निर्वाह आहार, गामिन गोपशु आहार, सांड के लिए आहार, कार्य करने वाले बैलों के लिए आहार, दूध उत्पादन के लिए आहार, भैंस के लिए पोषण, वृद्धि आहार, जीवन निर्वाह आहार, गामिन भैंस के लिए आहार, दूध उत्पादन के लिए

आहार, नर बच्चे को अधिक मांसल बनाने के लिए आहार, कार्य करने वाले भैंसा के लिए आहार

इकाई-12

बकरी तथा भेड़ों के लिए आहार – बकरियों के लिए पोषण, क्रीप आहार, बकरी के बच्चे का आहार, जीवन निर्वाह का आहार, शरीर वृद्धि के लिए आहार, गर्भावस्था में बकरी का आहार, दूधारु बकरियों के लिए आहार, प्रजनन हेतु उपयोग होने वाले बच्चे तथा वयस्क हेतु आहार, भेड़ों के लिए पोषण, मेमना के लिए आहार, जीवन निर्वाह के लिए आहार, प्रजनन के लिए आहार, फ्लॉंग आहार, भेड़ के लिए वृद्धि आहार

CLPS-03 : पशुपालन: प्रबन्धन एवं प्रजनन

खण्ड-01 गौवंशीय नस्लें, चयन एवं प्रजनन पद्धतियाँ

इकाई-01 दुधारु पशु एवं उनकी नस्लें— दुधारु नस्लें, द्विकाजी नस्लें, भारवाही नस्लें, विदेशी गायों की नस्लें, संकर गायों की नस्लें, भैसों की नस्लें, बकरियों की नस्लें, विदेशी बकरियों की नस्ले, अन्य दुग्ध उत्पादक प्रजातियाँ

इकाई-02 दुग्ध उत्पादन के लिए डेयरी पशुओं का चयन— चयन, चयन का महत्व, चयन का उद्देश्य, डेयरी पशुओं के आर्थिक गुण, चयन का आधार, चयन की विधियाँ, प्रदर्शन वृत्त वरण

इकाई-03 पशु प्रजनन की पद्धतियाँ— पशु प्रजनन, अंतः प्रजनन, बहिः प्रजनन; भिन्न संकरण, संकरण, भारत में संकर प्रजनन

खण्ड-02 पशु प्रजनन

इकाई-04 पशु जनन एवं प्रसव के समय प्रबंध— जनन, जनन अंग, नर जननेद्रिय के भाग एवं कार्य, मादा जननेद्रिय के भाग एवं कार्य, मद चक्र, निषेचन एवं भ्रूण का विकास, प्रसव, प्रसव के समय प्रबंध, प्रसव के बाद प्रबंध

इकाई-05 पशु बाँझपन एवं निवारण— पशुओं में बाँझपन, संबंधित शब्द, बाँझपन एवं अनुर्वरता की दशाएं, बाँझपन के कारण, बाँझपन के कारण, निदान, उपचार, रोकथाम

इकाई-06 कृत्रिम गर्भाधान— कृत्रिम गर्भाधान का विकास, लाभ एवं हानियाँ, कृत्रिम गर्भाधान की सीमाएं, कृत्रिम गर्भाधान की प्रविधि, वीर्य एकत्रीकरण, वीर्य परीक्षण तथा मूल्यांकन, वीर्य तनुकरण, वीर्य सुरक्षित रखना, मादा का गर्भाधान, यंत्रों का जीवाणु-हनन

खण्ड-03 पशुओं की देखरेख एवं प्रबन्धन

इकाई-07 पशुओं का रखरखाव— गाभिन पशु की देखरेख; ब्याते समय पशु की देखभाल, दूधारु पशु की देखभाल, नवजात बछड़-बछियों की देखभाल, सांड की देखभाल व प्रबन्ध

इकाई-08 पशुओं की दिनचर्या— डेरी फार्म का दैनिक कार्यक्रम, फार्म पशुओं की पहचान, पशुओं को नापना, पशुओं का भार निकालना, सींग रोधन, पशुओं को बधिया करना, दुग्ध दोहन, पशु बिछावन तैयार करना, व्यायाम कराना, खुरैरा करना, पशुओं को स्नान कराना, खुर बनाना, पानी पिलाना, पशुओं को पकड़ना, जमीन पर पड़े बिमार तथा गढ़्ढे में गिरे पशु को उठाना, पशु के पैर की परीक्षा करना, पैर चलाने वाली गाय को वष में करना, पशुओं को गिराना, पशु नियंत्रण के यंत्र व उपकरण

इकाई-09 फार्म पशु प्रबन्धन तथा पशुओं की बुरी आदतों का सुधार— फार्म पशु प्रबन्धन, पशु प्रबन्धन के सिद्धान्त, प्रबन्ध कार्यक्रम लागू करने में कठिनाइयां, पशुओं की बुरी आदतें तथा उनका सुधार

खण्ड-04 पशु आवास, अभिलेख एवं अर्थव्यवस्था

- इकाई—10 पशु आवास— अच्छी पशु आवास व्यवस्था के लाभ, आवास व्यवस्था के आधार, पशु आवास हेतु स्थान निर्धारण, डेरी फार्म भवनों का समूहन, डेरी फार्म भवनों का निर्माण, पशुशाला निर्माण, जरूरत के अन्य भवन, गर्मियों में की जाने वाली अतिरिक्त व्यवस्था, डेयरी पशुओं के आवास हेतु निर्धारित क्षेत्रफल
- इकाई—11 पशु फार्म के अभिलेख— पशुफार्म अभिलेखों की आवश्यकता तथा लाभ, फार्म अभिलेखों का वर्गीकरण, विभिन्न प्रकार के अभिलेख रिजिस्टर का प्रारूप, अभिलेख परिरक्षण, यूथ रजिस्ट्रेशन
- इकाई—12 डेरी फार्म अर्थव्यवस्था— दुग्ध उत्पादन लागत, अचल लागत, अचल लागत ज्ञात करना, चल तथा परिवर्तनशील लागत, दुग्ध विपणन, दूध का मूल्य निर्धारण, दुग्ध व्यवसाय विप्लेषण, 10 संकर गायों के डेरी फार्म की अर्थशास्त्र
- खण्ड—05 पशु स्वास्थ्य एवं पशुओं की बिमारियाँ
- इकाई—13 पशु स्वास्थ्य प्रबन्धन— स्वस्थ एवं बिमार पशु के लक्षण, बीमारियों के मुख्य कारण, बीमारियों का वर्गीकरण, पशु स्वास्थ्य प्रबन्धन, पशु सफाई, गोशाला की सफाई व विसंक्रमण, गोबर, गोमूत्र तथा स्लरी का निस्तारण, अच्छी आवासीय व्यवस्था, संतुलित आहार की उपलब्धता, स्वच्छ एवं ताजा जल की उपलब्धता, स्वस्थ पशुओं की खरीद, चारागाह में बदलाव, संगरोध, अलगाव, रोग की सूचना, पशु शव का निस्तारण, प्राथमिक उपचार, टीकाकरण
- इकाई—14 पशुओं में जीवाणु एवं विषाणु से फैलने वाली बिमारियाँ— पशुओं के जीवाणु जनित रोग; गला घोटू, लँगड़ी, एन्थ्रैक्स, सांसर्गिक गर्भपात, थनैला रोग, क्षय रोग, बछड़ों में संक्रामक दस्त, निमोनिया, जॉन्स रोग (पुराना कीटाणु अतिसार), पशुओं के विषाणु जनित रोग, पोकनी, खुरपका—मुँहपका, चेचक, रेबीज
- इकाई—15 उदर रोग, प्रजनन सम्बन्धी रोग तथा परजीवी रोग— पशुओं के उदर सम्बन्धी रोगों की रोकथाम, अफारा, रुमेन का गम्ब हो जाना, अजीर्ण रोग, जठषोथ, दस्त, बछड़ों की सफेद दस्त, बछड़ों की पौषणिक दस्त, नाभि रोग, पशुओं के प्रजन संबंधी रोगों के कारण, असंक्रामक एवं अन्य कारण, जेर का समय पर न गिरना, पशु का बार—बार गर्मी में आना, पशुओं का गर्मी में न आना, पशुओं को समय पर गाभिन न करवाना, दुग्ध ज्वर, परजीवी रोगों की रोकथाम, गेडुआ रोग, लिवर फ्लूक रोग, बेबेसियासिस, थिलेरियोसिस, सर्रा

Certificate in Poultry Farming (CPF)

Detailed Course Structure:

Paper – I CPF – 01 Introduction to Poultry Farming

Block1: Poultry Industry

- Unit 1: Poultry Farming: An Overview
- Unit 2: System and Types of Poultry Farming
- Unit 3: Poultry development Programmes in U P

Block 2: Poultry Breeds and Breeding

- Unit1: Species, Breeds and Strains
- Unit 2: Qualitative Traits and Breeding
- Unit 3: Selection, Culling and Artificial Insemination

Block 3: Farming of Different Poultry Species

- Unit1: Duck and Geese Farming
- Unit 2: Quail Farming
- Unit 3: Guinea, Fowl and Turkey Farming

Paper – II CPF – 02 Poultry Housing and Management

Block 1: Farm Establishment and Equipment

- Unit 1: Principles of Housing
- Unit 2: Housing Systems
- Unit 3: Poultry House Equipment

Block 2: Poultry Management

- Unit 1: Brooding Management
- Unit 2: Management of Broilers
- Unit 3: Management of Layers
- Unit 4: Routine Management

Block 3: Economics and Marketing of Poultry and Poultry Products

- Unit 1: General Economic Considerations in Poultry Farming
- Unit 2: Farm Record Keeping
- Unit 3: Quality Considerations in Marketing of Poultry products
- Unit 4: Processing and Marketing

Paper – III CPF – 03 Poultry Feeds and Feeding

Block 1: Principles of Poultry Feeding

- Unit 1: Energy and Protein Feedstuffs
- Unit 2: Mineral and Vitamin Supplements
- Unit 3: Feed Additives and Toxicants

Block 2: Feeding Standards

Unit 1: Dietary Requirements

Unit 2: Feed Processing and Quality Control

Unit 3: Feeding Methods

Paper – IV CPF – 04 Poultry Health Care and Diseases**Block 1: General Health Care**

Unit 1: Parameters of Identification of Healthy and Sick Birds

Unit 2: Intercultural Preventive measures

Unit 3: Vaccination and other medicinal preventive measures

Unit 4: Safe Disposal of Sick/Dead Birds and Poultry Wastes

Block 2: Common Poultry Diseases and their Control

Unit 1: Viral and Bacterial Diseases of Poultry and its cure

Unit 2: Protozoal and Fungal Diseases of Poultry and its cure

Unit 3: Internal and External Parasites of Poultry and its cure

Paper – V CPF – 05 Poultry Farm Training

A compulsory 10 days continuous hands-on training (CPF 05) will be conducted at the Designated Centers under the supervisions of the university. The keys areas will be as follows:

1. General Visit of a Poultry Farm;
2. Visit of an specific Farm viz, Broiler Farm, Layer Farm, Brooder Farm;
3. Visit to Grower House;
4. Visit to Feed Mixing Unit;
5. Bio-security Measures;
6. Visit to Other Farms; and
7. Discussion and Reporting

Certificate in Bee Keeping

Course Details:

Paper – I CIB – 01 Introduction to Beekeeping

Block 01: General Introduction to Honey Bee

Unit 01: Species, Morphology and Physiology

Unit 02: Life Cycle of Honey Be

Unit 03: Bee Family and Division of Labour

Block 02: Bee Keeping Industry

Unit 01: History and recent Trend of Bee Keeping

Unit 02: Government Policies, challenges and remedial Measures

Unit 03: Establishment of Bee Keeping Unit

Paper – II CIB-02 Management of Honey Bee Colonies

Block 01: General Management

Unit 01: Management of Colonies in Different Seasons

Unit 02: Routine activities of Bee Keeping

Unit 03: Swarming and Supersedure

Block 02: Production and Disease Management

Unit 01: Honey and Vax Production

Unit 02: Diseases of Honey Bee and their Cure

Unit 03: Natural Enemies of Honey Bee

Paper – III CIB-03 Hive Products and Economics of Bee Keeping

Block 01: Hive Products

Unit 01: Honey: Composition, Classification and Uses

Unit 02: Other Hive Products viz, Vax, Royal Jelly, Bee Pollen, Bee Venom, Bee Glue
etc.

Unit 03: Standardization of Hive Products

Block 02: Economics of Bee Keeping

Unit 01: Economics of Bee Keeping

Unit 02: Marketing of Honey and other Hive Products

Unit 03: Agro-ecological Importance of Honey Bee

Paper – IV CIB-04 On-Site Training

A compulsory 10-days' continuous hands-on training (CIB 04) will be conducted at the Designated Centers under the supervisions of the university. The key areas will be Box Making, Site Selection, Feeding during off seasons, Honey extraction equipments, separation of products, processing and packaging, use of intercultural preventive measures, marketing etc. Training report should be prepared and submitted to the University for Examination and evaluation.

Certificate Programme in Gardening

विस्तृत पाठ्यक्रम –

CPIG -01 - बागवानी के मूल तत्व

Block-01- बागवानी एक परिचात्मक अध्ययन

- Unit -01 - बागवानी की परिभाषा
- Unit -02 - बागवानी का महत्व
- Unit -03 - बागवानी का विषय क्षेत्र एवं भविष्य

Block-02 बागों में लगाये जाने वाले पौधों के प्रकार

- Unit -01 - फल
- Unit -02 - सब्जियां
- Unit -03 - पुष्प एवं अन्य सजावटी पौधे

CPIG -02 - फल, सब्जी एवं पुष्पों की खेती

Block-01- फलों की खेती

- Unit -01 - फलों की खेती हेतु उपयुक्त मृदा एवं जलवायु
- Unit -02 - फल उत्पादन की विधियां एवं रखरखाव

Block-02 सब्जियों की खेती

- Unit -01 - सब्जियों की खेती हेतु उपयुक्त मृदा एवं जलवायु
- Unit -02 - सब्जियों की खेती की विधियां एवं रखरखाव

Block-03 पुष्पों एवं अन्य सजावटी पौधों की खेती

- Unit -01 - पुष्पों की खेती एवं रखरखाव
- Unit -02 - अन्य सजावटी पौधों की खेती एवं रखरखाव

CPIG -03 - पौधशाला व्यवस्थापन एवं प्रबन्धन

Block-01- पौधशाला : एक परिचय

- Unit -01 - पौधशाला की परिभाषा एवं महत्व
- Unit -02 - पौधशाला के प्रकार एवं घटक
- Unit -03 - पौधशाला के उपकरण एवं साफ सफाई

Block-02 पौधे तैयार करने के माध्यम

- Unit -01 - क्यारी, गमले, पॉलिथीन थैली, प्लास्टिक ट्रे एवं अन्य
- Unit -02 - माध्यम एवं उनके तैयारी की विधियां

Block-03 प्रसारण की विधियां

- Unit -01 - बीज प्रसारण : परिभाषा, महत्व एवं प्रकार
- Unit -02 - लैंगिक एवं अलैंगिक प्रसार विधियां
- Unit -03 - पौधों का व्यवसायिक प्रसारण

CPIG -04 - वाटिका व्यवस्थापन : सर्वेक्षण आधारित प्रायोगिक कार्य रिपोर्ट

– 10 दिवसीय सर्वे कार्य की आख्या (Report) जिनमें निम्न बिन्दु समाहित हो;

1. सर्वे किये गये वाटिका का प्रकार

- गृह वाटिका/लॉन
 - संस्थागत उद्यान
 - सार्वजनिक उद्यान/ पार्क
2. लगाये गये पौधों के प्रकार
 3. पौधे प्राप्त करने के स्थान
 4. सिंचाई व्यवस्था
 5. खाद एवं अन्य व्यवस्था
 6. रखरखाव करने का तरीका
 - स्वयं रखरखाव करना
 - माली द्वारा कराना आदि

नोट:— प्रारम्भिक चरण में पाठ्य सामग्री के रूप में पुस्तकें प्रयोग की जायेगीं।

प्रस्तावित पुस्तकें :-

4. उद्यान नर्सरी – आयोजन एवं कार्य प्रणाली : लेखक – श्याम सुन्दर श्रीवास्तव
प्रकाशक— किताब महल एजेन्सीज 22, सरोजनी नायडू मार्ग, इलाहाबाद
5. आधुनिक शाक एवं पुष्प उत्पादन : लेखक – जी०एस० सैनी
प्रकाशक—रामा पब्लिशिंग हाउस, अग्रवाल कालोनी (राम लीला मैदान के सामने) दिल्ली रोड़, मेरठ (उ०प्र०)
6. फलोत्पादन – लेखक – डॉ० हरेन्द्र सिसेठी एवं डॉ० कृष्ण पाल सिंह
प्रकाशक – भारती भण्डार, 6 सुनील काम्प्लेक्स, बैस्टर्न कचहरी रोड़, मेरठ, (उ०प्र०)

Certificate in Organic Farming

Course Details:

CoF-01 Introduction to Organic Farming

Block-01 Organic Farming – An overview

Unit 1- Principal of Organic Farming- The Science of Modern Farming, Development of Organic Farming, Role of International Organisations, What is Organic Farming, Definitions of Organic farming, Concept of Organic Farming, Organic Concept, Holistic Concept, Living Soil Concept, Healthy Plant Concept, Principles of Organic Farming, The Principle of Health, The Principle of Ecology, The Principle of Fairness, The Principle of Care

Unit 2 – Benefits and Scope of Organic Farming- Organic Farming Approaches, Traditional Farming Approach, Organic Farming Approach, Sustainable Farming Approach, Biodynamic Farming Approach, Natural Farming Approach, Permaculture Approach, LEISA Farming Approach, Benefits of Organic Farming, Economic Benefits, Ecological Benefits, Social Benefits, Scope of Organic Farming, Let Us Sum Up

Unit-3 Present Status and Development- Milestones in Organic Farming, Present Status, Global Status, Standards and Regulations, Certification and Accreditation, Organic Farming Initiatives in India, India Organic, Facilitating Factors for Organic farming, Constraints for Organic Farming, Organic Market, Major Organic Products from India, Market for Organic products, Potential Customers for Organic Products in the Domestic Market, Products Comparative Advantage, The International Market, Japanese organic market, US organic market, The European organic market, price premium for the organic products, Future development.

Unit 4 Chemical Farming Vs Organic Farming - Green Revolution and its Aftermath, Pesticide Residue in the Food, Pesticide Effect on Living Things, GM Crops, Organic Farming- Evergreen Revolution, Characteristics of Organic Farm, Biodiversity, Diversification and Integration of Enterprises, Sustainability, Natural Plant Nutrition, Natural Pest Management, Integrity, Comparison of Chemical and Organic systems, Why do People Choose Organic Food?, Facts and Fallacies of Organic Farming

Block-02 Organic Norms

Unit 1- National Norms- who is a certified organic farmer?, Basic requirements in an organic farm, Conversion, Mixed Farming, Crop Rotation, Planting, Manuring, products that are permitted as manure in organic field, Restricted Products, Pest, Disease and weed management, Products Permitted for plant protection, restricted products, soil and water conservation, contamination control, processing, labeling packaging, social justice Documentation, Certification, Group Certification, Internal Control (ICS), Participatory Organic Certification, National standards for organic production, NSOP for crop Production and Animal Husbandry in General, Inspection and certification of organic products for export.

Unit 2- International Norms- International Organic Standards, The IFOAM and Its Norms, The IFOAM basic standards (IBS), IFOM Accreditation Criteria, The codex Alimentarius Norms, The European Union (EU) Council's Regulation on Organic Production, Japanese Organic Standards, United States of America organic Standards (National Organic Programme) Comparison of EU, JAS and USDA organic Standards, Private Certification in some Countries, Certification and Inspection in organic farming

COF-02: Organic Production System

Block-1 Farm Management

Unit-1 Farm Designing, Land Preparation and Buffer Zone – Farm Design, Characteristics and components of an organic farm, planning and layout of the farm, farm components in different Agro Eco-systems, Field crops in organic farms, Trees in organic farms, Border Tree, Agro-forestry, Farm Forestry, Benefits of trees in organic farm, farm biodiversity, Field Bunds, Compost yard, Farm Structure, Cattle Shed, Storehouse, Farm office, land preparation, Implements used for land preparation, Factors Influencing land preparation, Summer Ploughing, Wetland Preparation, Types of Tillage, Conventional Tillage, Minimum Tillage, No/Zero Tillage, Conservation Tillage, Land Preparation for Cereals and Millets (Paddy, Wheat, Maize, sorghum, Pear Millet, Barely, Finger Millet), Land Preparation for Pulses and Oilseeds, Chickpea, other Pulses (Lentil, Pea, Pigeon Pea, Green Gram, Black Gram, Cowpea and Soybean), Groundnut, Sesamum, Rape Seed, Mustard and Linseed, Sunflower, Land Preparation for Cash crops, cotton, Sugarcane, land preparation for green Manuring Corps, Sunhemp, Lucerne, Subsidiary Activities, Buffer Zone,

Unit-2 Seed and Planting – Seed Structure and its Germination, What is seed?, Seed Structure, Requirements for seed Germination, Seed Dormancy and methods of breaking Dormancy, Seed dormancy, Methods of breaking the seed dormancy, Seeds and sowing/planting, Cereals and Millets (Rice, Wheat, Maize, Sorghum, Bajra, Barley, Finger Millet, Proso Millet, Kodo and Kakun), Pulses and Oilseeds (Chickpea, Lentil, Field Pea, Pigeon Pea (arhar), Green gram, and Black gram, Cowpea and soybean, Groundnut, Rapeseed and Mustard, sunflower, Cotton and Sugarcane, Fruits and Vegetables

Unit-3 Water Management – Function of Irrigation water in the soil, Quality of Irrigation water, Standards for irrigation of water, Scheduling of Irrigation, Preparation of land for Irrigation, Methods of Irrigation ; Surface irrigation methods, Sub-surface Irrigation, pressurized Irrigation, Availability of soil water, Saturation Capacity, Field Capacity, Readily Available Moisture, Temporary wilting or incipient wilting point Permanent wilting or incipient wilting point, permanent wilting Ultimate wilting, plant Appearance, Root zone, Critical Stages in crop development, water management for different crops, Water Conveyance, Water Harvesting , Water Conservation.

Unit-4 Contamination Control – Soil Contamination; Nature and Impact of Soil contaminants on ecosystems, Water Contamination; Nature and Sources of water contamination, Organic and inorganic contamination, Mode of water contamination, Air Contamination, Groundwater Contamination, Contamination Control

Unit-5 Livestock, management in organic Farming - Cattle and Buffalo Breeds, Livestock Housing, sheds for cattle and other livestock, poultry house, Livestock Hygiene, Livestock Nutrition; Cereals , pulses, oilseeds and Their by products, Pasture Herbage, Cultivated Fodders and Legumes, Straw, hay and Silages, Tree Leaves, other Sources of feed, Preparation of ration, care of pregnant cows and calves, Feeding Goats and pigs, National and international norms for organic livestock, National Norms, International norms, Record keeping

Unit-6 Farm Implements - Ploughing Implements; Indigenous wooden plough, mould board plough, special ploughs, Pudding Implements; wetland puddler, Hleical bladed puddler, sheep foot roller, Sowing Implements; country seed drills, bullock drawn seed drills, dibblers, Inter-cultivation implements; cultivators, Harrows, Rollers, leveling and bund forming implements, Implements used for intercultural operations; Japanese Rotary Weeder, Peg tooth weeder, Star tooth weeder, Other farm Implements; Multi purpose tool carrier, Soil scoop

Block-2 Soil Fertility and Nutrient Management

Unit-1 Crop Rotation- Principles of crop Rotation, Effects of crop Rotation; Balanced and Economic Nutrient absorption, soil fertility and health build up, legume effect, reduction in insect pest build up, legume effect, Reduction in insect pest build up, weed management, crop disease management, efficient resources utilization, soil moisture utilization, reduction in soil erosion, income stability, time management, machinery efficiency, Farmers Skill, Crop Rotations after green Revolution, Agronomical Practices for cropping system, land preparation, manuring, water management, weed, pest and disease management, Selection of crops in rotations, advantages of crop rotations, disadvantages of crop rotations

Unit-2 Composting and Manuring- Organic Resources Available for manuring and composting, Compost and composting, stages of composting; Mesophilic stage, Thermophilic stage, Curing, Principles of composting, Types of composting; Aerobic decomposition, anaerobic decomposition, vericomposting, methods of composting, Indore method, Bangalore method, Coimbatore method, coimbatore method, mechanical compost plants, NADEP method, other methods of composting, Factors Affecting composting, C/N ratio of the bedding materials, Blending and shredding moisture, Temperature, oxygen or aeration pH, Vermicopost, External Features of earthworm, life cycle of earthworm, types of earthworm used for vermicomposting characteristics of vermicopost, chemical, physical, vermicompost preparation, advantages of manures and compost, disadvantages of manures and compost, organic manure; farm yard manure, gobar gas slurry, green manure, Poultry manure, concentrated organic manures; cakes, meal group manures, liquid farm yard manure, vermiwash,

Unit-3 Bio-Fertilizers – Types of biofertilizers and their description, nitrogen fixing biofertilizers, rhizobium, blue green algae, azospirillum, azotobactor, acetobactor, frankia, phosphorus solubilising microorganisms (PSM), vesicular arbuscular mycorrhiza (VAM), methods of biofertilizer inoculation (application), seed Inoculation, Root and seedling Treatment, Soil application, self inoculation or Tubez inoculation, advantages, disadvantages, constraints in biofertilizers

Block-3 Plant Protection

Unit-1 Cultural and Mechanical Practices – Cultural Practices; use of cleaned seeds, pre sowing irrigation, summer ploughing, crop rotation, trap rotation, Intercropping, use of tolerant/Resistant varieties, manipulations in sowing dates, irrigation/flooding, destruction of volunteer plants, managements of alternate host plants, Mechanical practices shaking the branches, handpicking and killing, traps, spike thrust method, tree banding, trenching, tree past, principles of cultural practices, advantages of cultural methods.

Unit-2 Botanical Pesticides – Botanical pesticides, Adathoda vesica, azadirachta indica (neem), Neem seed kernel extract (NSKE), Neem Decoction, Neem oil, Neem cake, Neem leaf decoction, Acorus calamus, annona squamosa, curcuma longa (Turmeric), asapoetida, allium cepa (Onion), capsicum annuum, calotropis gigantean, ricinus communis (castor), Tobacco, Bidens pilosa (Spanish needles), Lantana camara, Coriander, Ocimum basilicum (Tulsi), Marigold, Plant disease management, organic practices, advantages of botanical pesticides, disadvantages of botanical pesticides

Unit-3 Bio-pesticides (Microbial)- Classification of biopesticides, Bacterial biopesticide, non-spore forming bacteria, spore forming bacteria, fungal biopesticide, beauveria bassiana metarrhizium anisopliae, verticillium lecani, mycoherbicide, viral biopesticide, culture of insect pathogens, bacteria, fungi, viruses, management of plant diseases, seed treatment, soil application, foliar application, seeding dip, soil drenching, usage in the nursery bed, advantages of biopesticides, disadvantages of biopesticides, precautions while using the bio-pesticides.

Unit-4 Bio-control Agents- Biological control procedures, introduction, mass rearing and release, conservation and encouragement, Biological control agents, Predators, parasitoids, pathogen, criteria of a successful bioagent, advantages of bio-control agents, some classical examples of biogents,

COF- 03: Inspection and Certification of Organic Produce

Block-01: Documentation and Documentation Control

Unit-1 Development of Internal Control System (ICS)- Concept of group certification, constitution of grower group as per NPOP, Importance of Internal Quality System (IQS), Internal Control System (ICS), Definition and concept, basic steps for development of ICS, Implementation of ICS, Preparation of ICS Manual, Organization and work distribution among the ICS personnel, conflict of Interests, Scope of certification and trade, Procedures for implementation of internal control system (ICS), registration for new members, provision of documents to the members of the grower group, Operating document, Critical control points of Risk Assessment by the external certification body, Internal inspection, external inspection, Yield Estimates, Internal Approval, Non- compliance and Sanctions, Training of IQS/ICS personnel and Farmers, Additional Procedures, Role of service provider in ICS

Unit-2 Quality Management of Certification Body- Concept of Quality system, Definition, preparation of quality manual and its importance, different components of quality manual, Main features of quality manual, Policy, organization, Documents/Records, Quality Management and Internal Review, Internal Audit.

Unit-3 Third Party Verification/ Certification- Concept of third party verification, what is third party verification in organic production, Certification procedure, key steps in certification process, merits of certification, certification of small farmer groups (group certification), Accreditation process and evaluation, accreditation of third party certification, Need for certifying agencies to get accreditation, major criteria for accreditation of a certification agency, certificates of conformity, scope certificate, transaction certificate, Group certificate.

Unit-4 Formats for Documentation- Documents to be Maintained by farmers, farm and field maps, field history register, Input record, Harvest record, Storage Record, Sales Record, Pest control Record, Labeling Records, Soil Testing Record, other additional documents required at farm level, format for different certificates and request for issue, livestock records, formats for group certification.

Block-02: Farm Inspection and Certification Procedure

Unit-1 Procedures of Inspection- Critical Control Points- General concept about Inspection, basic of inspection, requirements for inspection, key steps in the inspection procedure, check lists for inspection, HACCP and Critical Control Points (CCP), General Introduction to HACCP and CCP, organic critical control points (OCCP) at different stages, Risk assessment, organic crop protection strategies, submission of inspection report.

Unit-2 Chain of Custody- Chain of custody and relevant guidelines, definition and concept, IFOAM Guideline on certification scope and chain of custody, NPOP guidelines on chain of custody certification.

Unit-3 Certification Trademark- Description of organic certification trademark (India organic logo), Grant of licence for the use of Logo, Application for licence, Grant licence, Terms and conditions of the licence, Termination/ Cancellation of the licence, significance of the certification trademark.

Unit-4 Checklists for farm inspection and certification- Importance of checklist, why checklists are necessary? What are the areas to be considered for checklist, Checklists and its uses, checklist as an inspection, tool, checklist for organic farm inspection, checklist required for grower group, checklist required for wild harvest, checklist on handling/processing, checklist for animal husbandary.

Block-03: Practical Manual

Exercise- 1 Visit to Study of Grower Group- Study Guide, Procedure, Principle, Requirements, steps, Observation and results, Precautions, Report Preparation and Submission.

Exercise – 2 Study on Internal Control System (ICS)- Study Guide, Procedure, Principle, Requirements, steps, Observation and results, Precautions, Report Preparation and Submission.

Exercise -3 Visit to Certified Organic Farm- Study Guide, Procedure, Principle, Requirements, steps, Observation and results, Precautions, Conclusion, Report Preparation and Submission.

COF-04: Economic and Marketing of Organic Produce

Block-1: Economics of Production

Unit-01 Cost of Production system-including benefits cost ratio- Benefits-Cost Ratio, Definition, Cost components, comparison between organic and conventional Production system, Economics of Organic farming, assessment of economic Viability, Economics viability under conversion stage, Role of organic inputs in the economics of organic farming, Case study with different crops, calculation of BCR, Adoption of Organic Farming by the Farmers, Profitability against Net Return

Unit-02 Government Schemes and Other Financial Resources- National Programme for Organic Production, Schemes of Ministry of Agriculture (MoA) Govt. of India, Background, Components of the Scheme, Eligibility, Scheme of organic farming under National Horticulture Mission, background, components of the scheme, Eligibility, Scheme on Capacity building for organic Products, other financial resources.

Block-2: Markets and Marketing

Unit-01 Basics of Marketing of Organic Produce- Markets- Concepts and Classification, Definition of market, Classification of Markets, channel of distribution and role of middlemen, Understanding the marketing process, Marketing of Agricultural Products, Marketing of Organic produce, Current status of world organic market, organic market in India, Limitation of organic market in India.

Unit-02 Marketing Channels and Agencies for Organic Produce- Concept of marketing channels and agencies; what are the marketing channels?, Role of Marketing Intermediaries, Channel Functions and Flows, marketing channels for agricultural Produce, Market Status of organic Produce, World Scenario of marketing organic Produce, Demand drivers for sale of organic produce, organic market in India, Markets for organic foods in India- A survey Report, Case study for supply chains for different organic produce (Rice, Fruits and vegetables, Cotton, Spices, Tea, Coffee), role of trade fair in trading organic produce.

Unit-03 Basic Marketing Function- General concepts about marketing Functions, Definition of marketing function, Importance of marketing functions, Classification, market functions and their roles, function of exchange, physical distribution, facilitating functions, market functions for organic products.

Unit-04 Marketing Informatics- Market information system and its Importance, concept of marketing information system (MIS) and its role, understanding on different type of information, marketing research and its task, role of survey methods in data collection and its tools, Analyzing the data and interpretation, Needs of marketing information on organic farming, collection of preliminary information, scope of using secondary data, relevant information on organic farming and its market.

Block-03: Practical Manual

Exercise- 1 Visit to Certified Organic Outlets- Study Guide, Procedure, Principle, Requirements, steps, Observation and results, Precautions

Exercise – 2 Project Formulation- Study Guide, Procedure, Principle, Requirements, steps, Tips and caution for preparing a good project.

Diploma Programme Detail Syllabus

Diploma in Watershed Management (DWM)

Detailed Course Structure:

This programme has been developed by IGNOU in collaboration with the Department of Land Resources, Ministry of Rural Development, Govt of India. School Board of Agricultural Sciences of UPRTOU has proposed to run this programme as such keeping in view the uniformity of syllabus in open universities. However the practical and projects will be based on the local conditions of UP state. In beginning the study materials of IGNOU is proposed to be used to start the programme else the books available in market will be used.

Diploma in Dairy Technology (DDT)

DDT-01: Milk Production and Quality of Milk

Block – 01 Dairy Development and Cooperative System :

Unit – 01 Dairy Development in India- Dairy Development in Pre-Independence Period, Dairy Development from 1947-1970, Government Projects, Non Government Organisation, Councils, Institutes and Association, International and Foreign Agencies, Dairy Development from 1970 onwards, Dairying through co-operation flood, Technology Mission on Dairy Development, BAIF Development Research Foundation, Present Position of Dairying in India, Production and Import of milk power, Milk Production, Per Capita Availability of Milk, Growth Pattern of Livestock Population.

Unit – 02 Dairy Co-operatives – History of Co-operatives, Principal of Co-operatives, Open and Voluntary membership, Limited Return of Equity, Democratic Governance, Equitable Distribution of Surplus, Co-operatives among Co-operatives, Co-operatives Education, Indian Co-operatives Societies Act, Co-operatives Movement in India, Anand pattern Co-operatives, Co-operatives in Dairy Development, Three Tier Structure of Dairy Co-operatives, Milk Federations, National Co-operative Dairy federation in India, National Milk Grid.

Unit – 03 Government Policies and Incentives – Vision and Mission of the Dairying, Schemes for development of Dairying, intensive dairy development programme, Strengthening Infrastructure for quality & Clean Milk Production, Assistance to Co-operatives, National Project cattle and buffalo breeding, Incentive schemes for farmers, Youth and Entrepreneurs, Dairy/Poultry Venture Capital Fund, Livestock Insurance Scheme, Other Scheme for Dairying.

Block – 02 Milk Production.

Unit – 01 Milch Breeds – Milch Breeds of Cattle, Indigenous milch and Dual-purpose breed, Exotic Dairy cattle breeds, Synthetic crossbred cattle strains, Breed improvement in Cattle, Milch Breeds of Buffaloes, Breed improvement in Buffaloes, Milch breeds of Goats, Indigenous goat breeds, Exotic Dairy goat breeds, Breed improvement in goat.

Unit – 02 Animal Husbandry Practices and Healthcare- Management of Down Calvers and calf Raising, Care and Management of Down Calver cows and buffaloes, Care and management of calf at the time of birth, Management and Feeding Practices for growing Calves, Heifer management and Feeding Practices, Breeding management of dairy animals, sexual maturity and onset of Estrus cycle, symptoms of heat and heat detection, Artificial insemination and time of

breeding, Management and feeding practices for milking cows and buffaloes, Healthcare practices of Dairy Animals, signs of Ill health, common diseases and their control measures, vaccination for the prevention of diseases.

Unit – 03 **Clean Milk Production-** Concepts of Clean Milk Production, Significance of Clean Milk Production, Factors affecting Clean Milk Production, Animal management at farm level, Somatic cell counts (SSC) cleanliness of milking equipment and Utensils, hygienic milker and milking practices, proper storage and transportation, Strengthening Infrastructure for quality and Clean Milk Production, strategies to improve the quality of milk, Present status of Clean Milk Production in India, Constraints in Adoption of Clean Milk Production.

Unit – 04 **Milk Procurement and Modes of Payment -** Milk Disposal Pattern, milk marketing systems, Milk Procurement, Direct system, Agent system, Contractor system, cooperative system, Feeder/Balancing plants, State milk grid and national milk grid, Economics of milk procurement, milk transportation cost, milk chilling cost, pricing of milk and modes of payment, Pricing on fat content, pricing on the species source, pricing on the basis of a minimum fat percentage plus premium for fat, pricing of total milk solids, two axis pricing of milk, pricing of products for sale.

Block – 03 **Fundamentals of Dairy Chemistry**

Unit – 01 **Milk Composition, its Constituent and Nutritional Importance-** Milk composition, milk constituents, Factors affecting the composition of milk, Flavours and off- flavours related to milk, Nutritive value of milk.

Unit – 02 **Physico-chemicals Properties of Milk-** Density and specific gravity, Viscosity, Surface tension, Refractive index, freezing point, boiling point, specific heat, acidity, pH, buffering action, oxidation-reduction potential, Electrical conductivity.

Unit – 03 **Thermal Processing of milk-** Heat processing of milk, effect of heat on milk, freeze processing of milk, enzymes in relation to processing

Unit – 04 **Preservatives, Neutralizer and Adulterants in Milk and their Detection-** Preservative, Neutralizers, Adulterants.

Block – 04 **Fundamentals of Dairy Microbiology**

Unit – 01 **Introduction to Dairy Microbiology-**Microorganisms found in milk, bacteria, fungi, viruses

Unit – 02 **Milk in Relation to Public Health-** Bacterial Pathogen, Fungal pathogen, viral pathogen.

Unit – 03 **Factors Affecting Growth of Micro-organisms -** Nutritional Factors, Microbial growth, Growth curve, nutritional requirements of cells, culture media for the growth of bacteria, physical and environmental requirements for microbial growth, oxygen, pH, temperature, water availability, osmotic pressure.

Unit – 04 **Control of Microbial Spoilage -** Prevention of contamination before processing, clean milk production, prevention of microbial adhesion, preservation on milk/milk products, refrigeration, thermisation, pasteurization, sterilization, irradiation, chemical preservation, Activation of inhibitory substance present in milk, preservation through water removal, concentration, dehydration, protective packaging of dairy products, novel preservation techniques, hurdle technology.

DDT-02: Dairy Equipments and Their Maintenance

Block – 01 Dairy Equipments and their Maintenance:

- Unit – 01** **Materials, their Characteristics and Selection of Equipments** – Types of materials, Properties of materials, corrosion and its prevention, choice of materials, selection of milk handling and processing equipment, selection of utilities.
- Unit – 02** **Dairy Equipments for Fluid Milk Processing-** The dairy plant, milk collection or chilling centre, milk reception and storage, pasteurizer and sterilizer, homogenizer and centrifuges, packaging and filling, clean-in-place (CIP) cleaning system
- Unit – 04** **Preventive Maintenance of Dairy Plants and Machineries** - Principles of preventive maintenance, development of plant maintenance programme, guidelines for effective lubrication, care and cleaning of SS Surface, care of pipes and fittings maintenance of rubber and gaskets, Dairy building sanitation.
- Unit – 03** **Dairy Equipment for Products Processing-** Butter and cheese making equipment, Ice-cream making equipment, evaporators and Dryers, Ghee making equipment, khoa making equipment, dahi and lassi making equipment, Paneer, chhana & casein making equipment.

Block – 02 Refrigeration Systems:

- Unit – 01** **Basic Principles & Components of Refrigeration** -Basic Principles of vapour compression Refrigeration System, major Components of vapour compression refrigeration machine, refrigerant compressor, condensers, expansion valves and control devices, evaporators, selection of refrigerant.
- Unit – 02** **Different Cooling Systems for Milk and Milk Products-** Farm milk coolers, chilled water supply system in a dairy plant, refrigerated storage for milk & milk products, Ice cream Freezers.
- Unit – 03** **Cold Storage & Insulation-** Principles of cold storage, components of a cold storage, design considerations, rating of insulation, properties of insulating materials, Types of insulating materials, insulation application & management.
- Unit – 04** **Maintenance & Repair of Commercial Refrigeration Systems-** General check up of a Refrigeration Plant, Preventive maintenance of compressor and checking its general efficiency, Preventive maintenance of condenser and evaporators, Preventive maintenance of controls of refrigeration system, Common problem and remedies in a commercial refrigeration plant.

Block – 03 Steam Generation and Boilers

- Unit – 01** **Basic Principle of Steam Generation and Different Types of Boilers-** Formation of steam, different types of steam, heat content of steam, steam boiler, different types of steam boilers, operating a steam boiler.
- Unit – 02** **Control and Safety Devices of Boilers-** Boiler mountings and Accessories, boiler safety mountings, boiler control mountings.
- Unit – 03** **Steam Supply Line Accessories and Energy Conservation-** steam line system in a dairy plant, steam line expansion bends and joints, steam traps, steam strainer, steam pipe line insulation, care and maintenance of steam lines, energy conservation principles, energy conservation accessories in a steam boiler.

Unit – 04 Instruments for Measuring of Process Parameters- Purpose of measurements, measuring temperature of fluids, measuring pressure of fluids, measuring of flow of fluids.

Block – 05 Water Supplies and Dairy Effluent System:

Unit – 01 Tube Well, Water Storage System- source of water supply, classification of wells, construct of a tube well, water yield of a well, types of pumps, water storage, water distribution systems.

Unit – 02 Water Qualities, Water Treatment and Purification- physical, chemical and biological characteristics of water, hardness of water, water purification, water softening, treatment of boiler feed water, demineralization of water, water disinfection.

Unit – 03 Waste Water Treatment, Reuse and Disposal- Characteristics of dairy Effluent, Reducing Waste and Wastewater in a dairy Plant, Reducing Waste and Wasterwater in a Dairy Plant, Pretreatment of dairy Effluents, Aerobic and Anaerobic Biological Treatment, Aerated lagoon, Trickling Filter, Rotating Contactors, Activated Sludge Process, Upward Anaerobic: Sludge Blanket (UASB) Process, Wastewater Reclamation and Reuse, Effluent Disposal.

Unit – 04 Water Conservation and Rain Water Harvesting- The hydrologic cycle, watershed and water conservation, rain water harvesting, advantages of rain water, how does a rain water harvesting system work? How much water can you collect? Materials of construction of rain water harvesting system, water conservation in a dairy plant.

Diploma in Dairy Technology (DDT) -03

Paper – III Milk Processing and Packaging

Block – 01 Milk Reception:

- Unit – 01 Milk Collection and Transportation-**Planning milk collection, organizing milk collection, containers for milk collection, transportation of raw milk.
- Unit – 02 Milk Receptions at the Dairy Dock-** layout of reception dock and equipment, reception of milk, laboratory testing of milk samples, chemical tests, microbiological tests, cleaning and sanitization of milk cans and tankers.-
- Unit – 03 Milk Chilling and Storage-** Chilling of milk, chilling of milk, storage of milk

Block – 02 Processing of Milk:

- Unit – 04 Clarification, Separation, Bactofugation and Standardization-** Filtration and clarification of milk, Separation of milk, methods of separation, factors affecting the skimming efficiency, factors affecting yield and fat content of cream, other centrifugal processes for milk, bactofugation, clarifixation, standardization of milk, standardization of milk for fat, standardization of milk for fat and SNF.
- Unit – 05 Pasteurization-** Definition and purpose of pasteurization, time-temperatuer combination, purpose, Theory of pasteurization, limiting factors for heat treatment, types of heat treatment, batch pasteurizer, HTST Pasteurizer plant and its components, flow diagram of pasteurization plant, plate heat exchanger, instrumentation, Operation of pasteurization plant, starring the plant, shut down of the plant, cleaning and sterilization of the plant, pasteurization of milk, trouble shooting, preventive maintenance, test for pasteurization efficiency.
- Unit – 06 Homogenization-** Homogenization, advantages and disadvantages of homogenized milk, viscolised milk, design and operation of homogenizers, high pressure homogenization technology, vacuum homogenization, checking the efficiency of homogenization, influence of process variables on the processing efficiency and product quality, factors affecting homogenization efficiency, effect of homogenization on milk properties, problems/defects associated with homogenized milk.
- Unit – 07 Sterilization and Ultra-High-Temperature Processing-** Sterilization, definition, theoretical basis, types of sterilization plants, description of the canning process, quality of sterilized milk, Ultra high temperature processing, Theoretical basis for UHT processing, Types of UHT sterilization plants, changes in milk during processing, changes in milk during storage, aseptic package, types of sterilizing medium, types of package materials description of aspect packaging systems.
- Unit – 08 Preparation of Designated and Special Milk-** Full cream milk, Definition and standards, toned milk and double toned milk, History, preparation, standardized milk, advantages, skim milk, composition, utilization of skim milk for making different dairy products, recombined milk, reconstituted milk, flavoured milk.

Block – 03 Packaging and Distribution:

Unit – 09 Packaging- Materials, Process and Machines – Packaging materials used for fluid milk, Single use packaging materials, Multiple use packaging materials, Materials used for bulk supply, Process for packaging fluid milk, Machinery involved in packaging fluid milk

Unit – 10 Operational Details of Common Packaging System for Fluid Milk - Packaging in multi-use-containers, Bottle fillers, bottle cappers, bottle washers, Packaging in single service pouches, Packaging long life milk.

Unit – 11 Storage and Distribution System:-Storage of processed milk, storage of bulk milk, storage of milk packed in multiple use packages, storage of milk packed in single use packages, Distribution of processed milk, Distribution of bulk milk, Distribution of milk packed in multiple- use packages, distribution of milk packed in single use packages, comparison of bulk and retail sale of milk.

Block – 04 Cleaning and Sanitization:

Unit – 12 Types of Detergents and Sanitizers– Choosing the appropriate detergent, Cleaning process, Cleaning Agents, Sanitation in Dairy plants, Radiation, Chemical Sanitizers, Factors affecting efficacy of sanitizers.

Unit – 13 Methods of Cleaning and Sanitization- Cleaning and sanitization, Cleaning methods and considerations, sanitization methods, factors and applications, Important Instructions for use of Detergents and Sanitizers, Assessment of Effectiveness of cleaning and Sanitization

Unit - 14 Types of Can Washers and their Operational Details- Working of can washers, Types of can washers, can scrubbers, can steaming block, rotary can washers, straight through can washers.

Unit - 15 Cleaning – in- Place (CIP)- Procedure of cleaning in place process, Preparation and supply of cleaning solution, features of CIP system, sanitization in CIP process, Important instructions and precautions for CIP system.

Diploma in Dairy Technology (DDT) -04
Paper – IV Dairy Products – I

Block – 01 Cream:

- Unit – 01 Definition, Composition, Standards and Processing of Cream-** Definition and classification, Composition of cream, Standards, Nutritional Value, principal of separation, gravity method, mechanical method, Types of centrifugal cream separators, factors influencing fat percentage in cream, fat losses in skim milk, yield of cream and skim milk, separator slime and its composition, processing of cream.
- Unit – 02 Preparations of Different Types of Creams -** Sterilized Cream, Plastic Cream, Frozen Cream, Sour Cream, Whipped Cream, uses of Cream, Composition and standards.
- Unit – 03 Packaging, Storage and Common Defects in Cream-** Definition and packaging requirements, Packaging and storage, defects in cream and their control, flavor defects and control measures, body and texture defects.

Block – 02 Butter:

- Unit – 01 Definition, Standards and Principles of Butter Making –** Definition and classification, composition and Nutritive value, Standards, Principle of butter making, churning and its theories, butter churns, continuous butter making, other methods of manufacture, uses of butter.
- Unit – 02 Methods of Manufacturing of Butter -** Methods, Desi butter, Creamery butter, Cooking butter, table butter, over-run, yield of butter , Butter milk, continuous butter making machine.
- Unit – 03 Packaging, Storage and Common Defects in Butter-** Packaging materials, Packaging machinery, Packaging forms, storage of butter, common defects in butter and their control, Flavour defect, Body defect, colour defect.

Block – 03 Ghee, Butter Oil and Low Fat Spreads

- Unit – 01 Definition, Composition, Standards and of Ghee and Butter Oil-** Definition of ghee and butter oil and their benefits, composition of ghee and butter oil, Nutritive value of ghee and butter oil, analytical constants of ghee, factors affecting composition and analytical constant of ghee, standards of ghee and butter oil, grading of ghee.
- Unit – 02 Principles and Methods of Manufacturing of Ghee and Butter Oil–** Principal of manufacture of ghee and butter oil, methods of manufacture of ghee, Indigenous Method, Direct cream method, Creamery butter method, pre-stratification method, continuous method, comparison of different methods of ghee making, methods of manufacture of butter oil, setting up of ghee refinery, Definition of a fat spread, classification of fat spread, Salient feature of low fat spreads, ingredients of low fat spreads, principal and methods of manufacture, packaging and shelf life of table spreads.
- Unit – 03 Packaging, Storage, Keeping Quality Extension and Adulteratin of Ghee -** Packging of ghee and butter oil, storage and defects of ghee and butter oil, market quality and regional preferences for ghee, keeping quality of ghee and butter oil, adulteration of ghee.

Unit-04 **Low Fat Spreads-** Definition of a Fat Spread, Classification of Fat Spread, Salient Features of Low-Fat Spreads, Ingredients of Low Fat Spreads, Principles and Method of Manufacture, Packaging and Shelf life of table Spreads

Diploma in Dairy Technology (DDT) -05

Paper – V Dairy Products – II

Block – 01 Heat Desiccated Products

Unit – 01 Definition, Composition and Standards of Khoa, Rabri and Basundi- Classification of traditional dairy products, khoa; standards, chemical composition of khoa, factors affecting composition of khoa, Rabri, Basundi, Nutritive value of heat desiccated dairy products, physico-chemical changes during heat desiccation of milk.

Unit – 02 Methods of Manufacturing and Factors Affecting Quality of Products – Principal of manufacture of khoa, rabri & Basundi, Preparation of khoa, Factors affecting quality and yield of khoa, mechanized and continuous methods of manufacture of khoa, preparation of rabri, preparation of basundi.

Unit – 03 Khoa Based Sweets - Burfi, Peda, Gulabjamun, Kalajamun, Kalakand, Milk cake, Kunda,

Unit – 04 Packaging, Shelf Life and Storage of Khoa and Khoa Based Sweets – Packaging of heat desiccated products; Packaging of khoa, packaging of rabri and basundi, Packaging of khoa based sweets, Shelf life of heat desiccated products, factors affecting shelf life, extension of shelf life of khoa, extension of shelf life of rabri and basundi, extension of shelf life of khoa based sweets, storage and defects of heat desiccated products, storage of khoa and khoa based sweets, defects in khoa and khoa based sweets.

Block – 02 Paneer and Chhana:

Unit – 01 Definition, Composition, Standards and Factors affecting of Paneer and Chhana- definition of paneer, standards of paneer, chemical composition of paneer, factors affecting quality of paneer, chhana, standards of chhana, chemical composition of chhana, factors affecting quality of chhana.

Unit – 02 Methods of Manufacturing of Paneer and Chhana - types of chhana, yield of paneer and chhana, packaging and storage of paneer and chhana.

Unit – 03 Chhana Based Sweets – Rasgulla, Definition and Methods manufacture of sandesh, Definition and Methods manufacture of Rashmalai, Definition and Methods manufacture of chhana murki.

Unit – 04 Packaging, Storage, Common Defects, Shelf Life and Preservation of Paneer and Chhana- Packaging of Paneer, Packaging of Chhana, Packaging of Chhana Based Sweets, Microbiological quality of paneer, Microbiological quality of chhana, Microbiological quality of chhana based sweets, defects in paneer and chhana, shelf life and preservation.

Block – 03 Concentrated Milks:

- Unit – 01 Definition, Standards, Nutritive Value and Principle of Evaporated-** Brief history & development, Definition, composition, standards, Nutritive value, Physico- chemical properties, Principle of evaporation, types of evaporator.
- Unit – 02 Methods of Manufacturing and Uses of Sweetened, Condensed and Evaporated Milks-** Manufacture of Sweetened condensed milk, Manufacture of Evaporated milk, plain condensed milk, super heated condensed milk, frozen condensed milk.
- Unit – 03 Packaging, Storage and Common Defects in Condensed Milks-** Packaging, storage, Judging and Grading, Defects their causes and preventive measures, Uses of Milk.

Block – 04 Dried Milks

- Unit – 01 Definition, Composition, Classification, Standards and Principles of Drying-** Definition classification and composition of dried milks, standards of dried milks, standard of malted milk foods, infant milk food and infant formula, standard of dairy whitener, principles of drying
- Unit – 02 Engineering Aspects of Roller Drier, Spray, Drier, Fluid Bed Drier and Tray Drier-** Roller driers; Classification, Description, Flow of product, factors affecting production, Spray driers; Spray drying process, atomization, movement of air, basic drying installations, Fluid bed driers; back mix flow fluid beds, plug flow fluid bed dryer, contact fluidizers, batch fluidized bed dryer, multi-tier fluid beds, Instanization process; pebbles process, cherry burell process, blow Knox process, niro/anhydro agglomerator, Tray drier.
- Unit – 03 Methods of Manufacture of spray and Roller dried milk power and Value Added Products-** Production of Milk power, manufacture of spray dried milk power, manufacture of roller dried milk power, malted milk food, infant milk food and infant formula, dairy whitener.
- Unit – 04 Packaging, Storage, Quality Attributes and common defects of dried milks-** Packaging of dried milks, packaging of infant foods, packaging of malted milk foods, packaging of dairy whitener, storage of dried milk, common defects of dried milks.

Diploma in Dairy Technology (DDT) -06

Paper – VI Dairy Products – III

Block – 01 Fermented Product:

- Unit – 01 Starter Cultures and Nutritional Importance of Fermented Milks –** Role of starters in fermented products, Types of starters, classification of starters, factors affecting fermentation process of starters, Preparation of starters, methods of propagation and production of starters, maintenance and preservation of starters, fermented milks, types of fermented milks, nutritive value.
- Unit – 02 Methods of Manufacturing of Fermented Dairy Products-** Dahi, Mishti dahi, shrikhand, lassi, yoghurt.
- Unit – 03 Packaging, Storage and Common Defects of Fermented Milk Products-** Packaging protective function of packs and requirements, Packaging materials, Storage and keeping quality of fermented milks, factors affecting the keeping quality of fermented milks (yoghurt), defects of fermented milks, enhancing the self life of fermented milk products.

Block – 02 Cheeses:

- Unit – 01 History, Definition, Composition and Classification -** Definition, Composition, Classification, nutritional and therapeutic value, growth pattern.
- Unit – 02 Principles and Method of Manufacturing of Cheddar Cheese-** Equipment and raw material, Principles of cheese manufacture, method of cheese manufacture, packaging of cheese, ripening of cheese, defects, buffalo milk cheddar cheese.
- Unit-03 Principles and Method of Manufacturing of Mozzarella Cheese-** Methods of Manufacturing of Mozzarella Cheese, Method of Manufacturing of Mozzarella Cheese by direct acidification, chemistry of “Stretch” of Mozzarella cheese, packaging, Defects in cheese, use of milk of other species.
- Unit-04 Principles and Method of Manufacturing of Pasteurized Processed Cheese products (Pcps) -** Definition and composition of process, ingredients used other cheese in pasteurized processed, manufacture of processed cheese, storage of packaged processed cheese, defects in process cheese.

Block – 03 Frozen Dairy Products:

- Unit – 01 Definition, Composition, Classification and Standards -** Definition, Composition, Classification, Standards ; Prevention of food adulteration Act, Bureau of Indian Standard.
- Unit – 02 Principle and Method of Manufacture-** Principle and method of manufacture, ingredients, preparation of Ice Cream mix, Pasteurization of Ice cream mix, Homogenization of mix, Cooling and Ageing of mix, freezing of mix, overrun in ice cream.
- Unit – 03 Packaging, Hardening, Storage and Transportation and Common Defects-** Packaging of Ice cream and Frozen Desserts, Hardening and storage, Transportation of Frozen Desserts, Sensory Attributes, Common Defects and their remedy.

Unit-04 Softy and Novelties- Definition, Composition, Legal Standards and Method of Manufacture- Legal Standards, Formulation of Soft Serve Ice cream, Composition, Manufacturing Procedures, Ice cream Novelties, Method of Manufacture, Chocolate Coating, Ice cream cakes and pies, Aufait ice cream, other Novelties, Cassata Ice cream, Chocolate Jam Sticks, Quiescently Frozen Stick items, Indigenous Frozen Dairy Products.

Block – 04 By-Milk Products:

Unit – 01 Skim Milk – Casein and Caseinates- Legal Standards, Acid Casein, Renet Casein, Yield, Caseinate, Uses of Caseins and Caseinates.

Unit – 02 Whey – Whey Powder, Lactose and Whey Protein Concentrates- Composition of Different Types of whey, Utilisation of Whey, manufacture of condensed whey and whey power, Chemical composition of whey power, storage of whey power, whey beverages and drinks, whey protein concentrates, Lactose.

Unit – 03 Butter Milk and Ghee Residues- Butter milk; Chemical Composition, Processing and drying of sweet cream buttermilk, Utilization of sweet cream buttermilk, Utilization of Desi and Sour cream buttermilk, Ghee Residue; Chemical composition, Nutritional Properties, Utilization of Ghee Residue.

Unit – 04 New Technologies in By-Product Utilization- Membrane filtration, Advantages of membrane process, limitations, Reverse Osmosis (RO), Principles of Reverse Osmosis, Typical Reverse Osmosis applications, Ultrafiltration (UF), Filtration modules, separation limits for membranes, Factors affecting the separation capacity of the membrane, Pressure conditions, Principles of Plant designs, Typical Ultrafiltration applications, concentration whey using ultrafiltration process, Nanofiltration (NF) Microfiltration.

Diploma in Dairy Technology (DDT) -07

Paper – VII Quality Assurance

Block – 01 Quality:

Unit – 01 Quality – Definition and Importance – Definition and Components of Food Quality, Function of Quality Control Unit, Quality Aspects of Milk and Milk Products, Quality Control Tasks in Dairy Industry

Unit – 02 Quality Control Management Systems- Food Hazards, Importance of Safe Food, Quality Control Management System, What is Quality Control Management System, Requirements of Quality Control Management System, Implementation of Quality Management System.

Unit – 03 Good Manufacturing Practices, Good Hygienic Practices and HACCP- Primary Production, Selection, Design, Structure and Facilities, Control of Operation, Management and Supervision, Personal Hygiene, Transportation, Product Information and Consumer Awareness, Training, Hazard Analysis Critical Control Points (HACCP)

Unit - 04 Laboratory Equipments and Instruments- General Purpose Equipments/ Instruments, Instruments for physical Properties, Microbiological Instruments/ Equipments, Modern/ Sophisticated Instruments, Milk Testing Equipments/ Instruments

Block – 02 Chemical and Microbiological Analysis of Milk and Milk Products:

Unit – 01 Rules and Regulations Governing Dairy Industry- Food Laws and Standards, National Quality Control Laws and Associated Institutions, International Institutions, Product Certification and Licensing.

Unit – 02 Sampling of Milk and Milk Products- Introduction, Sampling

Unit – 03 Chemical Analysis of Milk and Milk Products- Introduction, Test Methods

Unit- 04 Microbiological Analysis and Milk and Milk Products- Microbiological Test; Direct Microscopic Count (DMC) Method, Standard Plate Count (SPC) Method, Dye reduction methods, Coliform Test, Detection of Pathogens in Milk

Block – 03 Sensory Evaluation

Unit – 01 Definition, Application of Sensory Quality Parameters and Sensory Lab Requirements- Definition Importance and Uses of Sensory Evaluation, Sensory Receptors and Their Roles in Sensory Evaluation, Role of Primary Senses in Judging of Dairy Products, Requirements for Sensory Evaluation, Factors Affecting Sensory Evaluation.

Unit – 02 Selection and Training of Sensory Panelists and Methods of Sensory Evaluation- Types of Sensory Panelists, Screening, Selection and Training of Sensory Panelists, Sensory Methods, Consumer Evaluation, Sample Preparation for Training.

Unit – 03 Judging of Milk and Milk Products- General Scoring and Grading Guide, Sensory Evaluation of Milk, Sensory Evaluation of Ghee, Sensory Evaluation of Table Butter, Sensory Evaluation of Ice cream, Sensory Evaluation of Cheddar Cheese, Sensory Evaluation of Khoa, Sensory Evaluation of Dahi, Sensory Evaluation of Milk Powder

Block – 04 Packaging Materials and other Food Ingredients

Unit – 01 Packaging Materials, and Specifications- Packaging Materials, Standards and Quality Aspect

- Unit – 02** **Testing of Packaging Materials-** Sampling Plan, Conditioning of Test Specimen, Types of Tests of Packaging Materials, Testing of Rigid Packaging Materials, Testing of Semi rigid Packaging Materials
- Unit – 03** **Standard for Food Ingredients-** Definition and Classification, Colouring Matters, Acidulants, Sweeteners, Antioxidants, Chemical Preservatives, Emulsifiers and Stabilizers, others (Salt, Silver, Leaf, Lecithin)
- Unit – 04** **Testing of Food Ingredients-** Colouring Matters, Acidulants, Sweeteners, Antioxidants, Emulsifying and Stabilizing agents, Preservatives, Flavouring agent.

Course Code: DDT – 08

Block – 01 Dairy Plant Management:

- Unit – 01 Milk Losses** – Milk Losses in Dairy Plants; Presnet scenario of milk handling losses, losses during various stages of processing, indetification of milk losses, factors responsible for milk Losses, Controlling of Milk Solids Losses; Accounting of milk losses, modernization process, fixing frequency of equipment clearing, regular monitoring, continual improvement techniques, utilization of by-products, Implementing clean production or EMS techniques, Monitoring the Milk Losses; Check list for independent monitoring
- Unit – 02 Managing Productivity** – Managing Productivity, Sizing of Process Equipment, Computer Application in Dairy Industry.
- Unit – 03 Human Resorucs (Manpower Planning for the Dairy/ Plant)-** Human Resource Planning; Functional Requirements of plant, organization structure, factors affecting human resource deployment, manpower quality aspects, determining manpower strength, manpower planning for shift, Optimizing Use of Human Resource; Leadership, Motivation concepts, Skill enhacement, management of resistance to change, effective communication, effective coordination.
- Unit – 04 Dairy Plants Design and Layout-** Classification of Dairy Plant, Planning considerations for dairy plant, Site location, Estimation of plant Equipment, Design of establishment, Plant Layout

Block – 02 Book-Keeping and Accountancy:

- Unit – 01 General Principles of Book Keeping and Accountancy Single and Double Entry System-** Accounting- an exposition, Generally accepted accounting principles, Book keeping and accountancy, Accounts- Their Construction, single and double entry system.
- Unit – 02 Maintenance of Accounts and Working Capital Management-** Purpose of Accounting Information, Accounting and Working Capital Management, Concepts and Neet for working capital, Importance of working capital management, factors determining working capital measuring working capital, sources of fincancing working capital, approaches to managing working capital.
- Unit – 03 Product Costing-** Basic Cost Concepts, Types of Costing, Methods of Costing, Classification of Costs, Cost Measurement, Case Study on Product costing in a dairy plant.

Block – 03 Marketing and Logistics Management:

- Unit – 01 Fundamental of Marketing, Understanding Consumers, Market Survery, Sales Forecasting-** Marketing- A perpective, Mapping out Marketing Strategy and Developing a marketing plan, Managing Product life cycle, the buying process, product pricing and market dynamics-criticality of pricing the product/ service correctly, promotion, distribution channel management, Designing and using market research Effectively, Measuring customer satisfaction.
- Unit – 02 Concept in Price and Cost Analysis-** Setting the price, Selecting the price objective, Determining Demand, Estimating Costs, Analyzing

competitor's Prices and offers, Selecting the price/ quality/ value equation. Selecting a pricing method, Selection the Final Price, Responding to market changes.

Unit – 03 **Market Information Systems and Logistic Planning-** Marketing Information Systems, Sales Reporting Mechanism, Marketing Decision Support System, Logistics – Planning.

Block – 04 Entrepreneurship and Organization Building:

Unit – 01 **Entrepreneurial Skill and Delegation-** Must have skills for entrepreneurs, Delegation, Advantages of Delegation, Delegation-Responsibility and Authority, Delegation- Tasks.

Unit – 02 **Development of Business Plan-** Why is business plan needed?, Main components/ parts of a business plan, business description, manpower requirement, operations and location, marketing, Finance.

Unit – 03 **Managing and Operating a Small Business-** Challenges of Operating a small business, Key factors in Managing a business, Managing Growth, Managing Downturn, Disaster Planning and Recovery.

Unit – 04 **Performance Evaluation of a Small Enterprise-** Planning, Performance Measurement, Performance Control, Tools and Techniques of Controlling.

Diploma in Value Added Products from Fruits and Vegetables (DVAPFV)

DVAPF-01 - FUNDAMENTAL OF FOOD

Block-01 Introduction to Food Science and Technology :

- Unit-01 Introduction to Food Science** – Definition of food, constituents of food, properties and their significance, Food chemistry: Moisture, carbohydrates, proteins, lipids, vitamins, minerals and phyto-chemicals, Nutrition and Digestion, Food Spoilage and its effects, Recent trends in food processing and preservation, New products and equipment.
- Unit-02 Food Processing Industries** – Food Production in India and World, Processing and value addition, Parts of food Industry, Trends in Consumption of processed food, Status of food processing in India, major food sectors, their status, problem and prospects, cereal processing, pulse processing, oilseed processing, livestock and aquaculture produce processing. National food processing policy.
- Unit-03 Food Laws and Associate Bodies-** Food laws and standards, Indian: PFA, FPO, MPO, BIS, AGMARK, International: AOCA, USDA, FDA, ISO, Codex Alimentarius, HACCP, GMP, Export Promotion Council, APEDA and MPEDA, Food Health Authority, NABL, FRAC, MFPI, Ministry of Health, Total Quality Management, Product Certificate & Licensing.

Block- 02 Characteristics of Edible Horticultural Products:

- Unit-04 Food Grains, Pulses and Oil Seeds-** Production and Importance, Structure and Composition, Post harvest losses, Physical and Thermal Properties, Water Activity, Cleaning and Grading, Parboiling, Conditioning and drying, Grain milling and oilseed crushing, Grain storage, Value Added product Utilization.
- Unit-05 Food and Vegetables -** Production and Importance, Type of Fruits and vegetable, composition and food vegetables, Cultural Practices, Pre-harvest Treatment, Safe Harvesting, Post harvest management, Transportation, Processing of fruits and vegetables, by-product Utilization, Techno Economic Feasibility
- Unit-06 Dairy, Poultry, Meat and Fisheries-** Production and Economic Importance, Dairy, Poultry, Meat, Fisheries
- Unit-07 Commercial Crops, Spices, Medicinal and Aromatic Plants-** Commercial Crops (Sugarcane and Cotton) Spices (Chilli, Cardamon, Pepper, Tamarind, Turmeric and Ginger) Medicinal and Aromatic Plants.

Block-03 Nutrition:

- Unit-08 Nutrition Aspects -** Scope and Importance, Need for Energy, Basal Energy Metabolism, Energy Value of Foods, Nutritive Value of Foods, Food Pyramid, Dietary Allowances, Standards and Balanced Diets for different Age Groups. Techniques for Assessment of human Nutrition, Nutritional Labelling.

Unit-09 Food for Growth and Maintenance – Importance of food for growth and sustenance, Food Structure, Texture, Colour, Keeping, Quality, Degradation of Nutrients, Colour Pigments and microorganisms during, thermal processing and storage, Permitted Colours, Health food, Green/Organic Traditional Foods, Designer Foods, Packaging for Safety and Quality.

Unit-10 Loss of Food Values in Fresh Produce and Processed Products- Assessment of Loss, Factors Causing Spoilage: Physical, Physiological, Thermal, Microbial, Chemical, Insects, Pests Diseases. Post harvest/ Slaughter – biochemical Changes, Handling and Transport, cold Storage, Protection and Preservation Techniques, Evaporative Cooling and storage.

Unit-11 Anti Nutritional Factors, Food Contaminants and Toxic Elements – Anti Nutritional Factors, Contamination of food by Microorganism, Pathogens, Food Intoxicants, Mycotoxins, Food Poisoning and Food Infections, Food Borne Diseases, Methods of Preventing Food Contamination, Deficiency: Protein, Vitamin and Mineral – Consequences and Corrective Measures, Methods of Nutrient Retention during Processing and Storage, Food Analysis, Residue Analysis.

Quality Aspects:

Unit-12 Quality Characteristics- Physical Factors, Appearance Factors, Textural Factors, Kinesthetic Factors, Flavour Factors, Quality Standards, Quality Evaluation, Grading and Certification, Adulteration of Food- Detection and Prevention.

Unit-13 Deteriorative Factors and Their Control- Shelf life and dating of foods, Causes of food deterioration, Nutritional Changes in food Quality, Food Borne Disease, Food Allergies, Anti Microbial Agents used in Food, Enzyme Inactivation, Treatments, Hygiene and Sanitation.

Unit-14 Quality Assurance: Regulation, Codes, Grades and Standards- Food Safety Issues, Food Adulteration, Contamination and Their Detection, Quality Control, Grades, Standards, Enforcement of Food Laws, Testing of Samples, Residue Analysis.

Practical Manual- Experiment 1- Equilibrium Moisture Content (EMC), **Experiment 2-** Bulk Density, **Experiment 3-** True Density **Experiment 4-** Measurement of Fat/Oil **Experiment 5-** Crude Protein (total Protein) **Experiment 6-** Total Carbohydrates, **Experiment 7-** Free Fatty Acids (FFA)

DVAPF-02 Principles of Post-Harvest Management

Block-1 Need and Importance:

- Unit 1- Importance of Post Harvest Management-** Increase Food Availability, Nutrition Security, Employment Generation, Value Addition, Export Earning, Rural Industrialization, Beneficial to Producers and Consumers.
- Unit 2- Causes of Pre and Post Harvest Losses of Fruits and Vegetables-** Pre-harvest Factors in Post- harvest Losses, Biological Factors, Environmental Factors, Improper Handling, Packing, Storage and Transportation, Socio-Economic Factors.
- Unit 3- Maturity Indices and Harvesting Parameters-** Determination of Maturity, Maturity Indices of Commercially Important Fruits, Maturity Indices of Commercially Important vegetables, Harvesting.
- Unit 4- Transportation of Fresh Produce and Control of Losses-** Selection of Packaging Material, Functional and Properties of Packaging Material, Packaging Material for Vegetables and Root Crops, Cushioning Materials and Wrap, Pre-packaging.
- Unit 5- Transportation of Fresh Produce and Control of Losses-** Pre-operations and Treatments; Packaging house operation, Curing, Degreening, Pre-cooling, Washing, Drying, Grading, Sizing, Disinfestations Treatment, Factors Affecting Transportation of Fresh Produce, Modes of Transport, Loading and Unloading, Palletisation/ Unitization.

Block-2 Post Harvest Treatments:

- Unit 6- Cleaning Selection, Sorting, Grading and Packaging-** Cleaning, Washing, Dry Cleaning, Trimming, Selection, Sorting Equipment, grading, Grading Equipment, Optical Methods of grading, Manual Inspection and Grading, Packaging, Pre-packaging, Qualities of a package, Prevention of Mechanical Damage, Some Important Aspects, Packing Line
- Unit 7 Treatments: Pre-cooling Curing, Inhibition of Sprouting and Fungicide Application and Ripening–** Importance and Methods of Pre-Cooling, Role and methods of drying and curing, Effects of Sprouting and its Inhibition, Waxing and Surface Coating, Post harvest Disease Management and Fungicide Application, Control of Ripening.

Block-3 Storage and Marketing:

- Unit 8- Factors Affecting Storage Life-** Principal of Storage, Types of Storage Operations, Factors Affecting Storage Life.
- Unit 9- Storage Structure-** Refrigerated/ Cool Storage, Control/ Modified Atmosphere Storage, Ice band Cooler, Hypobaric Storage, Low cost Storage, Evaporative Cooling/ Pusa Zero Energy Cool Chamber.
- Unit 10- Market and Market Mechanization-** Concept and Definitions, role of Markets, Types of markets, Marketing Functions, Marketing Channels, The perfect Market Concept, Role of Middleman, Marketing Efficiency, Market Mechanization – Concept, Role and Scope.
- Unit 11- Market Information System-** Concept and Definition, Importance and Need of marketing Information System, Types of market Information, Agencies providing market

information, Components of marketing Information System, Lacunae in Market Information, How marketing Information can be improved.

Block-4 Processing and Preservation:

- Unit 12- Minimal Processing-** Advantages of Minimal Processing (MP), Perishability of MP, factors Affecting Quality, Packaging and Storage of MP Fruits and vegetables.
- Unit 13- Processing by Heat Application-** Effect of Heat on Texture and Composition, Effect of Heat on Microorganisms and enzymes, Role of Heat Application- Peeling, Juice Processing, Syrup/ Brine, Preparation & Filling, Blanching and Exhausting, Combination of Time, Temperature, pH/ Acidity, Role of Heat Application during Product Preparation.
- Unit 14- Drying and Dehydration of Fruits and Vegetables-** Theories of Drying and Dehydration, Advantages of Dried Fruits and Vegetables, Merits of Dehydration over Sun Drying, Factors affecting Dehydration, Pre-treatments for drying and drying of fruits and vegetables, Drying Rate, Drying and Reconstitution Ratio, Role of water Activity and its Importance in Dried Products, Common Types of Driers Used for Drying of Fruits and Vegetables, Ideal Condition for packaging and Storage of Dried Products, Drying Process for Fruits and Vegetables.
- Unit 15- Freezing-** The Freezing Point of Foods, Advantages of Frozen Fruits and vegetables, Quick and Slow Freezing, Pre-treatment Prior to Freezing, Freezing Technology, Packaging and Storage, Quality and Physical Changes in Frozen Foods, Storage and Transportation of Frozen Produce, Future Trends in Frozen Foods.
- Unit 16- Chemical-** Definition of chemical Additives (Food Additives), Functions of Food Additives as Preservatives, Types of Food Additives, Nutritional Additives, The Potential Use of Probiotics, Basis for Concern, Steeping Preservation, Preservation of Pulp, Juices, Sauces, chutneys, Purees and Pastes, Use of Chemicals during Curing of Pickles, Preservation of Whole Tomato Concentrate.

Practical Manual- Experiment 1- Assessment of Post Harvest Losses at Different Levels, **Experiment 2-** Demonstration of Value- Addition – by Post harvest handling and Packaging, **Experiment 3-** On Farm Storage- Pusa Zero Energy and cool Chamber **Experiment 4-** Solar Drying of Fruits and Vegetables, **Experiment 5-** Primary and Minimal Processing, **Experiment 6-** Extraction and Preservation of Pulp and Juices, **Experiment 7-** Preparation of Whole tomato Concentrate, **Experiment 8** – Utilization of Waste Generated during fresh Handling and Processing

DVAPF-03 Food Chemistry and Physiology

Introduction:

- Unit-1 An Overview of Food Chemistry** – What is food Chemistry?, History of food Chemistry?, Functions of Food Chemistry: Chemical composition of foods, Quality Changes in foods, Safety Evaluation of foods, Waste Management, Societal Roles.
- Unit- 2 An Overview of Food Physiology** – Morphological Characteristics, Post harvest physiology of fruits and vegetables, Structural Changes during growth and Ripening, Compositional changes during growth and ripening.

Block-02 Food Constituents:

- Unit- 3 Food Constituents – Carbohydrates and Lipids** –Carbohydrates : Occurrence, Nomenclature, Classification, Chemical Reactions of carbohydrates, Lipids : Occurrence and Classification, Fatty Acids, Properties of fats and oils.
- Unit- 4 Food Constituents** – Proteins, Enzymes and Water- Proteins: Amino Acids, Protein Classification, Protein Structure, Protein Denaturation, non-enzymatic browning, proteins from different sources, Enzymes : Nomenclature and Classification, Properties of Enzymes, Immobilised enzymes, Water: State of water, Water activity and food spoilage, Freezing of water, water quality and Standard, chlorination, Packaged drinking water, Water analysis.
- Unit- 5 Food Constituents – Vitamins and Minerals-** Vitamins, fat soluble vitamins, Water soluble vitamins, Minerals
- Unit- 6 Food Additives-** Preservatives, Antioxidants, Acidulants, Colouring Agents, Natural food colourants, synthetic colourants, flavouring agents, sweeteners, nutritive sweeteners, Non-nutritive sweeteners, Miscellaneous additives.

Block-03 Food Physiology-

- Unit 7 Ethylene Liberation and its control** – Sources of Ethylene, Uses of Ethylene, Ethylene as ripening inducer, Biogenesis of ethylene, Mechanism of ethylene action, Ethylene treatment systems, Control
- Unit 8 Growth, Maturation and Senescence-** Physicochemical changes during growth of storage organs, Mechanism of Nutrient Mobilization and Accumulation, Respiration and Respiratory climacteric, Climacteric and Non climacteric fruits and vegetables, Morphological and chemical changes during ripening and senescence.
- Unit 9 Physiological Disorders** – Physiological Disorder of tropical and sub-tropical produce, low temperature disorders- chilling injury, High temperature disorders, Disorders due to altered atmospheric Composition. Mineral deficiency disorders.

Block -04 Food Fermentation:

- Unit 10 Fermentation Method of Fermentation and Industrial Significance-** History of Food Fermentations, Microbiology and Biochemistry, Nutritional Values of Fermented foods, Nutritional Quality of fermented vegetables and fruits, Possible harmful effects, classification of fermented foods, general methods of fermentation, pre-requisites for industrial fermentations, computer applications in fermentations.
- Unit 11 Fruits and Vegetables Based Fermentation and their Commercial Products** – Lactic Acid Fermented Fruits and Vegetables, Sauerkraut (Cabbage) Fermentation, Cucumbers Fermentation, Kimchi Fermentation, Indian Sinki Fermentation, Fermented Pickles.
- Unit 12 Fruits based Alcoholic Beverages-** Types of wine, Fruits used for wine making, Importance factors influencing the quality of wine, microorganisms involved in wine making, Pre-fermentative practices in wine-making, Fermentation, Spoilage of fermentation and wine, Post fermentative practices, wine from different varieties of fruits, Chemical composition of wine.

Unit 13 Technological Aspects of Industrial Production of Alcoholic Beverages and Related Products – Fermenters, Technology for cider making, Technology of sparkling cider, Technology of fortified wine: Vermouth, Technology for brandy making, Technology of fenny and brandy of Cashew apple, Technology of Vinegar Production by fermentation.

Practical Manual- Experiment 1- Determination of Acidity and pH, **Experiment 2-** Determination of Moisture, **Experiment 3-** Determination of Ash and its Characteristics **Experiment 4-** Determination of Reducing Sugar, Total Reducing Sugars, Sucrose and starch, **Experiment 5-** Determination of crude fibre, **Experiment 6-** Determination of Alcohol by specific Gravity Method, **Experiment 7-** Detection and determination of synthetic colours.

DVAPF-04 Food Processing and Engineering-I

Block-1 Food Processing and Engineering Introduction:

Unit-1 Unit Operations – Dimensions, Engineering Units, Systems and Properties, Thermal Processing, Refrigeration, Food Freezing, Evaporation, Food Dehydration.

Unit-2 Moisture Content and Its Equilibrium – Chemistry of water, Properties of water, Types of water & water activity, Role of water in Food Preservation and Shelf Life of Foods, Water Hardness and Treatment, Moisture Measurement Preservation, EMC & its Relevance to food Preservation, EMC determination methods.

Unit-3 Cleaning and Grading – Definition and objectives of cleaning, Methods of Cleaning, Methods of Separation, Screens, Effectiveness and Efficiencies of Screens, Cleaners, Graders and Separators.

Unit-4 Storage – Storage parameters for fresh produce, Damages during storage, Direct Damages, Indirect damages, Sources of infestation, Storage requirements, storage process, Traditional storage structures, Improved storage Structures, Modern storages structures, Controlled and Modified atmosphere storage or hyperbolic storage, losses in storage, Relevant Standards.

Block-2 Unit Operations: Size Reduction, Milling, Material Handling, Transportation and Packaging:

Unit-5 Size Reduction- Principles of Size Reduction, Methods of Size Reduction, Size Reduction Equipment, Efficiency of size reduction, Energy requirement for size reduction, Fineness Modulus.

Unit-6 Milling- Methods of Milling, Milling Equipment, Efficiency of milling, Methods of Separation, Relevant Standards.

Unit-7 Material Handling- Material Handling Devices, Principal Drive Mechanisms, Suitability of use and Energy Requirement for materials handling equipments, Interaction between material and handling devices, Selection of material handling devices, Cost of material handling.

Unit-8 Transportation and Packaging– Methods of Transportation and their suitability with respect to product, Special Requirements for transportation of agricultural materials, Transportation costs, Role of packaging of agricultural and food materials, packaging for physical distribution and transportation, Quality testing of packages and packaging materials, standards for safe packaging, special packaging materials.

Block-3 Value Added Products From Fruits and Vegetables

Unit-9 Juice and Beverages- Fruit Juice, Equipment for Juice and Pulps, Squashes, Cordial, Syrups, Carbonated Beverages, Fruit Juice Concentrates, Fruit Juice Powders, Standards, Packaging.

Unit-10 Jams, Jellies, Marmalade and Other Sugar-based Products- Sugar, Fruit Jam, Fruit Jelly, Marmalade, Preserve, Candied Fruit/Vegetable, Glazed Fruit/Vegetables, Fruit Bar/Leather, Fruit Toffees, Packaging of the Finished Product, Problems in Preparation of Preserves/Candied Fruits, Quality Parameters.

Unit-11 Pickles, Chutneys, Sauces and Tomato Products- Pickles, Various Pickles, Containers used for pickling, Keeping Quality, Causes of Spoilage, Chutneys, Sauces, Soups and other Mixes, Tomato Products, Microbiology of Raw & Finished Products, Problems in Tomato Processing and Means to Avoid Them, Quality Standards.

Unit-12 Dehydrated Products from Fruits and Vegetables- Definition, Use of Dried Fruits and Vegetables, State of Water in Foods, Factors influencing Dehydration, Drying Rate Curves, Procedure for Drying, Pre-drying Treatments, Drying Methods, Post Drying Treatments, Packaging, Storage, Suitability and Acceptability of Different Fruits and Vegetables for Dehydration, Effects of Drying on Product Quality, Special Care to be taken during Drying.

Block-4 Plant Layout, Equipment and Mechanization:

Unit-13 Site Selection and Layout- Site selection, Importance of Proper Plant Layout, General Plant layout, Analysis of Men and Material Movement, Maintenance of Clean working Environment, Workers' Safety, Regulations and Standards.

Unit 14 Equipment and Machinery- Selection of Equipment, Movement and Installation of Equipment, Electrical Wiring, Ergonomic Considerations, Upkeep of Operational Area, Maintenance and Inspection Schedule, Periodic Maintenance Practices, Inventory of spare parts, Minimisation of equipment downtime, Maintenance of records, Certification, Good Manufacturing Practices.

Unit-15 Plant Sanitation and Effluent Treatment– Importance of plant sanitation with respect to food safety, Risks and Hazards, Properties and Requirements of processing water, Properties of Waste water, Waste water Treatment, Waste Solids Upgrading and Treatment, Lowering Discharge Volumes, Plant Sanitation and Effluent Treatment as a Continuous Responsibility, Waste/ Effluent disposal Regulations, Environmental Impact.

Practical Manual- Experiment 1- Preparation of Food Beverages- Squash, Cordial, RTS Beverages, Fruit Nectar and Sharbets, **Experiment 2**-Production of Fruits Jam, Jelly, Marmalade, Fruit Butters and Cheese and Candies, **Experiment 3**- Preparation of Pickles, Chutneys, Relishes and Sauces, **Experiment 4** - Production of Tomato Juice, Ketchup, Puree and Paste, **Experiment**

DVAPF-05 Food Microbiology

Block-1 Introduction:

- Unit-1 Classification of Micro-organisms Importance in the Food Industry: Bacteria, Yeasts and Mold-** Various types of Micro-organisms, Characteristics (Morphological, Cultural and Physiological) of various Microorganisms, Bacteria, Molds, Yeasts.
- Unit-2 Factors Affecting Growth and Inhibition of Micro-Organisms in Food-** Hydrogen-Ion Concentration (pH), Moisture Requirement/Water Activity., Oxidations Reduction Potential, Nutrient Content, Biological Structure, Inhibitory Substances.
- Unit-3 Industrially Importance Bacteria, Yeasts and Mold-** Culturing of Important Microorganism, Enzymes and Kinetics, Types of Fomenters: Concept of Batch and Continuous Fermentation, Microbial Production and Recovery of Wine, Vinegar, Sauerkraut, Ethyl Alcohol, Beer, Organic Acids. Single Cell Proteins.
- Unit-4 Spoilage and its Associated Chemical/Physiological Changes in Food-** Principles of Food Preservation, Classification of foods based on Perishability, Factors Governing Spoilage, Chemical and physical changes Associated with Food Spoilage, Microbiology of Fresh Fruit and Vegetable Products, Preventive Measure.

Block-2 Controlling Micro-organisms:

- Unit-5 Concept Determination of Process Lethality Requirements and Importance-** Classification of Foods According to pH, Relationship between pH of Food and Heat Resistance of Microorganisms, Heat Resistance of Microorganism and Spores, Thermal Death Point, Thermal Death Time, Determination of Thermal Death Time, Determination of Process Lethality Requirements at low and high Temperature, Behavior of Microorganisms under Freezing and Refrigeration Environments, Control of Microorganisms by various Means, Principles Involved in Various Methods to control Microbial Spoilage of Food.
- Unit-6 Thermal Control of Micro-Organisms-** Thermal Preservation of Foods, Heat Preservation Processes, Pasteurization, Preservation by Moist Heat, Microbiology of Thermally Processed Food.
- Unit-7 Drying- Controlling of Micro-organisms-** Principles, Mechanisms of Dehydration, Theory of Drying, Importance of Water Activity (a_w), Microorganisms Associated with Dried fruits and Vegetables, Microbiology of Dried Foods, Survival of Microorganisms in Dried Foods, Microbial Spoilage of Dried Foods.
- Unit-8 Chemical for Controlling Micro-organisms-** Use of Various Food Additives and Chemical Preservatives, General Considerations in the Selection of Chemical Food Additives, Developed and Added Preservatives.

Block-3 Food Poisoning:

- Unit-9 Food Borne Diseases-** Types of Food Borne Diseases, Human Diseases, Chemical Contamination of Foods, Non Bacterial Microbiological Contamination of Food, Investigation of Food Borne Disease Outbreak.
- Unit-10 Food Intoxication-** Natural Toxins, Mycotoxins, Botulism, Staphylococcal Food Poisoning.
- Unit-11 Bacterial Food Infections-** Zoonotic Diseases, Salmonellosis, Escherichia coli Gastroenteritis, Bacillus cereus gastroenteritis, Cholera, Vibrio parahaemolyticus gastroenteritis, Shigella dysentery, Campylobacteriosis, Yersiniosis (Yersinia enterocolitica infection) Listeria monocytogenes infection (Listeriosis), The most important Point to Remember to Wash you Hand.

Block-4 Safe Chemical and Microbial Limits for Different Foods:

- Unit-12 Chemical-** Need for Food Preservation, Techniques of Food Preservation, Characteristics of Chemical Preservatives, Classification of Preservatives, Antimicrobial Preservatives, General Rules for Chemical Preservation.
- Unit-13 Microbial-** Microbiological Profile of Harvested Fruits and Vegetables, Standards for water for human Consumption, Microbiology of canned fruits, Microbiological Standards for Processed Foods.

DVAPF-06 Food Processing & Engineering II

Block-1 Introduction

Unit-1 – Principles of Heat and Mass Transfer- Heat Transfer System, Type of Food for Heat Processing, Heat Penetration, Heat Transfer Characteristics of Food, Devices for Determination of heat penetration, Determination of cold point in a food container, Calculation of Process Time, Factors Affecting Heat Penetration.

Unit-2- Heat Application- Heat Exchangers, Blanching, Pasteurization, Sterilization, Aseptic Processing and Packaging, Hot Pack or Hot Fill, Microwave and Ohmic Heating.

Unit-3- Canning of Fruits of Fruits and Vegetables – Canning Process for Fruits and vegetables, Canning of fruits, Canning of vegetables, Aseptic Canning of Fruits and Vegetable Products.

Block-2 Food Preservation Through Water Removal

Unit-4 – Forms of Water in Foods Sorption and Desorption of Water in Foods and Water Activity- Properties of Water in Solutions, Water Sorption Isotherms, Water Activity and Methods, Effect of water Activity on Enzyme Reactions, Effect of water Activity on Non-enzymatic browning Reactions, Effect of water Activity on Microbial Growth and Survival, Effect of water activity on packaging and storage .

Unit-5- Drying, Dehydration and Evaporation- Drying Phenomena, Factors Affecting Drying, Drying and Reconstitution Ratio, Spoilage of Dried Fruits and Vegetables, Drying Methods and Equipment, Evaporation/ Concentration Method and Equipment.

Block-3 Food Preservation Through Temperature Reduction, Atmospheric Control and Irradiation

Unit-6 – Chilling – Refrigeration, Determination of Refrigeration Load, Refrigerated Storage of Fruits and Vegetables, Chilling Injury of Fruits and vegetables, Evaporative Cool Storage System .

Unit-7- Controlled and Modified Atmosphere Storage-Physiological Basis of Controlled Atmosphere (CA) Storage, Effects of CA Storage, Methods of Creating Modified Atmosphere (MA) Conditions, Commercial Application of CA Storage, Environmental Factors Influencing MA and CA Storage, CA Systems for Transportation.

Unit-8 – Food Irradiation - Ionizing Radiations, Effects of Ionizing Radiation on Nutrients, Radiation Sensitivity of Microorganisms, Effect of Irradiation on Insects (Quarantine Treatment) Practical Applications of Food Irradiation, Beneficial Aspects of Food Irradiation.

Block-4 Production Utilization

Unit-9 – Types of By-products- Handling and marketing wastes of fruits and vegetables, By-products from Fruit processing, Wastes and By-products from vegetables.

Unit-10- Utilization of fruits and vegetable Processing Waste for Food, Feed, Fuel and Industrial Products-Fruits and Vegetable Wastes, By-products from fruit and vegetable wastes, Industrial products from fruit and vegetable wastes, Animal Feed From wastes, Pulp wash, Recovery and Utilization, Fermentative Utilization of fruits and vegetable wastes, Fruits and vegetables processing wastewater treatment and Utilization.

Unit-11- Food Fortification –Necessity of Food Fortification, Food Fortification, Fortification of Fruit and vegetable products.

Block-5 Food Packaging

Unit-12 – Need and Importance- Types of Packaging: Packaging Components, Packaging Materials, Properties of Packaging, Importance of successful Package.

Unit-13- Packaging Materials- Glass Containers, Metal Cans, Aluminum Foil, Plastic Materials, Plastic Containers, Collapsible Containers, Composite Containers.

Unit-14- Packaging Process and Machinery – Packaging of Fresh/Chilled fruits and vegetables, Packaging of Frozen foods, Packaging of dehydrated fruits and vegetables, Manufacturing of Packaging Materials, Aseptic Packaging, Vacuum and Inert Gas Packaging, Form-Fill and Seal Equipment .

Practical Manual- Experiment 1- Adequacy of Blanching of Fruits/ Vegetables, **Experiment Canning** of Fruits and Vegetables, **Experiment 3-** Cut-out Analysis of Canned Product **Experiment 4-** Testing of Flexible Packaging Materials, **Experiment 5-** Preparation of Fruit-based Carbonated Drinks.

DVAPF-07 Food Quality Testing and Valuation

Block-1 Quality:

Unit-1 Definition and Importance- Definition of Food Quality, Food Quality Attributes, Quality Specifications for the Consumer, Food Borne Hazards/Food Poisoning, Functions of Quality Control.

Unit-2 Standardization- National Food Control System, National Food Legislations, Food Regulations for International Organizations.

Unit-3 Food Safety Management- Food Safety; Food Hazards, Importance of Safe Food, Food Safety Programmes; Good Manufacturing Practices (GMP), Hazard Analysis Critical Control Points (HACCP) System, International Organization for Standardization (ISO), Total Quality Management (TQM)

Block-2 Testing and Evaluation:

Unit-4 Physical Methods- Colour, Viscosity and Consistency, Texture.

Unit-5 Chemical and Microbiological Methods- Chemical Analysis of Foods, Bacteriological Examination of water, Assessment of Surface Sanitation, Microbiological Examination of Food Spoilage.

Unit-6 Sensory Analysis of Foods/ Beverages- Application, Conducting Sensory Test, Physical Set Up for Conducting Sensory Test, Sensory Test Methods, Sensory Test and Instrumental Measures.

Block-3 Analytical Instrumentation:

Unit-7 Analytical Instrumentation - Analytical Balance, pH meter and Chromatography – Measurement of Mass, pH Measurement- pH Meter, Chromatography

Unit-8 Analytical Instrumentation based on Electromagnetic Radiation – Properties of Electromagnetic Radiation, Spectroscopy, Absorption of Radiation, Atomic Spectroscopy, Refractometry, Polarimetry.

Practical Manual-

Experiment 1- Determination of Ascorbic Acid by Titrimetric and Colorimetric Methods, **Experiment 2-** Determination of Sodium Chloride, **Experiment 3-** Determination of Total Carotenoids and Beta-Carotene, **Experiment 4-** Determination of Sulphur Dioxide, **Experiment 5-** Estimation of Benzoic Acid, **Experiment 6-** Determination of Hardness of water, **Experiment 7-** Estimation of Residual Chlorine in water, **Experiment 8-** Determination of Total Soluble Solids (⁰BRIX), **Experiment 9-** Contaminants: Tin Content in Canned Foods, **Experiment 10-** Sensory Evaluation of Food Products – Hedonic Rating Test.

DVAPF-07- Entrepreneurship and Marketing

Block- 1 Entrepreneur and Entrepreneurship:

- Unit-1 Being an Entrepreneur : What does it Involve?-** Becoming an Entrepreneur, Need for Entrepreneurship, Benefits of Self Employment, Who is an Entrepreneur? Setting Challenging goal- Risk Taking, Sensing Opportunities, Entrepreneur and Economy, Food Processing Business.
- Unit-2 Entrepreneurial Skills –** The Joy of being an Entrepreneur, what is required to be an Entrepreneur?Concept of Entrepreneurial Skill, Understanding Entrepreneurial skills.
- Unit-3 Developing Entrepreneurial Skill –** Right Mindset, Strategy to bring Desirable Changes in “Mind Set” through Training, Locus of Control, Achievement Planning and Business Goal,

Block-2 Setting up and Enterprise:

- Unit-4 Business Idea- How to Get it?-** What is Business, Business Opportunity Identification and Assessment, Sources of Business Idea, Generation of Business Idea, Evaluation of Business Idea.
- Unit-5 Market Assessment-** Concept of Marketing, How to Assess Market for any business Idea, What constitutes the market for your business Idea, Market Size for your business idea.
- Unit-6 What does Marketing involve-** Marketing functions, What is Marketing Mix?, Marketing Mix- Products, Marketing Mix-Price, Marketing Mix-Promotion, Marketing Mix- Place (Distribution).
- Unit-7 Analysing and Competitive Situation-** Competitors Present in the Market, Marketing Strategies vis-à-vis competitors, How to Understand the Strengths and Weaknesses of Business, What are the Strengths and Weakness of the Competitors, Special Features of the Product to Attract Customers.

Block-3 Planning for the Enterprise-

- Unit-8 Preparation of the Business Plan-** Meaning of Business Plan, Why a business plan is needed?, Inputs required for a Business plan, Preparation of project report, Project Appraisal, Common Errors in Formulation of Business plan and Remedies Thereof.
- Unit-9 Arranging the Inputs: Finance and Material-** Finance : Meaning, Need and Types, Sources of Finance, Specialised Financial Institution, Evaluation of the Sources of Finance, Material: Its Procurement and Important Considerations.
- Unit-10 Understanding the Components for Marketing –** Meaning of Marketing Mix, Marketing Mix- Products, Marketing Mix-Price, Marketing Mix-Promotion, Marketing Mix- Place

Block-4 Marketing Management of the Enterprise:

- Unit-11 Product Consideration-** Product : Meaning and Significance, Product Selection, Product Mix Decisions, The Concept of Product Lifecycle, Branding and Packaging Decisions, Differentiation and Positioning Products.
- Unit-12 Setting the Price** – Importance of the Pricing Decision, Understanding the Basic Elements of Pricing, what should you know about Costs? what should you know about your Customers?, what should you know about your competitors and Trade Practices?, Understanding Pricing Objectives, Alternative Pricing Policies that Entrepreneurs follow- Relationship between price and quality, Putting pricing in practice – what should you know before implementing the pricing decision.
- Unit-13 Developing and Managing Distribution** – Direct or Indirect Distribution, Types of Intermediaries, Implications of Using, Intermediaries: Channel Levels, Selecting an Appropriate Channel, Physical Distribution Tasks: Distribution Activities and Logistics, Issues in the physical Distribution Process.
- Unit-14 Understanding and Managing Promotion-** What is Promotion and How Advertising Works?, Components of the Promotion Mix, Deciding upon the Promotion Mix, Setting Advertising Objectives, Deciding upon the promotional budget, Selecting appropriate advertising Message, Coordinating with Advertising Agency, Role of Publicity in Promotion, Role of Personal Selling, Role of Sales Promotion, Evaluation the Effectiveness of Your Promotional Effort.

Block-5 Appraisal Performance:

- Unit-15 Performance Measurement and Control** –Meaning and Features of Controlling, Procedure of Controlling, Tools and Techniques of Controlling.
- Unit-16 Managing Growth-** Meaning of Growth and Its Measures, Need for growth, Growth Strategies, Stages of Growth and Challenges Faced by the Entrepreneurs.
- Unit-17 International Markets:** Scope for Small Enterprises- Knowledge about the Market, Opportunities offered by the International Markets, How to Enter International Markets? Export Pricing and Export Documents.

Practical Manual-

Experiment 1- Preparation of Cost of Project and Means of Finance, **Experiment 2-** Preparation of Depreciation Schedule **Experiment 3-** Preparation of Statement of Production, Raw Material Consumed and Gross Sales, **Experiment 4-** Calculation of Working Capital, **Experiment 5-** Preparation of Profitability Statement, **Experiment 6-** Preparation of Taxation Statement, **Experiment 7-** Preparation of Balance Sheet, **Experiment 8-** Preparation of Break even analysis Statement, **Experiment 9-** Preparation of Statement of power Calculation, **Experiment 10-** Preparation of Statement of Analytical and Comparative Ratios, **Annexure- I** Guidelines for Preparation of various statements relating to the project for Manufacturing food item. **Annexure- II** Procedure for EPO Licensing.

Detailed Syllabus of PG Diploma in Agricultural Extension (PGDAE)

PGDAE – 01: Principles and Practices in Distance Education

Unit – 1: Learning methods: Learning in Ancient India, Conditions of Learning, Theories of Learning Learning Methods, Man and Machine Ratio for Learning

Unit – 2: Distance Education System: Distance Education and its Needs, Systems Approach in Distance Education, Growth of Distance Education, Openness in Distance Education, Open Universities a Revolution

Unit – 3: Communication Technologies in Distance Education: Types of Communication, Domains of Communication, Potential Technologies, Networking for Technology Application, Technological Application by Open Universities

Unit – 4: Characteristics of Distance Learning: Learner as a Customer of Education, Conventional and Distance Learners, Learner Isolation, Psychological Needs of Distance Learners, Open University Approach to Distance Learners

Unit – 5: Multimedia for Optimum Learning: Optimum Learning, Roles of a Multimedia, Interactive Multimedia, Open University Approach, Computer as Multimedia

Unit – 6: Philosophical Perspectives of Distance Education: Philosophy of Distance Education, Philosophical Contribution of Distance Education, Openness and Learner Autonomy, Cumulative Effects on Open Universities, SQ3R Technique for Studying Text

Unit – 7: Andragogical Perspectives of Distance Education: Pedagogical Principles of Learning, Democratic Approach of Andragogy, Pedagogy and Andragogy, Andragogical Essence in Distance Education, Programme Evaluation for Quality Education

Unit – 8: Economics of Distance Education: Economy in Distance Education, Economy and Quality of Education, Research Priorities for Managing Economy, Open University Approach in India, Barriers to Economy – A Challenge

Unit – 9: Management of Distance Education: Managerial Approach in Distance Education, Managerial Components and their interdependence, Systems Approach in Distance Education, Open Universities and their Management, Management of Open and Conventional Universities.

Unit – 10: Managing a Need based Mass Education: Open University – A Mass Varsity, Need Assessment, Types of Educational Needs, Flexibility in Programmes, Managing Mass Education

Unit – 11: Growth of Distance Education: Variety of Educational Needs, Social Challenges and Gender Equality, Limitations of Conventional System, Distance Education as an Educational System

Unit – 12: Distance Education in Developed Countries: The Regional Perspectives of Distance Education in Europe, The Scenario of Distance Education in Canada and U.S.A., The Developments of Distance Education in Russia, The Success Story of Distance Education in China and Japan, The Practices of Distance Education in Australia and New Zealand

Unit – 13: Distance Education in Developing Countries: The Regional Perspectives of Distance Education in Asia, The Scenario of Distance Education in South American Continent, The Developments of Distance Education in African Continent, The Development of Distance Education in Middle East, The Practices of Distance Education in South Pacific Region

Unit – 14: Distance Education in India and Around: Dual Mode of Education, Growth of Open Universities in India, Scenario of Distance Education in Neighboring Countries, Issues before Distance Education in India, Issues before Distance Education in India, Future of Distance Education in India

Unit – 15: Growth of Mega Open Universities: Open and Distance Education as Social Practice, Development of Mega Open Universities, Status of Distance Education Across the World, Networking with Open Universities, Monitoring of Distance Education

Unit – 16: Quality Control in Distance Education: open University as an Industry, Quality Control ISO-9000 for Open and Distance Learning System, Learner Satisfaction – A criteria for Quality, Barriers to Quality Control

Unit – 17: Cost Effectiveness in Distance Education: Cost Analysis in Distance Education, Financing in Distance Education, Cost function in Distance Education, Cost Structure in Open and Distance Learning System, Cost in Open and Distance Learning System

Unit – 18: Networking among Open Universities: Priorities for Networking among Open Universities, Networking between Open Universities and NGO's, Networking Benefits to Dual Mode Education System, High Tech Institutional Support to ODL System, Short Term Exchange of Staff

Unit – 19: Staff Development for Distance Education: Staff Development, Part Time Staff Training Needs, Training of Core Staff for Technology Applications, Future Challenges for Staff Development, Staff Development – Present Scenario

Unit – 20: Openness and Flexibility in Open University System: Openness – Some Challenges to an Open University, Flexibility – A Modular Approach, Openness for Optimum Learning, Demerits of Openness and Flexibility, Openness in Dual Mode Institutions.

Reference for SLM:

1. SLM Code No. AGR – 401 of YCMOU, Nashik, Maharashtra Developed and used for M. SC. Agricultural Extension in that University. It is available in PDF form On their Website www.YMCOU.ac.in

PGDAE – 02: Agricultural Extension and Farm Journalism

- Unit – 1: Fundamentals of Extension Education:** History and Development of Extension Education, Objectives and Philosophy of Extension Education, Recent Trends in Agricultural Extension, Community Development Programme
- Unit – 2: Extension Methods Tools and Techniques:** Principles of Teaching in Extension, Teaching Methods in Extension, Andragogy and Adult Learning, Audiovisual aids for Extension Education
- Unit – 3: Rural Sociology:** Introduction to Rural Sociology, Group Organization and Rural Socialization, Structure and Functions of Society, Social Satisfaction and Interaction, Social Changes
- Unit – 4: Educational Psychology:** Concept of Educational Psychology, Learning Theories and their Impact, Intelligence and Factors Affecting Intelligence, Behaviour Role of Attitude and Interest, Decision Making
- Unit – 5: Programme Planning:** Programme Planning, Professional Abilities of Planners, Role of Extension Agents, Participatory Approach, Programme Evaluation
- Unit – 6: Administration & Management of Organization:** Nature and Purpose of Administration, Principles of Administration, Management of Extension Organization, Public and Private Organization, Privatization of Extension Services
- Unit – 7: Human Resource Development:** Concept and Principles of Human Resource Management, Personnel Management, New Analysis and Motivational Techniques, Performance Appraisal, HRD in Agriculture
- Unit – 8: Rural Leadership:** Theories of Leadership, Importance of Leadership, Qualities and Traits of Leader, Selection and Training of Leaders, Local Leaders in Agricultural Development
- Unit – 9: Training Models and Methods:** Importance and Need of Training; Phases of Training; Training Modules and Models; Types, Techniques and Method of Training; Evaluation of Training
- Unit – 10: Women in Rural Development:** Farm Women, Demographic Features of Farm Women, Farm Women in Agricultural Production, Training Needs of Farm Women, Women Empowerment
- Unit – 11: Principles of Farm Journalism:** Journalism, Farm Journalism in India, Principles of Writing, Rural Press and Periodicals, Legal Aspects of Print Media
- Unit – 12: Basic Tools of Journalism:** Writing for Farmers, Readable Writing, Illustrations in Publications, Writing for Radio and Television, Technical Writing
- Unit – 13: Editing and Printing:** Editing and Printing Instructions, Press Management, Printing Process, Quality of Printed Material, Distribution of printed Material

Unit – 14: Visual Graphics in Farm Communication: Definition and Concepts, Principles of Visual Graphics, Photo Treatment, Photo Printing, Picture Services

Unit – 15: Radio and Television: Characteristics of Radio and Television; Programme Production; Feedback and Evaluation; Innovation; Storage, Preservation and Distribution

Unit – 16: Writing for Farmers: Agriculture in Uttar Pradesh, Information Gathering, Information Processing, Evaluation of Farm Publication. Printing

Unit – 17: Script Writing for Radio and Television: Preparation for Film Interview, Information Presentation, Models of Presentation, Editing and Special Effects, Microphone and Camera

Unit – 18: Farm Photography: Type of Photography, Press Photography, Film and Television Photography, Scientific and Technical Photography, Commercial Photography

Unit – 19: Information Technology: Information Collection, Information Management, Agri-informatics, Presentation Techniques, Public Relations

Unit – 20: Public Communication: Models of Public Communication, Exhibition and Exhibits, Hording and Display, Social Advertisements, Evaluation

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PGDAE – 03: Agricultural Communication and Mass Media

- Unit – 1: Process of Communication:** Communication Process and Agricultural Communication, Theories and Models of Communication, Principles of Communication, Communication and Learning, Dimensions of Communication, Aspects Related to Communication
- Unit – 2: Modes of Communication:** Traditional and Folk Media, Print Material, Audio and Radio, Video and Television, Digital Media
- Unit – 3: Consequences of Communication:** Diffusion of Farm Innovation, Adoption of Farm Innovation, Rejection of Farm Innovation, Media and Adoption of Innovation, Opinion Leaders & Diffusion of Farm Innovation
- Unit – 4: HRD in Communication:** Characteristics of Communicator, Training in Communication Methods, Training of Local Leaders in Agricultural Communication, Training Programme in India, Local Human Resources Utilization
- Unit – 5: Agricultural Communication in India:** Rural Institutions and Communication Pattern, Gender in Rural Communication, NGOs in Rural Communication, Communication in Tribal Communities, Communication Pattern in Rural India
- Unit – 6: Communication and Development:** Communication for Rural Development, Development Approach, Information Dissemination in Rural India, Communication Structure and Policies, Developmental Communication
- Unit – 7: Status of Agricultural Communication:** International Organizations, National Organizations, State Level Organizations, Non-Government Organizations, Corporate and Local Organizations
- Unit – 8: Effective Strategy Communication:** Evaluation of Effectiveness; Problems of Communication; Communication Planning; Organizational Communication; Persuasion, Propaganda and Publicity
- Unit – 9: Communication of Farm Innovations:** Promotion of Farm Innovations, Consequences of Diffusion of Farm Innovations, Problems in Communication of Farm Innovations, Extension Organizations
- Unit – 10: Farm advertising:** Farm advertising; Types of Farm advertising; Content – Heading, Illustrations and Layout; Testing of Farm Advertisements; Strategies of Farm Advertisements
- Unit – 11: Modes of Mass Communication:** Print Material, Radio and Television, Video Films, Exhibition, Computer
- Unit – 12: Print Media:** News Paper, Bulletins and Booklets, Farm Magazines, Feature Writing, Poster and Hoardings
- Unit – 13: Preparation for Print Media:** Steps in News Writing, Pattern of News Writing, Leads in News, Manuscript, Manuscript Editing, Readability Test

Unit – 14: Feature Writing: Importance of Feature Writing, Types of Feature Writing, Writing Sequence, Importance of Illustrations in Feature, Layout of Farm Literature

Unit – 15: Writing for Audio and Video Media: Preparation and Presentation of Audio Talk, Preparation and Presentation of Video Talk, Limitations of Audio-Visual Presentation

Unit – 16: Audio Media: Instructional Audio Programme, Types of Audio Programme, Process of Audio Recording, Evaluation of Audio Programme, Advantages and Limitations

Unit – 17: Video Media: Instruction through Television and Video; Video Script and its Development; Video Equipment and their Use; Instructional Programming; Types, Advantages and Limitations of Video

Unit – 18: Computer Literacy and Programming: Computer Literacy, Principles of Programmed Instructions, Types of Programmes, Evaluation of Instructional Video, Advantages and Limitations

Unit – 19: Instructional Print Materials: Characteristics of Instructional Text, Preparation for Writing, Teaching Concepts and Instructional Text, Adult Learning theories and Instructional Text, Writing of an Instructional Text

Unit – 20: Dimensions of Modern Communication: Non-verbal Communication, Two Way Communication, Distance Learning, Tele Teaching, Internet

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PGDAE – 04: Agricultural Information Technology

Unit – 1: Computer System and Development: Definition and Applications of Computers, History and Development of Computers, Types of Computers, Bits and Bytes

Unit – 2: Computer Hardware: Anatomy of Computer, Central Processing Unit (CPU), Peripheral Devices

Unit – 3: Computer Software: What is Software, Operating Systems (OS), Programming Languages, Computer Programming, Computer Viruses

Unit – 4: Software Applications for Office Use: Word Processing, Desk Top Publishing (DTP) and Printing, Spreadsheet Application, database Application

Unit – 5: Telecommunication and Computer Networking: Network Applications, Local Area Network (LAN), Wide Area Network (WAN), Network Devices and Media, Network Protocol

Unit – 6: Internet Technology: What is Internet, Use of internet, Requirement for internet Connection, How to Connect Internet, How internet Works

Unit – 7: World Wide Web: World Wide Web, Web Browsers, Searching Information on Web, Web Multi Media, Indian Agriculture Websites

Unit – 8: Communication and Electronic Web: Fax, Voice and Information Services; Electronic Mail (E-mail), Video Conferencing, Factors Affecting data Communication

Unit – 9: Introduction to Multi Media: What is Multimedia, Components of Multimedia, Multimedia Database Management System, Multimedia Computer, Multimedia Applications

Unit – 10: Information Technology in Business: Modern Information Processing; E-commerce Site Development; E-commerce Business Chain; Marketing , Advertisement and Sale

Unit – 11: Agri-Informatics and Agri-Polyclinics: Modern Agri-Informatics, Model Agri-Polyclinics, Working of Agri-Informatics and Polyclinics, Agri-Informatics Services, Agri-Polyclinics Services

Unit – 12: Geographical Information System and MIS: Geographical Information System (GIS), Management Information System (MIS), GIS and Participatory Rural Appraisal, GIS and Watershed Management, MIS and Decision Making

Unit – 13: Farm Information Management: Input Management, Production Process Management, Output Management, Data Documentation and Interpretation, Farm Decision Support System, Weather forecasting

Unit – 14: Electronic Commerce in Agriculture: Electronic Marketing, Working of Electronic Marketing, Indian Culture and Electronic Business, High-tech agriculture and E-Commerce, WTO and E-Commerce

Unit – 15: Personal, Legal and Ethical Issues in I.T.: Computer and Your Health, computer Ethics, Intellectual Property Rights, Computer Crimes, Business Issues in Computer Networking, Internet Technology in Agriculture

Unit – 16: I.T. in Agricultural Production: I.T. in Land Use Planning, I.T. in Crop Cultivar Selection, I.T. in Plant Nutrition, I.T. in Plant Protection, I.T. in Post-harvest Technology

Unit – 17: I.T. in Agricultural Research Management: I.T. in Agricultural Research, I.T. in Prioritization of Research, I.T. in Research Communication, I.T. in Research Documentation, I.T. in Research Dissemination

Unit – 18: I.T. in Agricultural Education Management: I.T. in Agricultural Education, I.T. in Education Planning and Development, I.T. in Human Resource Management, I.T. in Reforms in Education System, I.T. in Online Education

Unit – 19: I.T. in Agricultural Extension Management: I.T. in Resource Documentation, I.T. in Methods of Extension, I.T. in Farming systems, I.T. in Technical Knowledge Backup, I.T. in Resource Utilization and Management

Unit – 20: I.T. in Agro-based Rural Development: I.T. in Agro-based Industries, I.T. in Watershed Management, I.T. in Wasteland Management, I.T. in Rural Production Enterprises, I.T. in Agro-Marketing Systems

Reference for SLM:

1. **SLM Code No. AGR – 504 of YCMOU, Nashik, Maharashtra Developed and used for M. SC. Agricultural Extension in that University. It is available in PDF form On their Website www.YMCOU.ac.in**

PGDAE – 05: Research Methods and Statistical Analysis

- Unit – 1: Research Methods** – An Introduction: Meaning and Objective of Research, Types of Research, Research and scientific Methods, Research Process, Problems Encountered
- Unit – 2: Basic Principles of Research Methods:** Motivating Factors in Research, Scope of Research, Limitations in Scientific Research, Type of Research for Agriculture, General Phases of Scientific Procedure
- Unit – 3: Defining the Research Problems:** Research Problems and its Scope, Selection of Research Problems, Techniques involved in Defining Problems, Research Proposal Steps, Illustration of Research Problems
- Unit – 4: Research Design:** Need for Research Design, Features of a Good Research Design, Important Concepts of Research Design, different Research Design, Basic Principles of Experimental Designs
- Unit – 5: Plan of Study:** Delimitation of Scope of Investigation, Choice of Research Topic, Classification of Data, Sequence of Study, Sources of Information
- Unit – 6: Sampling Methods:** Complete enumeration, Types of Sampling Designs, Sampling and Non sampling Errors
- Unit – 7: Methods of Field Observation:** Formulation of Hypotheses and Observation, Field Observation, Aids in Field Observation, Reporting Observation, Errors in Observation
- Unit – 8: Methods of Data Collection:** Types of Data, Data Collection Methods, Major Aspects in the Design of Questionnaire, Problems in Communication, Organization of Data from Questionnaire
- Unit – 9: The Interview:** Major Purpose of Research Interview, Advantages and Limitations, Types of Interview, Some Techniques of Interviewing, Interview Guide, References
- Unit – 10: Project Assessment and Evaluation:** Basis of Assessment, Purpose and Goals of Evaluation, Theoretical Basis of comprehensive Evaluation, Evaluation Models and Approaches, Reporting the Assignment
- Unit – 11: Processing and Analysis of data:** Processing, Operations and Data Classification; Variables and Attributes; Frequency Distribution; Tabulation of Statistical Data
- Unit – 12: Testing of Hypotheses:** Hypothesis and its Definition, Types of Hypothesis, Procedure of Hypothesis Testing, Types of Tests and Limitations of Hypothesis
- Unit – 13: Statistical Concepts:** Measures of Typical Sizes, Variability, Correlation and Regression, Non Parametric Tests
- Unit – 14: Scaling Techniques:** Scales for Measuring Social Status, Scaling Techniques, ‘T’ Scores, Likert Scale, Reliability of Test, Validity of Test Scores
- Unit – 15: Graphic Presentation:** Rectangular Co-ordinate Graphs, Frequency Distribution Graphs, Diagrams, Flowcharts

Unit – 16: Analysis of Variance and Covariance: Analysis of Variance and Assumptions, Types of Classification of Data, Analysis and Interpretation of Data, Analysis of Covariance, Need and Use of Covariance Technique, Analysis and Interpretation of ANCOVA

Unit – 17: Multivariate Analysis: Concept of Multivariate Analysis, Multiple Correlation Analysis, Discriminate Function, D^2 Analysis and Interpretation of Results

Unit – 18: Path, Content and Factor Analysis: Path Analysis, Content Analysis, Factor Analysis

Unit – 19: Package for Data Analysis: Need of Software Package for Data Analysis, Software Package for Data Analysis, SPSS Packages

Unit – 20: Scientific Report Writing: Scientific Writing, Types of Scientific Reports, Thesis and Dissertation Writing

Reference for SLM:

1. SLM Code No. AGR – 402 of YCMOU, Nashik, Maharashtra Developed and used for M. SC. Agricultural Extension in that University. It is available in PDF form On their Website www.YMCOU.ac.in