Revised Course Curriculum and Syllabus

Of

B.Sc. (Honours) (Agri.Business Management)

As per Recommendations of DICC Commitee

State Agricultural Unersities of Maharashtra

from

Academic Year 2017-18

- **Mahatma Phule Krishi Vidyapeeth, Rahuri**
- **Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola**
- **Dr. Balasaheb Sawant Kokan Krishi Vidyapeeth, Dapoli**
- **Vasantrao Naik Krishi Vidyapeeth, Parbhani**

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(D.B. Yadav)

Degree & Discipline coordinator

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2.	Dr. S.N. Tilekar, Principal, Dr. D. Y. Patil, College of Agriculture Business Management, Akurdi, Pune	Chairman	
3.	Dr. B.K. Mali, Professor, MBA (Agri), College of Agriculture, Pune.	Member	
4.	Dr. G.G. Joshi, Assit. Professor, PGI (Agril Economics) MPKV, Rahuri.	Member	
5.	Dr. M.B. Bhujbal Principal, GramonnatiMandals College of Agriculture Business Management, Narayangaon, Pune	Member Secretary	

6.	**Dr. R. G. Deshmukh, Head, Dept. of Agril. Economics, Dr.P.D.K.V., Akola**	**Discipline Course Coordinator, Agril. Economics**	
7.	**Dr. P. A. Turbatmath, Associate Dean, Dr.A. S. College of Agril. Engg. & Tech. Mahatma PhuleKrishiVidyapeeth, Rahuri**	**Discipline Course Coordinator, Agril. Engg.**	
8.	**Dr. D. B. Deosarkar, Head, Dept. of Agril. Botany, VNMKV, Parbhani**	**Discipline Course Coordinator, Agril. Botany**	
9.	**Dr. A. L. Narangalkar, Head, Dept. of Agril. Enotomology, Dr. BSKKV, Dapoli**	**Discipline Course Coordinator, Agril. Enotomology**	
10.	**Dr. B. R. Salvi, Head, Dept. of Horticulture, Dr. BSKKV, Dapoli**	**Discipline Course Coordinator, Horticulture**	
11.	**Dr. P. A. Sawant, Head, Dept. of Extension Education, Dr. BSKKV, Dapoli**	**Discipline Course Coordinator, Extension Education**	

12.	**Dr. R. S. Nandanwar, Head, Dept. of Agril. Botany, Dr.P.D.K.V., Akola**	**Discipline Course Coordinator, Environmental Science**	
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14.	**Dr. S. S. Mane, Head, Dept. of Plant Pathology and Asso. Dean, CoA, Akola**	**Discipline Course Coordinator, Plant Pathology and Agril. Microbiology**	
15.	**Dr. V. M. Bhale, Dean & DI, Head, Agronomy, Dr.P.D.K.V., Akola**	**Discipline Course Coordinator, Agronomy**	
16.	**Dr. A. L. Pharande, Head, Dept. of SSAC, MPKV,Rahuri**	**Discipline Course Coordinator, SSAC**	
17.	**Dr. B. M. Thombre, Head, Dept. of Animal Husbandry Dairy Science, VNMKV, Parbhani**	**Discipline Course Coordinator, ASDS**	
18.	**Dr. S. V. Patil, Student Welfare Officer, MPKV, Rahuri**	**Discipline Course Coordinator, NSS**	

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Department-wise Credit Allotment

Sr. No.	Departments	Credits
1.	Department of Agricultural and Allied Sciences	55
2.	Department of Agricultural Economics	21
3.	Department of Agricultural Marketing	21
4.	Department of Agriculture Business Management	26
5.	Electives	09
6.	Experiential Learning Programme	20
7.	In-plant Training Programme	20
8.	Non- Credit Compulsory Courses	05
9.	Study tour	03
	Total	**180**

Semester-Wise Credit Allotment

Sr. No.	Semester	Credits
1.	I	23=15(8+7)+5
2.	II	24(12+12)
3.	III	24(13+11)
4.	IV	22(12+10)
5.	V	23(12+11)
6.	VI	24(11+13)
7.	VII	20(0+20) Any two of (0+10)
		Study Tour I (0+1) = 1
8.	VIII	20(0+20) Study Tour II (0+2) = 2
	Total	**180**

Note: * Non credit Compulsory Courses
** Remedial Courses

Department wise courses of B.Sc. (Honours) (Agri.Business Management)

1. Department of Agricultural and Allied Sciences

Course No	Course Title	Credits
AGRO-111	Agro-Techniques of Principal Field Crops- I (Kharif)	1+1=2
AGRO-122	Agro-Techniques of Principal Field Crops- II (Rabi)	1+1=2
AGRO-233	Irrigation Water Management	1+1=2
AGRO-244	Modern Farming Systems and Sustainable Agriculture	1+1=2
	Total	**4+4=8**
HORT- 111	Production Management of Important Fruit Crops	1+1+2
HORT-122	Production Management of Vegetable, Floricultural, Aromatic and Medicinal Crops	2+1=3
HORT-233	Post Harvest Technology of Horticultural Crops	1+1=2
	Total	**4+3+7**
BOT-121	Principles of Plant Biotechnology	1+ 1=2
BOT-362	Environmental Studies and Disaster Management	2+1=3
	Total	**3+2=5**
SSAC-111	Fundamentals of Soil Science	1+1=2
SSAC-122	Soil, Water and Plant analysis	1+1=2
SSAC-233	Soil Fertility, Fertilizers and Nutrient Management	1+1=2
	Total	**3+3=6**
ASDS-111	Animal Production Management	1+1=2
ASDS-122	Value Addition in Animal Products	1+1=2
	Total	**2+2=4**
ENGG-121	Farm Structures and Green House Technology	1+1=2
ENGG-232	Post-Harvest Technology of Agricultural Crops	1+1=2
ENGG-243	Farm Power and Machinery	1+1=2
	Total	**3+3=6**
ENT-121	Fundamentals of Entomology	1+1=2
ENT-352	Integrated Pest Management	1+1=2
	Total	**2+2=4**
PATH-231	Fundamentals of Plant Pathology	1+1=2
PATH-362	Integrated Disease Management	1+1=2
	Total	**2+2=4**
EXTN-231	Communication Skills & Personality Development	1+1=2
EXTN-242	Consumers Psychology in Business Management	1+1=2
EXTN-363	Entrepreneurship Development and Business Management	1+1=2
	Total	**3+3=6**
COMP-111	Information and Communication Technology	1+1=2
	Total	1+1=2
STAT-241	Business Statistics	1+2=3
	Total	1+2=3

	Grand Total	**27+28=55**

2. Department of Agricultural Economics

Course No	Course Title	Credits
ECON- 111	Agricultural and Natural Resource Economics	2+1=3
ECON-122	Money, Banking and International Trade	2+1=3
ECON-233	Principles of Economic Theory	2+1=3
ECON-244	Agril. Co-operation, Institutions and Management	2+1=3
ECON-355	Structure and Dynamics of Indian Agriculture	2+1=3
ECON- 356	Farm Management and Production Economics	2+1=3
ECON-367	Financial Management in Agribusiness	2+1=3
	Total	**14+7=21**

3. Department of Agricultural Marketing

Course No	Course Title	Credits
MKT-121	Introduction to Agricultural marketing	1+1=2
MKT-232	Marketing Institutions and Organizations	1+1=2
MKT-233	Principles of Marketing Management	1+1=2
MKT-234	Market and Trade Acts	2+0=2
MKT-245	Rural Marketing and Market Infrastructure	2+1=3
MKT-246	Input Marketing Management	1+1=2
MKT-357	Product Promotion Methods	1+1=2
MKT-358	Trading of Agricultural Commodities-I	1+1=2
MKT-359	Trading of Agricultural Commodities-II	1+1=2
MKT-3610	Commodity Markets	1+1=2
	Total	**12+9=21**

4. Department of Agribusiness Management

Course No	Course Title	Credits
ABM-111	Principles of Management and Agribusiness	1+1=2
ABM-122	Agro-based Industrialization	1+1=2
ABM-233	Agri. Informatics	1+1=2
ABM-234	Human Resource Management and development	2+1=3
ABM-245	Office Procedures for Agribusiness	0+1=1
ABM-246	Organizational Behaviour for Business Management	2+0=2
ABM-357	Strategic Business Management	1+1=2
ABM-358	Production Management, Planning and Control	1+1=2
ABM-359	Inventory Management	1+1=2
ABM-3510	Agro-processing Management	1+1=2
ABM-3611	Managerial Accounting	1+1=2
ABM-3612	Market Survey and Price Analysis	0+2=2
ABM-3613	Supply Chain Management	1+1=2
	Total	**13+13=26**

Elective Courses

Course No	Course Title	Credits
ELE-HORT 244	High-tech Horticulture	1+2=3
ELE-ABM 2414	Agro Tourism	1+2=3
ELE-ABM 2415	Food Technology and Processing Management	1+2=3
ELE-ABM 3516	Food safety and standards	2+1=3
ELE-MKT 3511	Export Import Management	1+2=3
ELE-MKT 3512	Retail Management	1+2=3
ELE-ABM 3617	Value Chain in Agriculture	1+2=3
ELE-ECON 368	Recent Advances in Banking	1+2=3
ELE-ECON 369	Planning, Formulation and Evaluation of Business Projects	1+2=3

Experiential Learning Programme

Set No	Module No.	Course Title	Credits
I	ELM-ABM 4718	Production Management of vegetable crops	0+10=10
	ELM- MKT 4713	Marketing Management of vegetable crops	0+10=10
II	ELM-ABM 4719	Production Management of floriculture crops	0+10=10
	ELM- MKT 4714	Marketing Management of floriculture crops	0+10=10
III	ELM-ABM 4720	Production Management of oilseed crops	0+10=10
	ELM- MKT 4715	Marketing Management of oilseed crops	0+10=10
IV	ELM-ABM 4721	Production Management of pulse crops	0+10=10
	ELM- MKT 4716	Marketing Management of pulse crops	0+10=10
V	ELM-ABM 4722	Production Management of Dairy Enterprises	0+10=10
	ELM- MKT 4717	Marketing Management of Dairy Enterprises	0+10=10
VI	ELM-ABM 4723	Production Management of Poultry Enterprises	0+10=10
	ELM- MKT 4718	Marketing Management of Poultry Enterprises	0+10=10
VII	ELM-ABM 4724	Value Additions in Major Agril. Commodities	0+10=10
	ELM-MKT 4718	Marketing of Value Added Products	0+10=10
		Any Two modules (From the same set)	**0+20=20**

In Plant Training Programme

Sr. No.	Title	Credits
1	Attachment to Agro. Industry	**0+20=20**
	Total Credits	**0+20=20**

Study tour

Sr.no	Particulars	Semester	Credits
Study tour I	Study tour – I Within State	VII	0+1=1
Study tour II	Study tour – II Other State	VIII	0+2=2
		Total	**0+3=3**

II.Odd and even semester wise layout of B.Sc. (Honours) (Agri.Business Management) courses

1. Departments of Agricultural and Allied Sciences

Semester	Course No.	Title of the Course	Credits	Semester	Course No.	Title of the Course	Credits
Agronomy							
I	AGRO-111	Agro-Techniques of Principal Field Crops- I (Kharif)	1+1=2	II	AGRO-122	Agro-Techniques of Principal Field Crops- II (Rabi)	1+1=2
III	AGRO-233	Irrigation Water Management	1+1=2	IV	AGRO-244	Modern Farming Systems and Sustainable Agriculture	1+1=2
Horticulture							
I	HORT- 111	Production Management of Important Fruit Crops	1+1=2	II	HORT-122	Production Management of Vegetable, Floricultural, Aromatic and Medicinal Crops	2+1=3
III	HORT-233	Post Harvest Technology of Horticultural Crops	1+1=2	IV		NIL	
Botany							
I				II	BOT-121	Principles of Plant Biotechnology	1+1=2
III				IV			
V				VI	BOT-362	Environmental Studies and Disaster Management	2+1=3
Soil Science and Agril. Chemistry							
I	SSAC-111	Fundamentals of Soil Science	1+1=2	II	SSAC-122	Soil, Water and Plant analysis	1+1=2
III	SSAC-233	Soil Fertility, Fertilizers and Nutrient Management	1+1=2	IV		NIL	
Animal Science and Dairy Science							
I	ASDS- 111	Animal Production Management	1+1=2	II	ASDS-122	Value Addition in Animal Products	1+1=2

Agril. Engineering							
I		Nil		II	ENGG-121	Farm Structures and Green House technology	1+1=2
III	ENGG-232	Post-Harvest Technology of Agricultural Crops	1+1=2	IV	ENGG-343	Farm Power and Machinery	1+1=2
Entomology							
I		NIL		II	ENT- 121	Fundamentals of Entomology	1+1=2
III		NIL		IV		NIL	
V	ENT-352	Integrated Pest Management	1+1=2	VI		NIL	
Pathology							
I		NIL		II		NIL	
III	PATH-231	Fundamentals of Plant Pathology	1+1=2	IV		NIL	
V				VI	PATH-362	Integrated Disease Management	1+1=2
Agril. Extension							
III	EXTN-231	Communication Skills & Market-Led Extension for Business Management	1+1=2	IV	EXTN-242	Consumers Psychology in Business Management	1+1=2
V	EXTN-353	Information Technology in Agri- Business	1+1=2	VI			
Statistics							
I	COMP- 111	Information and Communication Technology	1+1=2	IV	STAT-241	Business Statistics	1+2=3
		Total	**13+13=26**			Total	**14+15=29**

2. Department of Agricultural Economics

Semester	Course No.	Title of the Course	Credits	Semester	Course No.	Title of the Course	Credits
I	ECON- 111	Agricultural Economics and Natural Resource Economics	2+1=3	II	ECON-122	Money, Banking and International Trade	2+1=3
III	ECON-233	Principles of Economic Theory	2+1=3	IV	ECON- 244	Agril. Co-operation, Institutions and Management	2+1=3
					ECON- 245	Structure and Dynamics of Indian Agriculture	2+1=3
V	ECON-356	Farm Management and Production Economics	2+1=3	VI	ECON-367	Financial Management in Agri-Business	2+1=3
		Total	**6+3=9**			**Total**	**7+4=11**

3. Department of Agricultural Marketing

Semester	Course No.	Title of the Course	Credits	Semester	Course No.	Title of the Course	Credits
I		NIL		II	MKT-121	Introduction to Agricultural Marketing	1+1=2
III	MKT-232	Marketing Institutions and Organizations	1+1=2	IV	MKT-245	Rural Marketing and Market Infrastructure	2+1=3
	MKT-233	Principle of Marketing Management	1+1=2		MKT-246	Input Marketing Management	1+1=2
	MKT-234	Market and Trade Acts	2+0=2				
V	MKT-357	Product Promotion Methods	1+1=2	VI	MKT-369	Trading of Agricultural Commodities-II	1+1=2
	MKT-358	Trading of Agricultural Commodities-I	1+1=2		MKT-3610	Commodity Markets	1+1=2
		Total	**6+4=10**			**Total**	**6+5=11**

4. Department of Agribusiness Management

Semester	Course No.	Title of the Course	Credits	Semester	Course No.	Title of the Course	Credits
I	ABM-111	Principals of Management and Agri. Business	1+1=2	II	ABM-122	Agro-based Industrialization	1+1=2
III	ABM-233	Agri. Informatics	1+1=2	IV	ABM-245	Office Procedures for Agribusiness	0+1=1
	ABM-234	Human Resource Management and development	2+1=3		ABM-246	Organizational Behaviour for Business Management	2+0=2
V	ABM- 357	Strategic Business Management	1+1=2	VI	ABM-3612	Market Survey and Price Analysis	0+2=2
	ABM-358	Production Management, Planning and Control	1+1=2		ABM-3613	Supply Chain Management	1+1=2
	ABM-359	Inventory Management	1+1=2				
	ABM-3510	Managerial Accounting	1+1=2			NIL	
	ABM-3511	Agro-processing Management	1+1=2				
		Total	**9+8=17**			**Total**	**5+6=11**

III. Total credits offered in various subjects for odd and even semesters in old and revised syllabi of B.Sc.(Honours)(Agri.BusinessManagement)courses

Sr. No.	Subject	Odd Semester Credit		Even Semester Credit		No. of total credit	
		Old	Revised	Old	Revised	Old	Revised
1	Agronomy	5	4	2	4	7	8
2	Horticulture	4	4	3	3	7	7
3	Botany	2	-	2	5	4	5
4	Soil Sci. & Agril. Chemistry.	2	4	2	2	4	6
5	Animal Sci. & Dairy Science	2	2	2	2	4	4
6	Agril. Engg.	2	2	2	4	4	6
7	Entomology	-	4	2	-	2	4
8	Pathology	2	-	2	4	4	4
9	Agril. Extension	4	4	6	2	10	6
10	Computer	2	2	-	-	2	2
11	Statistics	-	-	3	3	3	3
12	Agril. Economics	12	9	12	11	24	21
13	Agril. Marketing	10	10	10	11	20	21
14	Agribusiness Management	13	15	12	11	25	26
15	Experiential learning	20	20	20	20	40	40
	Total	80	80	80	82	160	162
	Elective	-	3	-	6	-	9
	Remedial	-	3	-	-	-	2
	Other Non Credits*	5*	5*	-	-	-	6*
	Grand Total	85	91	80	88	165	180

*** Other Non Credits = 5***

SEMESTER- I

Course No	Course Title	Credits
A)	**Core Course**	
AGRO-111	Agro-Techniques of Principal Field Crops- I (Kharif)	1+1=2
SSAC-111	Fundamentals of Soil Science	1+1=2
HORT- 111	Production Management of Important Fruit Crops	1+1=2
ASDS- 111	Livestock Production and Management	1+1=2
ECON- 111	Agricultural and Natural Resource Economics	2+1=3
ABM- 111	Principles of Management and Agribusiness	1+1=2
	Total	**8+7=15**
B)	**Common Courses**	
COMP- 111	Information and Communication Technology	1+1=2
C)	**Non Gradial Courses***	
LANG-111	Comprehensive and Communication Skills in English	1+1=2
HVE-111	Human Values & Ethics	1+0=1
PHEY-111	Physical Education and Yoga Practices	0+1=1
NSS-111/NCC-111	NSS/NCC	0+1=1
DEG-111	Democracy, Elections and Governance	1+0=1
	Total	**3+3=6**
D)	**Remedial Courses**	
MATH-111	ElementaryMathematics	1+1=2
BIO-1111	Introductory Biology	1+1=2
	Total	**15+6 =23**

SEMESTER- II

Course No	Course Title	Credits
A)	**Core Course**	
AGRO-122	Agro-Techniques of Principal Field Crops- II (Rabi)	1+1=2
HORT-122	Production Management of Vegetable, Floricultural, Aromatic and Medicinal Crops	2+1=3
BOT-121	Principles of Plant Biotechnology	1+1=2
SSAC-122	Soil, Water and Plant Analysis	1+1=2
ASDS-122	Value Addition in Animal Products	1+1=2
ENGG-121	Farm Structures and Green House Technology	1+1=2
ENT-121	Fundamentals of Entomology	1+1=2
ECON-122	Money, Banking and International Trade	2+1=3
MKT-121	Introduction to Agricultural Marketing	1+1=2
MKT-122	Marketing Institutions and Organizations	1+1=2
ABM-122	Agro- based Industrialization	1+1=2
	Total	**13+11=24**

SEMESTER- III

Course No	Course Title	Credits
A)	**Core Course**	
AGRO-233	Modern Farming Systems and Sustainable Agriculture	1+1=2
HORT-233	Post Harvest Technology of Horticultural Crops	1+1=2
SSAC-233	Soil Fertility, Fertilizers and Nutrient Management	1+1=2
PATH-231	Fundamentals of Plant Pathology	1+1=2
ENGG-232	Post-Harvest Technology of Agricultural Crops	1+1=2
EXTN-231	Communication Skills & Personality Development (**Common Courses**)	1+1=2
ECON-233	Principles of Economic Theory	2+1=3
MKT-233	Principles of Marketing Management	1+1=2
MKT-234	Market and trade acts	2+0=2
ABM-234	Human Resource Management and Development	2+1=3
	Common Courses	
ABM-233	Agri. Informatics	1+1=2
	Total	**14+ 10=24**

SEMESTER- IV

Course No	Course Title	Credits
A)	**Core Course**	
AGRO-244	Irrigation Water Management	1+1=2
ENGG-243	Farm Power and Machinery	1+1=2
STAT-241	Business Statistics	1+2=3
EXTN-242	Consumers Psychology in Business Management	1+1=2
ECON-244	Agril. Cooperation, Institutions and Management	2+1=3
MKT-245	Rural Marketing and Market Infrastructure	2+1=3
MKT-246	Input Marketing Management	1+1=2
ABM-245	Office Procedures for Agribusiness	0+1=1
ABM-246	Organizational Behaviour of Business management	2+0=2
B)	**Elective Course (3 credits)**	
ELE-HORT 244	High-tech Horticulture	1+2=3
ELE-ABM 2414	Agro Tourism	1+2=3
ELE-ABM 2415	Food Technology and Processing Management	2+1=3
	(Any one elective) Total	**12+11=23**

SEMESTER –V

Course No	Course Title	Credits
A)	**Core Course**	
ENT-352	Integrated Pest Management	1+1=2
ECON-355	Structure and Dynamics of Indian Agriculture	2+1=3
ECON-356	Farm Management & Production Economics	2+1=3
MKT-357	Product Promotion Methods	1+1=2
MKT-358	Trading of Agricultural Commodity-I	1+1=2
ABM-357	Strategic Business Management	1+1=2
ABM-358	Production Management, Planning and Control	1+1=2
ABM-359	Inventory and Risk Management	1+1=2
ABM-3510	Agro-processing Management	1+1=2
B)	**Elective Course (3 credits)**	
ELE-ABM 3516	Food safety and standards	2+1=3
ELE-MKT 3511	Export Import Management	1+2=3
ELE-MKT 3512	Retail Management	1+2=3
	(Any one elective) Total	**23**

SEMESTER - VI

Course No	Course Title	Credits
A)	**Core Course**	
PATH-362	Integrated Disease Management	1+1=2
ECON-367	Financial Management in Agri-Business	2+1=3
MKT-369	Trading of Agricultural Commodities-II	1+1=2
MKT-3610	Commodity Market	1+1=2
ABM-3611	Managerial Accounting	1+1=2
ABM-3612	Market Survey and Price Analysis	0+2=2
ABM-3613	Supply Chain Management	1+1=2
B)	**Common Courses**	
BOT-362	Environmental Studies and Disaster Management	2+1=3
EXTN-363	Entrepreneurship Development and Business Management	1+1=2
C)	**Elective Course (3 credits)**	
ELE-ABM 3617	Value Chain in Agriculture	1+2=3
ELE-ECON 368	Recent Advances in Banking	2+1=3
ELE-ECON 369	Planning, Formulation and Evaluation of Business Projects	1+2=3
	(Any one elective) Total	**23**

SEMESTER-VII
(Experiential Learning Modules)

Set No	Module No.	Course Title	Credits
I	ELM-ABM 4718	Production Management of vegetable crops	0+10=10
	ELM- MKT 4713	Marketing Management of vegetable crops	0+10=10
II	ELM-ABM 4719	Production Management of floriculture crops	0+10=10
	ELM- MKT 4714	Marketing Management of floriculture crops	0+10=10
III	ELM-ABM 4720	Production Management of oilseed crops	0+10=10
	ELM- MKT 4715	Marketing Management of oilseed crops	0+10=10
IV	ELM-ABM 4721	Production Management of pulse crops	0+10=10
	ELM- MKT 4716	Marketing Management of pulse crops	0+10=10
V	ELM-ABM 4722	Production Management of Dairy Enterprises	0+10=10
	ELM- MKT 4717	Marketing Management of Dairy Enterprises	0+10=10
VI	ELM-ABM 4723	Production Management of Poultry Enterprises	0+10=10
	ELM- MKT 4718	Marketing Management of Poultry Enterprises	0+10=10
VII	ELM-ABM 4724	Value Additions in Major Agril. Commodities	0+10=10
	ELM-MKT 4718	Marketing of Value Added Products	0+10=10
		Any Two modules (From the same set)	**0+20=20**

SEMESTER-VIII
In Plant Training Programme

Sr. No	Course Title	Credits
1.	Attachment to Agro.Industry	0 + 20=20
	Total Credits	**0 + 20=20**

Total Credits of B.Sc.(Honours) (Agri.Business Management) Degree Programme

Details	Credits
Semester I, II, III, IV, V, VI, VII and VIII (with Electives) + Remedial Courses + Non. Gradial Courses	**172 + 3** +5* = 180**

Semester wiseCourse Layout

Semester-I

Course No. : AGRO-111 Course Title : Agro-Techniques of Principal Field Crops- I (Kharif)

Credits : (1+1=2) Semester: I

Theory:

Importance of agricultural meteorology – weather and climatic factors affecting crops.Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of kharif crops.Cereals : Rice, maize, kharif sorghum, pearl millet and minor millets Pulses : Pigeonpea, mungbean, uridbean, horsegram, mothbean, cowpea Oilseeds : Groundnut, sesame, soybean, castor and niger; Fibre crops : Cotton, jute, sunhemp and dhaincha Forage crops : Sorghum, pearlmillet, maize, cowpea, cluster bean, rainfed and irrigated grasses

Practical:

Introduction to agro-meteorological instruments.Rice nursery preparation and transplanting/seed bed preparation and sowing of Kharif crops; Calculations of seed rate; Sowing of soybean, pigeonpea, mungbean, maize, groundnut, and cotton; Effect of seed size on germination and seedling vigour of soybean/groundnut; Effect of sowing depth on germination of soybean; Identification of weeds in rice, maize and soybean fields and study of weed control experiments in these crops; Top dressing of nitrogen in maize and rice and study of fertilizer experiments on rice, maize, sorghum and millets; Study of yield contributing characters, yield calculations, harvesting and yield estimation of above crops; Study of crop varieties and important agronomic experiments; Study of forage experiments.

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Weightage (%)
1	Introduction and importance of Agro-meteorology	6
2	Weather and climate, Factors affecting crops	6
3	Production Technology of cereals (origin, geographical distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield): Cereals: Rice, Maize	12
4	Production Technology of Cereals: *Kharif*Sorghum, Pearl millet	12
5	Production Technology of Minor millets	6
6	Production Technology of Pulses: Pigeon pea, Mungbean	12
7	Production Technology of Pulses: Uradbean, Horsegram	5
8	Production Technology of Pulses: Mothbean, Cowpea	5
9	Production Technology of Oilseeds: Groundnut, Sesame	8

10	Production Technology of Oilseeds: Soybean, Castor, Niger	6
11	Production Technology of Fiber crops: Cotton, Jute	12
12	Production Technology of Fiber crops: Sun hemp, Dhaincha	2
13	Production Technology of Forage crops: Sorghum, Pearl-millet	2
14	Production Technology of Forage crops :Maize, Cowpea	2
15	Production Technology of Forage crops: Cluster bean	2
16	Production Technology of Rain fed and Irrigated grasses	2

Practical Exercises:

ExercisesNo.	Title
1	Introduction to Agro-meteorological instruments
2	Rice nursery preparation
3	Transplanting/Seed bed preparation
4	Sowing of different *kharif* crops
5	Calculations of seed rate
6	Effect of seed size on germination and seedling vigour of crops
7	Effect of sowing depth on germination of different crops
8	Identification of weeds in rice, maize and soybean fields
9	Study of weed control experiments in different crops
10	Top dressing of nitrogen in maize and rice
11	Study of fertilizer experiments on rice, maize, sorghum and millets
12	Study of yield contributing characters
13	Study of yield calculations
14	Harvesting and yield estimation of above crops
15	Study of crop varieties and important agronomic experiments
16	Study of forage experiments

Suggested readings:

1) Text Book:

2) Reference Books:

1. Hand book of Agriculture, ICAR Publication, 6th edition, 2006.
2. Chhida Singh, Prem Singh and Rajbir Singh Modern Techniques of raising field crops, , 2nd edition
3. Rajendra Prasad Field Crops,
4. Reddy SR,Principles of Agronomy, Kalyani PublishersThird edition
5. S.S. Cheema, B.K. Dhaliwal and T.S. Sahota Theory and Digest Agronomy
6. M.M. Hosmani, B.M. Chittarpur and H.B. Babalad.Farm Productivity New Century New Challenges
7. V.G. Vaidya, K.R. Sahasrabuddhe and V.S. Khuspe,Crop production and field experimentation Continental Prakashan, Pune.

3) e-books:

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Course No. : SSAC-111 **Course Title: Fundamentals of Soil Science**

Credits : (1+1=2) **Semester: I**

Theory:

Soil pedological and edapholgical concept. Origin of the earth Earth's crust composition Study of soil forming rocks and minerals, Weathering of rocks and minerals, Soil forming factors and processes, Components of soils, Study of soil profile, Soil physical properties: Soil texture, textural classes, particle size analysis, Soil structure Classification, soil aggregates, significance of soil consistency, Soil crusting. Bulk density and Particle density.Soil porosity, their significance and manipulation. Soil compaction and soil colour, Soil water: Retention and potentials, Drainage: Soil temperature, Soil air: Gaseous exchange. Influence of soil temperature, air on plant growth, Soil colloids: Properties, nature, types and significance, Ion exchange. CEC and AEC. Factors influencing ion exchange and its significance, Soil organic matter: composition, C:N ratio, Soil biology: Definition soil Biomass, soil organisms and their beneficial and harmful roles, Soil survey and USDA Soil classification. Land Capability classification Soils of India, Soils of Maharashtra, Soil erosion. Types, universal soil loss equation & control measures

Practical:

Study of soil farming rocks and their identification, Collection of soil sample and processing of soil for physio-chemical analysis, Study of soil profile in field, Determination of Bulk density and particle density of soil, Determination of hydraulic conducting of soil Determination soil strength and Determination of moisture content of soil, Determination of infiltration rate of soil, Determination of soil texture and particle size analysis by hydrometer method, Determination of soil temperature, Study of basic analytical concepts techniques and calculations, Determination of organic carbon content of soil, Determination pH and EC of soil, Determination of CEC of soil.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightage (%)
1	Soil colour-definition, significance, Munsell soil colour chart. Factors influencing soil colour- parent material, soil moisture and organic matter.	5
2	Soil structure: definition, classification and Genesis. Factors influencing soil structure. Soil consistence, plasticity, Atterberg's limits.	5
3	Soil air : composition, factors influencing soil air, gaseous exchange/ renewal and effect on plant growth	5
4	Soil Temperature : Sources ,distribution of heat, factors influencing soil temperature and measurement of soil temperature and effect on plant growth	7.5
5	Soil chemical properties: Soil colloids: organic, humus, inorganic, secondary silicate clays and hydrous oxides	5
6	Ion exchange: cation and anion, importance of ion exchange.	5

7	pH and nutrient availability, soil buffering capacity.	5
8	Soil organic matter: sources, factors, decomposition and importance.	5
9	Soil water, soil moisture constants, energy concepts, measurement of soil water, movement, pF scale.	5
10	Soil biology :importance soil microbes, benefits and harmful effects	5
11	Soil taxonomy (soil orders), land capability classification, Soils of different ecosystems and their properties. Methods and objective of soil survey Soil erosion, types and control measures.	10
12	Aerial photography : Satellite image interpretation, Soil survey, types and importance ,Remote sensing application in soil and plant studies Soil degradation, soil compaction, compression, Problematic Soils –Salt affected soil, Acid soil, Flooded and Coastal saline soil properties. Management of problematic soils. Soil environmental quality.	10
	Total	**100**

Practical Exercises:

Exercises No.	Title
1	Basic analytical concepts, techniques and calculation.
2	Collection and preparation of soil samples for horticultural crops
3	Determination of moisture content in soil by gravimetric method
4	Determination of pH and EC of soil sample
5	Determination of calcium carbonate by Rapid Titration method
6	Determination of Organic carbon by Walkely and Black method
7	Determination of Bulk density and porosity of soil
8	Textural analysis of soil by Boucouyos hydrometer method
9	Determination of available nitrogen content in soil
10	Determination of available Phosphorus from soil
11	Determination of available Potassium from soil
12	Determination of available sulphur from soil
13	Determination of DTPA extractable micronutrient from soil
14	Description of soil profile in field
15	Determination of soil colour using Munsell colour chart, Estimation of water holding capacity , Field capacity, Permanent wilting point and
16	Determination of soil water potential characteristic curve by tensiometer and pressure plate apparatus Visit to Soil and Water Clinic

Suggested readings:

1) Text Book:

1. By J. A. Daji Text book of Soil Science.

2) Reference books:

1. By C. C. Shah and NK. Narayana (1966) Physical properties of soil
2. By Henry. D. Fothk Fundamentals of Soil Science (8th edition) 1990.
3. By Biswas and Mukharjiee Text book of Soil Science (Second edition) 1994

4. By N. C. BradyNature and properties of soils (Tenth edition), prentice Hall of India Pvt. Ltd. New Delhi.
5. By V.D. Patil & C.V. Mali Fundamentals of Soil Science – A Text Book
6. Fundamentals of Soil Science by ISSS, New Delhi .

3) e book:

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Course No. : HORT -111 **Course Title: Production Management of Important Fruit Crops**

Credit : (1+1=2) **Semester: I**

Theory:

Classification of fruit crops on horticultural basis. Importance, present status and future scope for fruit growing in Maharashtra and India. Area and production, export, import scenario of fruit crops and plantation crops in Maharashtra and India.Nutritive value of fruits, importance of selection of site, fencing, planting systems, high density planting, wind breaks and shelter belts in fruit production.Propagation methods and use of rootstocks, methods of training and pruning. Special horticultural practices like bahar treatment, ringing, girdling, bending, notching, etc. Nutrient management, water management, weed control, mulching, intercropping, use of growth regulators in fruit production, physiological disorders in fruit crops. Package of practices for cultivation of major fruit crops like, mango, banana, citrus, grape, papaya, sapota, guava, pomegranate, minor fruit crops like ber, fig, coconut, arecanut,etc. Industrial value of plantation crops (Give brief cultivation information in tabular form for minor crops).

Practical:

Study of garden tools and implements.Study of propagation media, containers, potting mixture, potting, repotting and transplanting. Nursery practices for raising seedlings. Identification of fruit and plantation crops.Plant propagation by seed, cutting, layering, budding and grafting.Practices in planning (layout) and planting systems of fruit crops.Training and pruning, manures and fertilizers application, irrigation methods. Special horticultural practices like bahar treatment, ringing, girdling, bending, notching etc. Preparation and application of growth regulators.Preparation and application of Bordeaux solution and paste.Identification of important pests and diseases of fruit crops and their control. Harvesting, post harvest treatments, grading and storage. Visit to commercial orchards

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Classification of fruit crops on horticultural basis.	Botanical, Climatic Adaptability, Fruit Morphology, Rate of Respiration, Nutrient Content, Photoperiodic Response	06
2	Importance, present status	Importance, present status and future scope for fruit growing in Maharashtra and India. Area and production, export, import scenario of fruit crops and plantation crops in Maharashtra and India	06
3	Nutritive value of fruits, Importance of selection of site, fencing, planting systems	Role in Human Nutrition Selection of site, Primary Operation, planning of orchard, fencing, Methods of planting systems with diagram	05
4	high density planting, wind breaks and shelter belts in fruit production	Definition, Importance, Characteristics, Advantages	10
5	Propagation methods and use of rootstocks, Methods of training and pruning.	Methods of propagation and their advantages and disadvantages Definition, Methods, Advantages and disadvantages	05
6	Special horticultural practices like bahar treatment, ringing, girdling, bending, notching, etc.	Definition and procedure	06
7	Nutrient management, water management, weed control, mulching, intercropping	Methods of Irrigation, manures and fertilizer application	07
8	Use of PGR physiological disorders in fruit crops	Role of PGR in plant growth Substances and Retardance	10
9	Package of practices for cultivation of major fruit crops like, mango,	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	05
10	Package of practices for cultivation of banana,	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	05
11	Package of practices for cultivation of Citrus	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation,	05

		Manures and Fertilizers, Maturity Indices, Harvesting and Yield	
12	Package of practices for cultivation of Grape	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	05
13	Package of practices for cultivation of Papaya and Sapota	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	07
14	Package of practices for cultivation of Guava and Pomegranate	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	07
15	Package of practices for cultivation of minor fruits Ber, Fig,	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	03
16	Package of practices for cultivation of minor fruits Coconut, Arecanut	Cultivation Practices ,Soil and Climate Requirement ,Varieties, Propagation, Planting, Irrigation, Manures and Fertilizers, Maturity Indices, Harvesting and Yield	03

Practical Exercises:

Exercise No.	Title
1	Study of Garden tools and Implements.
2	Study of Propagation Media, Containers, Potting Mixture, Potting, Repotting and Transplanting.
3	Nursery Practices for Raising Seedlings.
4	Identification of Fruit and Plantation Crops.
5	Plant Propagation by Seed, Cutting, Layering, Budding and Grafting
6	Practices in Planning (Layout) and Planting Systems of Fruit Crops.
7	Training and Pruning.
8	Manures and Fertilizers application
9	Irrigation Methods.
10 & 11	Special Horticultural Practices like Bahar Treatment,Ringing, Girdling, Bending, Notching etc.
12	Preparation and Application of Growth Regulators
13	Preparation and Application of Bordeaux Solution and Paste
14	Identification of Important Pests and Diseases of Fruit Crops and Their Control.

15	Harvesting, Grading and Storage
16	Post Harvest Treatments

Suggested readings:

1) **Text Book:**

2) **Reference books:**

1. Hayes, W. B. Fruit Growing in India. Kitab Publishing Co., Allahabad.
2. Shanmugavelu, K. G. Production Technology of Fruit Crops, SBA Publishers,Kolkatta.
3. Singh, Ranjeet. Fruits. National Book Trust Ltd., New Delhi.
4. Sham Singh. Fruit Growing. Kalyani Publishers, New Delhi.
5. Bose, T. K. and S. K. Mitra. Propagation of Tropical and Subtropical Horticultural Crops, Naya Udyog, 206, BidhanSavani, Kolkatta-700016.
6. Baker, H. Fruits. Mitchell Meagrely Publications, London.
7. Singh, A. Fruit Production and Technology. Kalyani Publishers, New Delhi.
8. Yadav, P. K. Fruit Production Technology. International Book Distributing Co., Division, Lucknow, Inida.
9. Sharma, R. R. Fruit Production Problems and Solutions. International Book Distributing Co., Division, Lucknow, India.
10. Kumar, P. Management of Horticultural Crops. (HortSciene Series Vol. 11, New India Publishing Agency, NIPA). Kumar, P. Management of Horticultural Crops. (HortSciene Series Vol. 11, New India Publishing Agency, NIPA).
11. Kunte, Y. N, Kawthalkar, M. P., Yawalkar, K.S. Principles of Horticulture and Fruit growing, Agro-Horticultural Pub.House, Nagpur.

3) **e book:**

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Course No. : ASDS -111 **Course Title :Livestock Production & Management**

Credit : (1+1=2) **Semester: I**

Theory:

Scope of livestock in Indian economy.Livestock census and trend of livestock production. Terminology used in livestock care, poultry care and management of livestock and poultry i.e. calf, heifer, milking animal, dry animal, pregnant animal, draft animal and breeding bull, stress management. Housing of different livestock and poultry.Routine farm management.Preparation of animal for different purposes. Various breeds of cattle , sheep, goat, buffalo and poultry. Nutrient requirement of livestock and poultry.Maintenance of

records on livestock dairy and poultry farms.Animal health cover, clean and hygienic milk production. Systems of breeding, artificial insemination

Practical:

Study of body parts of different classes of livestock, i.e. cattle, buffalo and poultry.Handling and control of animals. Routine practices on livestock and poultry farms. Vaccination schedules of livestock and poultry. Record keeping, judging of animals for dairy and draft purpose, instruments and equipments used in AI. Layout of various dairy structures. Utilization of dairy farm wastes. Disposal of milk

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightage (%)
1	Scope of livestock in Indian economy. Livestock census and trend of livestock production.	6
2	Terminology used in livestock and poultry	6
3&4	Care and management of livestock i.e. calf, heifer, milking animal, dry animal, pregnant animal, draft animal and breeding bull, stress management.	13
5	Care and management of poultry, Housing of different livestock and poultry.	12
6	Routine farm management	6
7	Preparation of animal for different purposes	6
8	Various breeds of cattle , buffalo, sheep, goat and poultry	7
9& 10	Nutrient requirement of livestock and poultry	6
11&12	Maintenance of records on livestock dairy and poultry farms, Animal health cover.	13
13	Structure of udder and letting down of milk, clean and hygienic milk production	6
14	Reproductive systems of male and female, estrus cycle, pregnancy and parturition	7
15 & 16	Systems of breeding, Artificial insemination	12

Practical Exercises:

Exercises No.	Title
1&2	Study of body parts of different classes of livestock, i.e. cattle, buffalo
3	Study of body parts of poultry
4	Handling and control of animals
5	Routine practices on livestock.
6	Routine practices on poultry farms.
7	Vaccination schedules of livestock and poultry
8	Record keeping for livestock and poultry
9	Judging of animals for dairy and draft purpose
10	Instruments and equipments used in AI.

11	Layout of various dairy and poultry structures
12	Utilization of dairy farm wastes
13	Disposal of milk.
14	Economics of milk production
15	Preparation of viable bank proposal for livestock and poultry
16	Visit to livestock and poultry farm

Suggested readings:

1) **Text Book:**
2) **Reference books:**

1. Singh, R.A. Poultry Production. Kalyani Publishers, New Delhi
2. Maske, O Norton. Commercial Chicken Production. Manuel AVI Publishers, INC West Port.
3. Devendra, C. and G. B. McElroy. Goat and Sheep Production in Tropics – Long man Group Ltd., London.
4. Wong, et al. Fundamentals of Dairy Chemistry. Publishers Van Nastrand Rain hold Comp. New York
5. Ling, E.R. Text Book and Dairy Chemistry. Chapman Hall Ltd., London.
6. Sukumar de Outline of Dairy Technology.
7. Dairy processing Hand book
8. Banerjee, G. C. Text Book of Animal Husbandry. Oxford and IBH Publishers, New Delhi.
9. Sashry, C.K. Thomas and R. A. Singh. Farm Animal Management and Poultry Production. NSR, Vikas Publishing House Pvt. Ltd., Delhi.
10. Hand book of Animal Husbandry, ICAR, New Delhi.
11. Panda, B. and et al. Feeding of Poultry. ICAR, Publication, New Delhi.
12. Singh, R.A. Poultry Production. Publishers, New Delhi

3) **e book:**

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Course No. : COMP -111 CourseTitle: Information and Communication Technology

Credit : (1+1=2) Semester: I

Theory:

UNIT I: IT and its importance; IT tools; IT-enabled services and their impact on society; Computer fundamentals; Hardware and software; Input and output devices; Word and character representation.**UNIT II:** Features of machine language, assembly language, high-level language and their advantages and disadvantages; Principles of programming - algorithms and flowcharts.**UNIT III:** Operating systems (OS) - definition, basic concepts; Introduction to WINDOWS and LINUX Operating Systems; Local area network (LAN); Wide area network (WAN); Internet and World Wide Web; HTML and IP.**UNIT IV:** Introduction to MS Office - Word, Excel, Power Point; Audio visual aids - definition, advantages, classification and choice of A.V. aids; Criteria for selection and evaluation of

A.V aids; Video conferencing; Communication process, Berlo's model, feedback and barriers to communication.

Practical:

Exercises on binary number system; Algorithm and flow chart; MS Word; MS Excel; MS Power Point; Internet applications: web browsing, creation and operation of email account; Analysis of data using MS Excel; Handling of audio visual equipments; Planning, preparation, presentation of posters, charts, overhead transparencies and slides; Organization of an audio visual programme.

Suggested readings:

1) **Text Book:**
2) **Reference books:**
    1. Gurvinder Singh, Rachhpal Singh &Saluja KK. 2003. Fundamentals of Computer Programming and Information Technology.Kalyani Publishers.
    2. Harshawardhan P. Bal. 2003. Perl Programming for Bioinformatics.Tata McGraw-Hill Education.
    3. Kumar A 2015. Computer Basics with Office Automation. IK International Publishing House Pvt Ltd.
    4. Rajaraman V &Adabala N. 2015.Fundamentals of Computers. PHI Recommended Latest Online Tutorials (over Internet).
3) **e book:**

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Course No. : ECON – 111 Course Title :Agriculture & Natural Resource Economics

Credit : (2+1=3) Semester: I

Theory:

Agricultural Economics: Meaning, Definition, Scope and Importance of Agricultural Economics Basic Concepts: Goods, Services, Utility, Value, Price, Wealth, and Welfare, Consumption Wants: Meaning, Characteristics, Classification of Wants, Importance. Utility: Definition, Forms, Law of Diminishing Marginal Utility, Law of Equimarginal Utility Measurement of Utility Factors of Production: Land, Labour, Capital and Organisation Definition, Meaning, Importance. Demand and Supply: Definition, Meaning, Laws, Factors affecting, Types, Determinants. Elasticity: Definition, Types Natural Resource Economics: Natural Resources – Meaning and Importance of Natural Resources. Renewable and Non-Renewable Natural Resources – Meaning and Importance.

Practical:

Exercise on Land Use Classification, Crop Patterns, Distribution of Ownership and Operational Land, Trends in Wages, Area, Production and Productivity of Major Crops in the State. Study of Trends in Natural Resources of Maharashtra and India viz; Land, Forest, Water and Fisheries Estimation of Degrees of Elasticity of Demand, Estimation of Degrees of Elasticity of Supply, Estimation of Equimarginal Utility.

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Weightages (%)
1&2	Agricultural Economics: Meaning, Definition	4
3&4	Scope Importance of Agricultural Economics	4
5&6	Basic Concepts: Goods, Services, Utility.	4
7&8	Value, Price, Wealth, and Welfare, Consumption	8
9&10	Wants: Meaning, Characteristics, Classification of Wants, Importance.	8
11	Utility: Definition, Forms,	4
12	Law of Diminishing Marginal Utility	4
13	Law of Equi marginal Utility	4
14&15	Measurement of Utility Factors of Production: Land, Labour, Capital and Organization.	8
16&17	Measurement of Utility Factors of Production: Definition, Meaning, Importance	8
18&19,20	Demand: Definition, Meaning, Laws, Factors affecting, Types, Determinants.	8
21,22&23	Supply: Definition, Meaning, Laws, Factors affecting, Types, Determinants.	8
24&25	Elasticity: Definition, Types	8
26&27	Resources – Meaning and Importance of Natural Resources.	8
28,29&30	Renewable and Non-Renewable Natural Resources – Meaning and Importance.	12

Practical Exercises:

Exercise No.	Title
1	Exercise on Land Use Classification
2	Study of crop pattern
3	Distribution of Ownership and Operational Land
4	Study of trends in Wages
5	Study of area, Production and Productivity of Major Crops in the State
6	Study of land resources in India
7	Study of forest resources in India
8	Study of water resources in India
9	Study of fisheries resources in India
10	Estimation of Degrees of Elasticity of Demand

11	Estimation of Degrees of Elasticity of Supply
12	Estimation of Equi marginal Utility.

Suggested Readings:

1) Text book:

1. S. Subba Reddy *et al*. Agricultural Economics. Oxford & IBH Publishing Company Pvt. Ltd, New Delhi. Email:oxford@oxford-ibh.in
2. Talathi J.M.*et al. Introduction to* Agricultural Economics and Agribusiness Management Books India New Delhi. Email:onebooks@vsnl.com, www.onebooks.com
3. Agrawal, A.N. Indian Agriculture: Problems, Progress and Prospects. Vikas Publishing House Pvt. Ltd., Delhi.
4. Owen Oliver. Natural Resource Conservation and Ecological Approach. MacMillan Co. 866, Third Avenue, New York – 10022
5. Dewett, K.K, G.C. Singh and J.D. Varma. Elementary Economic Theory. S. Chand and Co.,Ltd.,7361, Ram Nagar, Qutab Road, New Delhi-110 055

2) Reference Books:

1. Dewett, K.K. Modern Economic Theory.
2. Shyam Lal Charitable Trust, Ravindra Mansion Ramnagar, New Delhi –110 055.

3) e book:

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Course No. : ABM -111 Course Title: Principles of Management and Agribusiness

Credit : (1+1=2) Semester: I

Theory:

Agri-business: Meaning, definition, history and scope of agri-business (Input, Farm Product Sectors). Importance of agri-business in the Indian economy.Changing dimension of agricultural business. Agri-business Management-distinctive features, nature and components.

Introduction to management-Management functions -Management levels-Managerial roles-Management skills-Definitions of management-Role of management. Elements, Levels, Process & Functions of Management, Functions of Management:

1. Planning: Definition importance, characteristics, Steps in planning

Types of planning Nature and importance-Purpose of planning-Forms of planning- types of planning -Steps in planning -Limitations of planning.

2.Organizing: Meaning- definition, importance, Characteristics/Nature of organization.Principles & Process of organization.

3. Directing-definition, functions, techniques, qualities of good supervisor.

4. Controlling –Definition, Elements, Process of control, Techniques/ Tools of control.

Farm business analysis - Farm efficiency measures, farm financial & cash accounts, Net worth statement, systems of book keeping.

Practical:

Study of various business models in agri-business.Study of farm records.Study of Systems of book keeping.Study of measures of farm income.Study of measures of farm efficiency. Study of farm planning techniques & situations.Study of farm budgeting techniques & types.Study of farm inventory.Study of cost ratios, capital ratio.Study of balance sheet financial ratio analysis.

Teaching Schedule- Theory with weightages (%):

Lesson No	Topics	Weightage (%)
1 & 2	Agribusiness – Definition, scope for agribusiness in India.	13
3 & 4	Management – Definition, Characteristics, Importance	12
5 & 6	Elements, Levels, Process & Functions of Management	13
7 & 8	Planning- Definition importance, characteristics, Steps in planning Types of planning	12
9 & 10	Organizing- definition, importance, Characteristics/Nature of organization.Principles & Process of organization.	13
11 & 12	Directing-definition, functions, techniques, qualities of good supervisor.	12
13 & 14	Controlling –Definition, Elements, Process of control,Techniques/ Tools ocontrol	13
15 & 16	Farm business analysis (Farm efficiency measures, farm financial & cash accounts, Net worth statement, systems of book keeping)	12

Practical Exercises:

Exercise No.	Title
1	Study of various business models in agri-business.
2	Study of farm records
3	Study of farm inventory
4	Study of System of book keeping
5	Study of farm accountancy
6	Study of measures of farm income
7	Study of measures of farm efficiency
8	Study of farm planning techniques & situations
9	Study of farm budgeting techniques & types
10	Study of problems of partial budgeting
11	Study of cost ratios&capital ratio.
12	Study of balance sheet & financial ratio analysis.
13	Study of farm income statement
14	Study of methods of valuation of farm inventory

15	Study of preparation of farm financial budget & farm family living budget.
16	Study of preparation of cash flow plan

Suggested readings:

1) Text Book:

2) Reference Books:

1. K.Loknandhan, K.Mani, K.Mahendran Innovations in AB
2. D.K.Tripathi Principles& Practices of Management.
3. S.S.Johl, T.R.Kapoor Fundamentals of farm business management

3) e-books:

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Course No. : LANG -111 Course Title :Comprehensive and Communication Skills in English

Credit : (1+1=2) Semester: I

Theory:

The following Lessons from the *textbook-Current English for Colleges* (by N Krishnaswamy andT. Sriraman; Macmillan; 2007 Rs. *951-)-are* for the theory classes along with the Exercises at theend of each lesson.1. Education 2.Employment 3.Unemployment 4.Application 5.Planning 6.Curriculum Vitae 7.Interview 8.Reporting 9. General Knowledge 10. Stress 11.ShortStory 12.Environment 13.Computerecy 14.A Dilemma 15.Entertainment 16.You andYour English 17.Usage and Abusage 18. War Minus Shooting

Practical:

Vocabulary- Antonym, Synonym, Homophones, Homonyms; Functional grammar: Articles,Prepositions; Verb, Subject-Verb Agreement; Written Skills: Paragraph writing, Precise writing; TheStyle: Importance of professional writing; Preparation of Curriculum Vitae and Job applications;Interviews: kinds, Importance and process; Listening Comprehension: Listening to short talkslectures, speeches (scientific, commercial and general in nature). Oral Communication: Stress andIntonation, Conversation practice. Reading skills: reading dialogues, rapid reading, intensivereading, improving reading skills. Mock Interviews: testing initiative, team spirit, leadership,intellectual ability. Group Discussions.

Teaching Schedule- Theory with weightages (%):

Lecture	Topic	Weightage (%)
1	Education	5
2	Employment	5
3	Unemployment	5
4	Application	5

5	Planning	5
6	Curriculum Vitae	5
7	Interview	5
8	Reporting	5
9	General Knowledge	5
10	Stress	5
11	Short Story	10
12	Environment	10
13	Computeracy	5
14	A Dilemma	5
15	Entertainment	8
16	You and Your English	8
17	Usage and Abusage	2
18	War Minus Shooting	2

Practical Exercises:

Exercise No	Title
1	Education
2	Employment
3	Unemployment
4	Application
5	Planning
6	Curriculum Vitae
7	Interview
8	Reporting
9	General Knowledge
10	Stress
11	Short Story
12	Environment
13	Computeracy
14	A Dilemma
15	Entertainment
16	You and Your English
17	Usage and Abusage
18	War Minus Shooting

Suggested readings:

1) Text Book:

2) Reference Books:

1. Krishnaswamy,. Nand Sri raman, T. 1995. Current English for Colleges. Macmillan India Ltd. Madras.
2. Balasubrmanyam M. 1985. Business Communication. Vani Educational Books, New Delhi.

3. Naterop, Jean, B. and Rod Revell Telephoning in English . 1997. Cambridge University Press, Cambridge.
4. Mohan Krishna and Meera Banerjee. 1990. Developing Communication Skills. Macmillan India Ltd. New Delhi.
5. Narayanaswamy V R. 1979. Strengthen your writing. Orient Longman, New Delhi.
6. Sharma R C and Krishna Mohan. 1978. Business Correspondence. Tata Me Graw Hill Publishing Company,New Delhi.
7. Carnegie, Dale. 2012. How to Win Friends and Influence People in the Digital Age. Simon & Schuster.
8. Covey Stephen R. 1989. The Seven Habits of Highly Successful People. Free Press.
9. Spitzberg B, Barge K & Morreale, Sherwyn P. 2006. Human Communication: Motivation, Knowledge &Skills. Wadsworth.
10. Verma, KC. 2013. The Art of Communication. Kalpaz.
11. Mamatha Bhatnagar and Nitin Bhatnagar. 2011. Effective Communication and Soft Skills. Person Education.
12. Meenakshi Raman, Sangeeta Sharma. Technical Communication Principles and Practice
13. Harold Wallace and Ann Masters. Personality Development. Cengage Publishers.

3) e-books:

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Course No. : HVE 111 **Course Title :Human Values and Ethics**

Credit : (1+0=1) **Semester: I**

Theory:

UNIT I : Universal human aspirations: Happiness and prosperity; Human values and ethics: Concept, definition, significance and sources; Fundamental values: Right conduct, peace, truth, love and non-violence; Ethics: professional, environmental, ICT; Sensitization towards others particularly senior citizens, developmentally challenged and gender.

UNIT II: Spirituality, positive attitude and scientific temper; Team work and volunteering; Rights and responsibilities; Road safety; Human relations and family harmony; Modern challenges and value conflict: Sensitization against drug abuse and other social evils; Developing personal code of conduct (SWOT Analysis); Management of anger and stress.

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Weightages (%)
1	**Universal human aspirations:**Happiness and prosperity	6
2	**Human values and ethics:**Concept, definition	6
3	**Human values and ethics:** Significance and sources	6
4	**Fundamental values:** Right conduct, peace, truth, love and non-violence	8
5	**Ethics:** professional, environmental	6
6	**Ethics:** ICT	8
7	**Sensitization** towards others particularly senior citizens, developmentally challenged and gender	8
8-9	**Spirituality**, positive attitude and scientific temper	8
10-11	**Team work** and volunteering, Rights and responsibilities	8
12	**Road safety**; Human relations and family harmony	8
13	**Modern challenges** and value conflict,Sensitizationagainst drug abuse and other social evils	6
14	Developing personal code of conduct **(SWOT Analysis)**	8
15	**Management** of anger	6
16	**Stress Management**	8

Suggested readings:

1) Text Book:

1. Gaur RR, Sangal R & Bagaria GP. 2011. A Foundation Course in Human Values and Professional Ethics. Excel Books.
2. Nagrajan R. S. 2006. Professional Ethics and Human Values. Text book. New Age International (P) Ltd Publishers.
3. Sharma RA. 2011. Human Values and Education -Axiology, Inculcation and Research. R. Lall Book Depot.
4. Sharma RP & Sharma M. 2011. Value Education and Professional Ethics. Kanishka Publishers.
5. Srivastava S.S K Kataria & Sons. 2011. Human Values and Professional Ethics.
6. Srivastava S. 2011. Tripathi A.N. 2009 Environmental Science. . Human Values. New Age International (P) Ltd Publishers.

2) Reference Books:

1. Mathur SS. 2010. Education for Values, Environment and Human Rights. RSA International.
2. Encyclopedia of Ethics, 2nd ed. D. H. Hill Ref. BJ63 .E45 2001 3 vols.

3) e-books:

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Course No. : PEDN-111 **Course Title: Physical Education and Yoga Practices**

Credit : (0+1=1) **Semester: I**

Practical:

Introduction to physical education. Posture, exercise for good posture, physical fitness exercises for agility, strength, coordination, endurance and speed. Rules and regulations of important games, skill development in any one of the games, football, hockey, cricket, volleyball, badminton, throw ball, tennis. Participation in one of the indoor games, badminton, chess and table tennis. Rules and regulations of athletic events, participation in any one of the athletic events, long jump, high jump, triple jump, javelin throw, discuss throw, shot put, short and long distance running, Safety education, movement education, effective way of doing day-to-day activities. First-aid training, coaching for major games and indoor games.Asans and indigenous ways for physical fitness and curative exercises.Exercises and games for leisure time, use and experience.

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Course No. : NSS-111 **Course Title : National Service Scheme**

Credit : (0+1=1) **Semester: I**

Practical: NSS-Orientation of students in national problems, study of philosophy of NSS, fundamental rights, directive principles of state policy, socio-economic structure of Indian society, population problems, brief of five year plan. Functional literacy, non-formal education of rural youth, eradication of social evils, awareness programmes, consumer awareness, highlights of consumer act. Environment enrichment and conservation, health, family welfare and nutrition.

Teaching Schedule- Practical with weightages (%):

Lecture No.	Topic	Weightages (%)
1	Introduction and basic components of NSS: Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS, organizational structure ofNSS,	
2	Code of conduct for NSS volunteers. points to be considered by NSS volunteers awarenessabout health	
3	NSS programmes and activities , Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey,	
4	Analysing guiding financial patterns of ,scheme, youth programme/ schemes of *GOI,*	
5	Coordination with different agencies and maintenance of diary	
6	Understanding youth, Definition, profile, profile, categories, issuesand challenges of youth;	

7	Opportunities for youth who is agent of the social change	
8	Community mobilization, Mapping of community stakeholders, Designing the message as per problems andtheir culture;	
9	Identifying methods of mobilisation involving youth-adult partnership	
10	Social harmony and national integration, Indian history and culture,	
11	Role of youth in nation building, conflict, resolution and peace-building	
12	Volunteerism and shramdan, Indian tradition of volunteerisrn, its need, importance, motivation and constraints;	
13	Shramdan as part of volunteer ism	
14	Citizenship, constitution and human rights, Basic features of constitution of India, fundamental rights and duties,	
15	Human rights, consumer awareness and rights and rights to information	
16	Family and society, Concept of family, community (PRls and other community based organizations) and society	

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Course No. : MATH -111 **Course Title: Mathematics (Deficiency Course)**

Credit : (1+1=2) **Semester: I**

Theory:

Matrices-Definition of matrices, Addition of matrices, Subtraction of matrices, Scalar Multiplication, product of Matrices, Types of Matrices, Transpose of matrix, minor and cofactor.Inverse of matrix by adjoint method upto third order.**Determinants** -Definition of determinant as a function of square matrices, evaluation of determinant of second and third order only. Properties of determinants.**The Plane Co-ordinate Geometry**- Distance Formula, Section Formula, Section formula forinternal division, Section formula for External division.(Without proofs). **Straight Lines**- Equation of co-ordinate axes, Equation lines parallel to axes, Slope –Intercept form of equation of line, Slope -Point form of equation of line, Two Point form ofequation of line, Intercept form of equation of line, General form of equation of line(Statementsof form of equations only), Point of intersection of two straight lines, Angle between two straightlines, conditions for two lines to be parallel and perpendicular.**Circl**e - Definition of circle, various forms of equation of circle i.e. centre-radius form, standardform, three point form, diameter form and General form.**Mensuration**-Illustration of ordinates of curve and common distance between ordinates, Statement of Simpson's 1I3rd Rule(Without proof), Examples based on Simpson's rule.**Function, Limit &Continuity-** Definition of function, types of function, Theorems on limits(statement only), Definition of continuity, Simple Problems on limit, Simple Problems oncontinuity.**Differential Calculus**-Definition of Derivatives,functions (Formulae's), Derivatives of Sum,difference,functions (statement only), Differentiation of functionsimple

problems based on it.**Integral Calculus - Indefinite integral**: Definition, integrals of elementary functions(Formulae) Theorems, Integration of functions by decomposition method, Examples based on it.**Integral Calculus &its Application** -Definite integral :Definition of DefiniteIntegral, Examples based on it, Area under simple well-known curves.(simple problembased on it.)Differentiation of simple product and quotient of two of function (statement only),

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Subtopics	Weightages (%)
1,2	Matrices	Definition of matrices, Addition of matrices, Subtraction ofMatrices, Scalar Multiplication, product of Matrices, Types of Matrices, Transpose of matrix, minor and cofactor. Inverse of matrix by adjoin method up to third order.	11
3	Determinants	Definition of determinant as a function of square matrices,evaluation of determinant of second and third order only. Properties of determinants	06
4,5	The Plane Co-ordinate Geometry	Distance Formula, Section Formula, Section formula for internal division, Section formula for External division.(Without proofs)	11
6,7	Straight lines	Equation of co-ordinate axes, Equation lines parallel to axes, Slope-Intercept form of equation of line, Slope - Point form of equation of line, Two Point form of equation of line, Intercept form of equation of line, General form of equation of line (Statements of form of equations only), Point of intersection of two straight lines, Angle between two straight lines, conditions for two lines to be parallel and perpendicular.	11
8,9	Circle	Definition of circle, various forms of equation of circle i.e. centreradius form, standard form, three point form, diameter form and General form.	11
10,11	Mensuration	Illustration of ordinates of curve and common distance between ordinates, Statement of Simpson's *1/3rd* Rule(Without proof), Examples based on Simpson's rule.	11
12,13	Function, Limits & Continuity	Definition of function, types of function, Theorems on limits (statement only), Definition of continuity, Simple Problems on limit, Simple Problems on continuity.	11
14,15,16	Differential Calculus	Definition of Derivatives, Differentiation of simple functions(Formulae's), Derivatives of Sum ,difference, product & quotient of two functions(statement only), Differentiation of function of function(statement only), simple problems based on it.	11

17	Integral Calculus	Definition, integrals of elementary functions (Formulae) Theorems, Integration of functions by decomposition method Examples based on it.	11
18	Integral Calculus its application	Definite integral: Definition of Definite Integral, Examples based on it, Area under simple well-known curves.(simple problem based on it.)	06

Suggested readings:

1) **Text Book:**
2) A text book Agricultural Mathematics **Reference Books:**

1. A Text Book of Mathematics, 11th Part-I and Part II, 1ih Part-I and Part-II- Maharashtra State Board of secondary and Higher secondary Education-Pune.
2. Mensuration- I by Pierpoint.

3) **e-books:**

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Course No. **BIO-111** **Course Title** **Introductory Biology (New)**

Credits **1+1=2** **Semester** I

Theory:

Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics.Binomial nomenclature and classification Cell and cell division.Morphology of flowing plants.Seed and seed germination.Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae.Role of animals in agriculture.

Practical:

Morphology of flowering plants – root, stem and leaf and their modifications.Inflorence, flower and fruits.Cell, tissues & cell division. Internal structure of root, stem and leaf. Study of specimens and slides.Description of plants - Brassicaceae, Fabaceae and Poaceae.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Lesson Plan	Weightages (%)
1	Introduction to the living world. Composition and biological classification.	5
2	Diversity and characteristics of life.Definition of diversity; studying relationship between different organisms.	5
3	Origin of life ; theories of origin of life ,Oparin-Haldane theory of chemical origin of life.	5
4	Evolution and Eugenics ; evidences of organic evolution, theories of evolution; Definition of Eugenics , genetics and Mendel's experiment.	10
5	Binomial nomenclature and classification.	10

6 & 7	Cell and cell division: Cell Structure, Composition and cell organelles and their functions; Mitosis and meiosis their significance	15
8,9,10 & 11	Morphology of flowering plants. (roots, stems, leaves, flowers and fruits)	25
12	Seed and seed germination: Structure of monocot and dicot seed, Types of germination, factors affecting germination	5
13,14 &15	Plant systematic – Study of families *viz.*	15
	A) Brassicaceae, B) Fabaceae, C) Poaceae	
16	Role of animals in agriculture.	5
	Total	**100**

Practical Exercise :

Exercise No.	Title
1	Morphological studies of flowering plant.
2	Study of different root system and their Modifications.
3	Study of different forms of stems and their modifications.
4	Study of Branching pattern of plants.
5	Study of leaves and their modifications.
6	Study of stipules of leaves, leaf blade leaf venation.
7	Study of inflorescence, flowers and aestivation
8	Study of reproduction organs and placentation.
9	Study of fruits and their different parts.
10	Seed germination studies in different crops.
11	Study of Cell, Tissue and cell division through specimens and slides
12 & 13	Internal structure of root, stem and leaf of monocot and dicot plants.
14	Description of plant belongs to family Brassicacea. viz. Mustard/ Cabbage/ Cauliflower/ Radish. (Any one)
15	Description of plant belongs to family Fabaceae. viz. Pigeon pea/ Pea/ Cowpea/ Wal. (Any one)
16	Description of plant belongs to family Poaceae. viz. Rice/ wheat/ Jowar/ Maize. (Any one)

Suggested readings:

1) Text Book:

1 Cell Biology, Genetics, Molecular Biology and Evolution, P.S. Verma, V.K. Agrwal. S. Chand and Company Ltd. Ram Nagar New Delhi.

2 Evolution of Vertebrates, Edwin H. Colbert, A Wiley, Interscience Publication, John Wiley and Sons New York.

3 A class- book of Botany, A.C. Dutta. Oxford University press
YMCA Library Building. 1 Jai singh Road, New Delhi 110001, India

4 Fundamentals of Genetics, B.D. Singh, Kalyani Publishers B-I/1292, Rajinder Nagar, Ludhiana- 141008

5 A Text book of Practical Btoany-2, Dr. Ashok M. Bendre, Dr. Ashok Kumar. Rastogi Publications Shivaji Road, Meerut – 25002, India

6 Botany- An introduction to Plant Biology, Jamesh D. Mauseth. ContenentalPrakashan 1962, Pune

7 Anatomy of seed Plants, A.C. Datta, Sigh V. Pande P.G., Saiprintopack New Delhi Rastogi, Publication Meerut.
8 Hand book of Animal Husbandry. ICAR, New Delhi Publication. Directorate of knowledge management in agriculture, KrishiAnusandhanBhavan, Pusa New Delhi 110012

2) Reference Books:

3) e-books:

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Text and reference books:

SEMESTER- II

Course No	Course Title	Credits
AGRO-122	Agro-Techniques of Principal Field Crops- II (Rabi)	1+1=2
HORT-122	Production Management of Vegetable, Floricultural, Aromatic and Medicinal Crops	2+1=3
BOT-121	Principles of Plant Biotechnology	1+1=2
SSAC-122	Soil, Water and Plant Analysis	1+1=2
ASDS-122	Value Addition in Animal Products	1+1=2
ENGG-121	Farm Structures and Green House Technology	1+1=2
ENT-121	Fundamentals of Entomology	1+1=2
ECON-122	Money, Banking and International Trade	2+1=3
MKT-121	Introduction to Agricultural Marketing	1+1=2
MKT-122	Marketing Institutions and Organizations	1+1=2
ABM-122	Agro- based Industrialization	1+1=2
	Total	**13+11=24**

Course No. : AGRO-122 Course Title : Agro-Techniques of Principal Field Crops- II (Rabi)

Credit : (1+1=2) Semester-II

Theory:

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops Cereals : wheat, barley, Rabi sorghum Pulses : chickpea, lentil, peas, French bean Oilseeds : safflower, sunflower, linseed, rapeseed and mustard Sugar crops : sugarcane and sugarbeet Medicinal and aromatic crops : mentha, lemon grass, citronella, palma rosa, isabgol and posta Commercial crops : potato and tobacco Forage crops : maize, berseem, lucern and oat.

Practical:

Seed bed preparation and sowing of wheat, sugarcane and sunflower; Calculations on seed rate; Top dressing of nitrogen in wheat and study of fertilizer experiments on wheat and mustard; Identification of weeds in wheat and grain legumes, application of herbicide and study of weed control experiments; Morphological characteristics of wheat, sugarcane, chickpea and mustard; Yield contributing characters of wheat; Yield and quality analysis of sugarcane; Crop distribution in the state and the region; Important agronomic experiments of rabi crops and visit to research stations related to rabi crops.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightage (%)
1	Production Technology of following crops (origin, geographical distribution, economic importance, soil and climatic requirement, varieties, cultural	

	practices and yield) Production technology of Cereals: Wheat	8
2	Production Technologyof Cereals: Barley	4
3	Production Technology of Cereals: Rabi sorghum	6
4	Production Technologyof Pulses: Chickpea, lentil	10
5	Production Technology of Pulses: Peas, French bean	5
6	Production Technology of Oilseeds: Safflower, Sunflower	8
7	Production Technology of Oilseeds: Linseed, Rapeseed and mustard	8
8	Production Technology of Sugar crops: Sugarcane	12
9	Production Technology of Sugar crops: Sugar beet	8
10	Production Technology of Medicinal and Aromatic plants: Mentha, Lemon grass	2
11	Production Technology of Medicinal and Aromatic plants: Citronella, Palma Rosa	2
12	Production technology of Medicinal and Aromatic plants: Isabgol, Posta	2
13	Production technology of Commercial crops: Potato	10
14	Production technology of Commercial crops: Tobacco	10
15	Production technology of Forage crops: Maize, Barseem	2
16	Production technology of Forage crops: Lucerne, Oats	2

Practical Exercises:

Exercise No.	Title
1	Study of Seed bed preparation
2	Sowing of wheat, sugarcane and sunflower
3	Calculations of seed rates of different crops
4	Top dressing of nitrogen in wheat
5	Study of fertilizer experiments on wheat and mustard
6	Identification of weeds in wheat and grain legumes
7	Application of herbicides on different crops
8	Study of weed control experiments
9	To study morphological characteristics of Wheat and Sugarcane,
10	To study morphological characteristics ofChickpea and Mustard
11	To study yield contributing characteristics of wheat
12	Yield and quality analysis of sugarcane
13	To study crop distribution in the state
14	To study crop distribution in the region
15	To study agronomic experiments of rabi crops
16	Visit to research stations related to rabi crops

Suggested readings:

1) Text Book:

2) Reference Books:

1. Hand book of Agriculture, ICAR Publication, 6th edition
2. Chhida Singh, Prem Singh and Rajbir Singh Modern Techniques of raising field crops, 2nd edition

3. Rajendra Prasad Field Crops,
4. Reddy SR Principles of Agronomy Kalyani Publishers Third edition
5. Fageria MS Vegetable Crop Production, Kalyani Publishers
6. Syamal MM Production Technology of Medicinal and Aromatic plants

3) e-books:

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Course No. : HORT-122 Course Title :Production Management, Vegetables, Floricultural, Aromatic and MedicinalCrops.

Credit : (2+1 =3) Semester : II

Theory:

Vegetable: Definition, scope and importance of vegetable crops, area, production, distribution, exports and imports of vegetables from Maharashtra and India. Nutritive value, classification of vegetables, type of vegetable farming – kitchen garden, market garden, truck garden, vegetable production for processing, vegetable seed production, role of growth regulators in vegetable production. Cultivation of major vegetables like Tomato, Potato, Chilli, Brinjal, Onion, , Cabbage, Cauliflower, Watermelon, Cucumber and minor vegetables like Methi, Coriander, Palak, Amaranthus, Lettuce, Drumstick, Tondali. Note: tabular form crops:garlic, peas, beans, muskmelon, bitter gourd, bottle gourd, ridge gourd, red pumpkin, sponge gourd, snake gourd and minor vegetables like methi, coriander, palak, amaranthus, lettuce, drumstick, tondali, Floriculture: Importance and scope of floriculture industry in Maharashtra and India. Horticulture gardening. Principles of garden design (Formal and Informal garden and Land scaping), Production technology of rose, chrysanthemum, aster, carnation, jasmine, marigold, gladiolus, tuberose, gaillardia, orchids, anthurium, gerbera and dahlia.(Give brief cultivation information in tabular form for minor vegetable and flower crops).Note: tabular form crops:Aster, Carnation, Jasmine, Marigold, Tuberose, Gaillardia, Orchids,Anthuriu and Dahlia.

Practicals:

Identification of vegetable and ornamental plants.Planning and layout of kitchen garden. Raising and transplanting of vegetable seeds and seasonal flowers..Training and pruning of roses and pinching and disbudding in chrysanthemum.Planning and layout of gardens and garden designs for public and private areas.Intercultural operation in vegetable and ornamental/flower crops. Identification of important pests and diseases of vegetable and floricultural crops.. Flower arrangement and prolonging the vase life of cut flowers. Working out cost of cultivation of vegetable and floricultural crops (one crop each). Visit to

commercial vegetable and floriculture gardens. Identification of aromatic and medicinal plant.

Teaching Schedule- Theory with weightages (%):

Lesson No	Topics	Subtopic	Weightage (%)
1& 2	Vegetable: Definition, scope and importance of vegetable crops, area, production, distribution, exports and imports of vegetables from Maharashtra and India.	Vegetable: Definition, scope and importance of vegetable crops, area, production, distribution, exports and imports of vegetables from Maharashtra and India.	4
3	Nutritive Value, classification of vegetables,	Classification based on botanical, hardiness, Parts used as a food, method of culture	5
4 & 5	Type of vegetable farming – kitchen garden, market garden, truck garden, vegetable production for processing, vegetable seed production,	Kitchen garden (Diagram), Market garden, Truck garden, Vegetable production for processing Vegetable seed production.	4
6	Role of growth regulators in vegetable production.	Uses of PGR	3
7	Cultivation of major vegetables like Tomato, Potato	Cultivation practices	4
8	Cultivation of major vegetables like Chili, Brinjal	Cultivation practices	4
9	Cultivation of major vegetables like Onion Cabbage, Cauliflower	Cultivation practices	4
10	Cultivation of major vegetables like Watermelon, Cucumber	Cultivation practices	4
11	Minor vegetables like Fenugreek, Coriander,	Cultivation practices	3
12	Minor vegetables- Palak, Amaranths	Cultivation practices	3
13	Minor lettuce, Drumstick, Ivy gourd	Cultivation practices	4
14	Minor vegetables like Garlic, Peas, Beans, Muskmelon, Bitter Gourd	Cultivation practices	2
15&16	Bottle Gourd, Ridge Gourd, Red Pumpkin, Sponge Gourd, Snake Gourd tabular form crops:	Cultivation practices	2
17	Floriculture: Importance and scope of floriculture industry in Maharashtra and India.	Floriculture: Importance and scope of floriculture industry in Maharashtra and India.	4
18	Horticulture gardening.	Types of gardens	4
19&20	Principles of garden design (Formal and Informal garden and Landscaping)	Principles of garden design (Formal and Informal garden and Landscaping)	4
21	Production technology of rose	Cultivation practices	5
22&23	Production technology of chrysanthemum, aster	Cultivation practices	5

24&25	Production Technology of Carnation.	Cultivation practices	5
26&27	Production technology of Jasmine	Cultivation practices	5
28	Production technology of Marigold, Gladiolus,	Cultivation practices	5
29&30	Production technology of Tuberose, Gaillardia.	Cultivation practices	4
31	Production technology of Orchids, Anthurium,.	Cultivation practices	5
32	Production technology of Gerbera and Dahlia.	Cultivation practices	4

Practical exercises:

Exercise No.	Title
1	Identification of vegetable and ornamental plants.
2	Planning and layout of kitchen garden.
3	Raising and transplanting of vegetable seeds and seasonal flowers..
4	Training and pruning of roses
5	pinching and disbudding in chrysanthemum
6	Planning and layout of gardens
7	Garden designs for public and private areas.
8	Intercultural operation in ornamental/flower crops.
9	Intercultural operation in vegetable
10	Identification of important pests and diseases of vegetable and floricultural crops..
11	Flower arrangement and prolonging the vase life of cut flowers.
12	Working out cost of cultivation of floricultural crops .
13	Working out cost of cultivation of vegetable
14	Visit to commercial vegetable
15	Visit to commercial floriculture gardens.
16	Identification of aromatic and medicinal plants.

Suggested readings:

1) Text Book:

2) Reference Books:

1. Bose, T. K., Som, M. C. and Kabir.Vegetable Crops. Naya Prokash,
2. Calcutta Chaudhari, B. Vegetables.National Book Trust of India.
3. Bose, T. K. and L. P. Yadav.Commercial Flowers. Naya Prokash, Calcutta.
4. Radha, J. H. and A. Mukhopadhay.Floriculture in India. Allied Publishing Pvt.Ltd., New Delhi.
5. Prasad, S. 2005. Commercial Floriculture. Agrobios (India), Jodhpur.
6. Singh, A. K. 2006. Flower Crops: Cultivation and Management. New IndiaPublishing Agency, NIPA.

7. Gopalkrishnan, T. R. 2007. Vegetable Crops.(Hort. Science Series Vol. 4.New India Publishing Agency, NIPA.
8. Shinde S. J, S.D. Jature & B.G.Hiwale.2008.A Text Book on Production Technology of Vegetables & Flowers. Shri Rajlaxmi Prakashan. Aurangabad.
9. Chadda. K.L. Handbook of Horticulture. ICAR.
10. Nalage N.A. Navigator for Horticulture. Universal Prakashan, Pune.

3) e-books:

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Course No. : BOT -121 **Course Title :Principles of Plant Biotechnology**

Credit : (1+1=2) **Semester : II**

Theory:

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Nutritional requirements of in-vitro cultures; Techniques of In-vitro cultures, Micropropagation, Anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture, Factors affecting above in-vitro culture; Applications and Achievements; Somaclonal variation, Types, Reasons: Somatic embryogenesis and synthetic seed production technology; Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement. Genetic engineering; Restriction enzymes; Vectors for gene transfer – Gene cloning – Direct and indirect method of gene transfer – Transgenic plants and their applications. Blotting techniques – DNA finger printing – DNA based markers – RFLP, AFLP, RAPD, SSR and DNA Probes – Mapping QTL – Future prospects. MAS, and its application in crop improvement. Nanotechnology: Definition and scope, types of nano material and their synthesis, green synthesis. Tools and techniques to characterize the nano particles.Nano-biotechnological applications with examples, Nano toxicology and safety.

Practical:

Requirements for Plant Tissue Culture Laboratory; Techniques in Plant Tissue Culture; Media components and preparations; Sterilization techniques and Inoculation of various explants; Aseptic manipulation of various explants; Callus induction and Plant Regeneration; Micro propagation of important crops; Anther, Embryo and Endosperm culture; Hardening / Acclimatization of regenerated plants; Somatic embryogenesis and synthetic seed production; Isolation of protoplast; Demonstration of Culturing of protoplast; Demonstration of Isolation of DNA; Demonstration of Gene transfer techniques, direct methods; Demonstration of Gene transfer techniques, indirect methods; Demonstration of Confirmation of Genetic transformation; Demonstration of gel-electrophoricsis techniques. Green synthesis of nano particles and their size characterization.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Sub Topics	weightages (%)
1.	History, scope and importance of Biotechnology in Crop Improvement	History of Plant Tissue Culture and Plant Genetic Engineering, scope and importance in Crop Improvement:	10
2.	Totipotency and Morphogenesis,	Definition, Importance of totipotency and morphogenesis.	8
3.	Nutritional requirements of in-vitro cultures.	General techniques of tissue and cell culture, Different composition of culture medium, components of tissue culture medium, importance of growth regulator in culture medium	8
4.	Techniques of In-vitro cultures	Types of culture, Micro-propagation, Anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture Factors affecting above in-vitro culture; Factors affecting above in-vitro culture; Applications and Achievements;	7
5.	Somaclonal variation,	Introduction, causes, procedure and application in crop improvement. Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement.	10
6.	somatic embryogenesis	Types, direct and indirect embryogenesis, factors influencing somatic embryogenesis and synthetic seed production technology	8
7.	Protoplast Culture,	Introduction, method of protoplast fusion, selection of somatic hybrids and application of somatic hybridization.	7
8.	Genetic engineering;	Concept, vector and its types Restriction enzymes, Recombinant DNA techniques – Gene cloning, Direct and indirect method of gene 6transfer – Transgenic plants and their applications.	6
9.	Blotting techniques –	Types, procedure, Application, advantages and disadvantages.	10
10.	DNA finger printing	Introduction, Methodology, DNA based markers – RFLP, AFLP, RAPD, SSR and DNA Probes –	10
11.	Mapping QTL –	Introduction, concept, types,Mapping QTL – Future prospects. MAS (Marker Assisted Selection), and its application in crop improvement.	8
12.	Nanotechnology:	Definition and scope, types of nano material and their synthesis, green synthesis. Tools and techniques to characterize the nano particles. Nano-biotechnological applications with examples, Nano toxicology and safety.	8

Practical Exercises :

Exercise No.	Title
1.	General instruction and laboratory methods.
2.	Plant tissue culture laboratory organization.
3.	Plant tissue culture laboratory equipments and their uses.
4.	Dry, Heat and Wet Heat sterilization methods
5.	Chemical sterilization, Filtration and UV irradiation.
6.	Preparation of solutions
7.	Preparation of tissue culture media and their composition
8.	Establishment and maintenance of callus culture from different explants, sub culture of callus.
9.	Production of embryogenic callus
10.	Indiect organogenesis: Production of shoots and roots from callus
11.	Acclimatization and Hardening
12.	Micro propagation with shoot apex culture in different plants (Banana)
13.	Demonstration of Gene transfer techniques, direct methods and indirect methods;
14.	Demonstration of Confirmation of Genetic transformation;
15.	Demonstration of gel-electrophoresis techniques.
16.	Green synthesis of nano particles and their size characterization.

Suggested Reading:

1) Text Book:

2) Reference books:

1. Singh, B D, 2004. *Biotechnology Expanding Horizons* 2nd Edn.Kalyani Publishers, New Delhi.
2. Gupta, P.K., 2015. *Elements of Biotechnology* 2nd Edn. Rastogi and Co., Meerut.
3. Razdan M K, 2014. *Introduction to plant Tissue Culture* 2nd Edn. Science Publishers, inc. USA.
4. Gautam V K, 2005. *Agricultural Biotechnology*. Sublime Publications
5. Thomar, R.S., Parakhia, M.V., Patel, S.V. and Golakia, B.A., 2010. *Molecular markers and Plant biotechnology*, New Publishers, New Delhi.
6. Purohit, S.S., 2004. *A Laboratory Manual of Plant Biotechnology* 2nd Edn. Agribios, India.
7. Singh, B.D. 2012. *Plant biotechnology*. Kalyani publishers, Ludhiana
8. Bilgrami, K.S. and Pandey, A.K.1992. *Introduction to biotechnology*. CBS Pub. New Delhi
9. Gupta, P.K. 1994. *Elements of biotechnology*. Rastogi Pub. Meerut.
10. Chahal, G.S. and Gosal, S.S.2003. *Principles and procedures of plant approaches breeding Biotechnological and conventional*. Narosa Publishing House, New Delhi.

3) e-reading: http://ecourses.iasri.res.in/

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Course No. : (SSAC -122) **Course Title :Soil, Water and Plant Analysis**

Credit : 1+1=2 **Semester : II**

Theory:

Importance and objectives of soil, water and plant analysis Principles of instrumentation in soil, water and plant analysis, Methods of soil, water and plant sampling and processing for analysis, Nutrient mobility, diffusion and mass flow, Renewal of gases in soil and their abundance, Principles and methods of measurement of oxygen diffusion rate and redox potential, Radio tracer technology application in plant nutrient studies and fertility evaluation, Soil micro-organisms and their importance, Saline and alkali appraisal and management, Acid soil appraisal and management, Waterlogged soil appraisal and management, Sandy soil appraisal and management, Chemical and mineral composition of horticultural crops, Leaf analysis standards , index tissue, interpretation of leaf analysis values Rapid tissue test for plant, Management of poor quality irrigation water in crop management Soil pollution and water pollution.

Practical:

Collection and preparation of soil, water and plant samples for analysis, Preparation of standard solutions, Determination of pH and EC of soil, Determination of SAR and ESP of soil, Estimation of moisture content in soils and plants, Determination of available nitrogen in soil, Determination of available phosphorus in soil, Determination of available potassium in soil, Determination of DTPA extractable micronutrients in soil, Determination of DTPA extractable micronutrients in soil, Determination of boron, Determination of pH and EC in irrigation water samples, Determination of Carbonates , bicarbonates sulphates and chlorides in irrigation water, Determination of calcium, magnesium , sodium , potassium and Boron in irrigation water, Determination of NPK calcium , magnesium and sulphur in plant sample, Determination of micronutrients in plant sample, Preparation of plant nutrient deficiency symptoms album.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightage%
1 & 2	Importance and objectives of soil, water and plant analysis Principles of instrumentation in soil, water and plant analysis	10
3	Methods of soil, water and plant sampling and processing for analysis	7.5
4	Nutrient mobility, diffusion and mass flow	7.5
5	Renewal of gases in soil and their abundance	5
6	Principles and methods of measurement of oxygen diffusion rate and	7.5

	redox potential	
7 & 8	Radio tracer technology application in plant nutrient studies and fertility evaluation	10
9	Soil micro-organisms and their importance	5
10	Saline and alkali appraisal and management	5
11	Acid soil appraisal and management	5
12	Waterlogged soil appraisal and management	5
13	Sandy soil appraisal and management	5
14	Chemical and mineral composition of horticultural crops	7.5
15	Leaf analysis standards , index tissue, interpretation of leaf analysis values Rapid tissue test for plant	10
16	Management of poor quality irrigation water in crop management Soil pollution and water pollution	10

Practical Exercises:

Exercise No.	Title
1	Collection and preparation of soil, water and plant samples for analysis
2	Preparation of standard solutions
3	Determination of pH and EC of soil
4	Determination of SAR and ESP of soil
5	Estimation of moisture content in soils and plants
6	Determination of available nitrogen in soil
7	Determination of available phosphorus in soil
8	Determination of available potassium in soil
8	Determination of DTPA extractable micronutrients in soil
10	Determination of boron
11	Determination of pH and EC in irrigation water samples
12	Determination of Carbonates , bicarbonates sulphates and chlorides in irrigation water
13	Determination of calcium, magnesium , sodium , potassium and Boron in irrigation water
14	Determination of NPK calcium , magnesium and sulphur in plant sample
15	Determination of micronutrients in plant sample
16	Preparation of plant nutrient deficiency symptoms album

Suggested readings:

1) Text Book:

2) Reference Books:

1. Jackson, M.L. Soil Chemical Analysis. Prentice Hall of India Pvt. New Delhi
2. Klute, A. Methods of Soil Analysis. Soil Sci. Soc. Am. Inc. Madison, Wisconsin, USA.
3. Page, A.L., Millar, R. H. and R. D. Keeney.Methods of Soil Analysis. Soil Sci. Soc. Am. Inc. Madison, Wisconsin, USA.
4. Piper, C. S. Soil and Plant Analysis. Academic press., New York.

5. Westerman, R. L. Soil Testing and Plant Analysis. No. 3,Soil Sci. Soc. Am. Inc. Madison, Wisconsin, USA.

3) e-books:

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Course No. : ASDS -122 **Course Title: Value Addition in Animal Products.**
Credit : 1+1=2 **Semester: II**

Theory:

Present status of dairy, poultry, meat, wool and hide industries in WTO regime.Milk composition of different species.Production, packing, marketing of milk, meat and their products.Import, export of animal and poultry products. Utilization of animal dung, poultry manure for F.Y.M. and vermi compost, gobar gas production and its valuation, price regulation in animal products. Factors influencing price.Trends in marketing and utilization of animal products.Importance of hides and bones, quality standards and storage. Market standards and regulation of animal products.

Practical:

Organoleptic quality and evaluation of milk and milk products- meat, egg, wool and chicken.Physical properties of milk, meat, egg, wool and chicken.Chemical composition of different animal and poultry products.Visit to different slaughter houses may be included

Teaching Schedule- Theory with weightages (%):

Sr. No.	Topic	weightages (%)
1 &2	Present status of dairy, poultry, meat, wool and hide industries	8
3	Milk composition and important constituents of milk of different species	7
4	Structure of eggs and important constituents of egg	7
5	Meat composition and important constituents of meat	7
6	Reception, pasteurization, standardization and cooling of milk	7
7	Study of various dairy products	6
8	Processing and packaging of egg and chicken	8
9	Utilization of animal product waste	6
10	Standards for milk and Milk products and marketing of milk	8
11	Grading and marketing of egg	6
12	Quality and marketing of meat, chicken	6
13	International requirements for meat and eggs	6
14	Price regulation in animal products. Factors influencing price.	6
15	Trends in marketing and utilization of animal products	6
16	Importance of hides and bones, quality standards and storage	6

Practical Exercises:

1. Organoleptic quality and evaluation of milk and milk products- meat, egg, wool and chicken.
2. Physical properties of milk, meat, egg, wool and chicken.
3. Composition of different animal and poultry products.
4. Study of different marketing systems for animal and poultry products.
5. Study of different machinery and equipments for milk, meat and egg processing.
6. Preparation of value added milk products-I (Flavoured milk, dahi, Lassi, chakka and Shrikhand)
7. Preparation of value added milk products-II (Paneer, Ice cream)
8. Preparation of egg based products .
9. Preparation of meat based products
10. Study of meat cuts and edible / non edible offal.
11. Shearing, grading and marketing of wool.
12. Preparation of meat and chicken based value added products
13. Processing and preservation of animal products for marketing.
14. Different packaging materials useful for animal and poultry products.
15. Different methods of slaughtering the animals, poultry and their effects on quality of products.
16. Visit to existing marketing structures of animal products, co-operatives and private organizations

Suggested readings:

1) Text Book:

2) Reference Books:

1. Singh, R.A. Poultry Production. Kalyani Publishers, New Delhi.
2. Maske, O Norton. Commercial Chicken Production. Manuel AVI Publishers, INC West Port.
3. Devendra, C. and G. B. McElroy. Goat and Sheep Production in Tropics – Long man Group Ltd., London.
4. Wong, et al. Fundamentals of Dairy Chemistry. Publishers Van Nastrand Rain hold Comp. New York
5. .Ling, E.R. Text Book and Dairy Chemistry. Chapman Hall Ltd., London.
6. Sukumar de Outline of Dairy Technology.
7. Dairy processing Hand book.

3) e-books:

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Course No. : ENGG -121 **Course Title: Farm Structure and Green House Technology**

Credit : (1+1=2) **Semester : II**

Theory:

Introduction, location, size and arrangement of farmstead, Planning of farm residence, Disposal field - septic tank, soak pit, its location, capacity, construction and maintenance. Farm fencing and its types.Animal shelter and their types.Poultry housing and their types.Building materials.Farm silos and their types.History, development and scope of green house technology.Types of green houses.Green house planning, layout and its construction. Effect of temperature, pH and CO_2 with reference to micro-climate on green house crops .Role of light, ventilation, cooling, utility of green house for different crop production, covering material, irrigation, fertigation and humidification inside green house.

Practical:

Planning and layout of farmstead.Planning and layout of dairy barn.Planning and layout of poultry house.Study of farm fencing.Study of building materials.Study of silos.Study of planning of green house.Study of construction materials for green house.Study of glazing material.Study of irrigation system for green house.Study of cooling system for green house. Visit to various green houses/dairy barn/poultry houses

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Introduction, Location, Size and arrangement of farmstead	Introduction of subject, Definition-farmstead, Location of farmstead, Size and arrangement of farmstead	15
2	Planning of farm residence, Septic tank	Planning of farm house, Farm house design, Septic tank – Principle, functions, location, capacity, cleaning	
3	Disposal field - Soak pit, its location, capacity, construction and maintenance	Disposal field, Soakage pit – its location , capacity, construction and maintenance, Bore-hole latrine	
4	Farm fencing and its types	Farm fencing and its uses, Types of farm fencing 1. Woven wire fencing, 2. Barbed wire fencing, 3. Plain wire fencing, 4. Welded wire fencing, 5. Electric wire fencing, 6. Problems	5

		on barbed wire fencing	
5	Animal shelter and their types	Animal shelter – its types, Types of dairy barn 1.Stanchion barn a) face in type b) Face out type, 2. Loose housing barn, 3. Open air barn, Milking parlour, Pen barn, Community barn	10
6	Poultry housing and their types	Housing requirements, Types of Poultry Houses- 1.Wire floored poultry houses, 2.Deep litter poultry houses, 3.Cage houses Brooder Houses, Poultry equipments	10
7	Building Materials	Types of Building Materials: 1. Concrete – properties, slump test, example, curing, 2. Cement – types, 3.Sand – tests for quality, 4. Gravel, 5. Lime – classification, 6. Surkhi, morter, 7. Bricks – classification, 8. Timber, Seasoning	10
8	Farm Silo and their types	Types of silo – Tower silo, Horizontal silo, Pit silo, trench silo, Problems on silo	10
9	History, development and scope of green house technology	Definitions – greenhouse, History, scope of greenhouse technology, Advantages of greenhouse, Site selection for greenhouse installation, Green house effect	
10	Types of greenhouses	Types that accepted by Govt. of Maharashtra, Classification on the basis of span, Types on the basis of shape, Types on the basis of glazing/covering material, Types based on construction	10
11	Green house planning, layout and its construction	Planning of green house, Site selection for greenhouse installation, Factors deciding area under greenhouse, Greenhouse orientation, Layout of greenhouse , Construction materials for greenhouse, Type of loads considered for design	
11	Covering material	Glazing material for greenhouse, Properties of glazing material	10
13	Effect of temperature, pH and CO2 with reference to micro-climate on greenhouse crops, Role of light, Ventilation	Light control in the greenhouse, Light intensity, Duration of light, Factors affecting the temperature, Effect of temperature, pH and CO2 with reference to micro-climate on greenhouse crops	
14	Cooling systems	Methods of cooling systems, Natural cooling	

		systems, Evaporative cooling systems (a) Fan and Pad cooling systems (b) High Pressure mist systems (c) Low pressure mist systems	15
15	Irrigation Methods	Hand watering, Flooding, Perimeter Watering, Sprinkler Irrigation, Drip Irrigation	
16	Fertigation and Humidification inside greenhouse	Fertigation and Humidification in greenhouse	5

Practical Exercises:

Exercise No.	Title
1	Study of Planning and Layout of Farm Stead & Farm House
2	Study of Farm Fencing & Its Types and numerical on farm fencing
3	Study of Planning & Layout of different types of Dairy Barn
4	Study of Planning & Layout of different types of Poultry House
5	Design of silos
6	Study of Building Materials
7	Study of Planning of Greenhouse
8	Study of different types of Greenhouses
9	Study of Construction Material for the Greenhouses
10	Study of Glazing Materials for Greenhouses
11	Study of Irrigation Systems in Greenhouse
12	Study of Cooling Systems & Ventilation of Green Houses
13	Cost estimation of greenhouse
14	Study of Instruments used in Greenhouse
15	Visit to various greenhouse
16	Visit to dairy barn / poultry house

Suggested readings:

1) Text Book:

1. A. M. Michael, and T. P. Ojha Principles of Agricultural Engineering.. Vol. I, Jain Brothers., New Delhi.
2. Sawant B.P., Potekar J. M. and H. W. Awari. A text book of Greenhouse and Post Harvest Technology. Nikita Publication, Latur
3. P. V. Nelson.Green House Operation and Management. Reston Pub. Co. Inc. Apprentice Hall Co. Reston, Virginia.

2) Reference Books:

1. K. Radha Manohar, and C. IgathinathaneGreenhouse – Technology & Management.. Publications, Hyderabad.

2. Tiwari, GN. and R. Green House Technology – Fundamentals, Design, Modelling and Application..K. Goyal. Naroso Publishing Co. Bombay.

3) e-books:

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Course No. : ENT-121 **Course Title : Fundamentals of Entomology**

Credit : (1+1=2) **Semester : II**

Theory:

Systematic and Taxonomy – Classification and characteristics of Phylum Arthropoda &Characteristics of Hexapoda**, 1.** Morphology of insects**, 2.** Major pests in following crops: **a.** Scientific name, **b.**Symptoms of insect damages**, c.** Lifecycle of insect/pests, **d.** Management of insects,**Cash crops**- Sugarcane, cotton, **Cereals**- Paddy,Jawar,Bajra,Wheat,Maize**, Pulses**- Pigeon pea, **Oilseed crops**- Ground nut, Soya bean**, Fruits**- Mango, Grapes, Pomegranate, Citrus, Banana**, Vegetable crops**- Brinjal, Okra, Tomato, Chilly, Onion, Cabbage & cauliflower. Honey Bees and Bee-keeping**,** Silkworms and Sericulture &Pests of stored products and their management

Practicals:

Collection and preservation of insects,Identification of insects and their damages**,** Morphology of insects- Types of legs,Types of mouthparts**,** Types of antenna &Dissection of cockroach (Digestive system)

Teaching Schedule- Theory with weightages (%):

Lesson No	Topics	Points to be covered	Weightage (%)
1-3	Systematics and Taxonomy	Classification and characteristics of Phylum Arthropoda Characteristics of Hexapoda	15
3-5	Morphology of insects	Head, Thorax, Abdomen, Wing, Leg	15
6-10	Major pests in following crops:	**a. Scientific name** **b. Lifecycle of insect/pests** **c. Management of insects** i. Cash crops- Sugarcane, cotton ii. Cereals- Paddy,Jawar,Bajra,Wheat,Maize iii. Pulses- Pigeon pea iv. Oilseed crops- Ground nut, Soya bean v. Fruits- Mango, Grapes, Pomegranate, Citrus, Banana	25

		vi. Vegetable crops- Brinjal, Okra, Tomato, Chilly, Onion, Cabbage & cauliflower.	
11-12	Honey Bees and Bee-keeping	Honeybees, Beekeeping, Bee products	15
13-14	Silkworms and Sericulture	Silk producing moth What is silk Sericulture and its components Mulberry sericulture Non Mulberry sericulture Protection of silkworms	15
15-16	Pests of stored products and their management	Introduction Control of stored grain pests	15

Practical Exercises:

Exercise No	Title
1 –2	Collection and preservation of insects Crop: Cereal, Pulses, Fruit, Store grain and preparation of insect box
3-7	Identification of insects and their damages i. Cash crops- Sugarcane, cotton ii. Cereals- Paddy,Jawar,Bajra,Wheat,Maize iii. Pulses- Pigeon pea iv. Oilseed crops- Ground nut, Soya bean v. Fruits- Mango, Grapes, Pomegranate, Citrus, Banana vi. Vegetable crops- Brinjal, Okra, Tomato, Chilly, Onion, Cabbage & cauliflower.
8-9	Morphology of insects- Separate collection of: i. Types of legs ii. Types of antenna
10-11	Metamorphosis
12-13	Digestive system (Dissection of cockroach)
13-14	Reproductive system
15	Visit to Apiculture unit and make visit report
16	Visit to Sericulture unit and make visit report

Suggested readings:

1) Text Book:

1. Richards O.W. and R.G. Davies – Imms' General Text Book of Entomology –Vol. I and I

2) Reference Books:

1. Shrivastava K. P., A Text book of Applied Entomology, Kalyani Publishers, New Delhi.- Vol.1 and Vol.2
2. Dr. S. Manisegaran and Dr. R. P. Soundararajan, Pest Management In Field Crops (Principles And Practices)
3. Saxena R. C. and Srivastava R. C., PrasadT. V, Entomology at a Glance, Third Edition. Handbook of Entomology New Vishals Publication, Revised Edition

3) ***e-reading:*** **http://ecourses.iasri.res.in/**

Assignment: Each student should collect at least 100 insect specimens belonging to the aforesaid orders.

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Course No. : ECON – 122 Course Title :Money, Banking and International Trade

Credit : (1+2=3) Semester : II

Theory:

Money: Meaning, importance, evolution, qualities of good money, coins and coinage, kinds of money, functions of money, demand for and supply of money, monetary standards, bimetallism, monometalism and paper standard.**Banking:** Types of banks, role in economic development, functions and achievements of commercial banks. Central bank – banking principles and functions of central bank, measures of credit control, monetary policy. Nationalization of banks and its impacts, role of credit institutions in development of agriculture.**International Trade:** Meaning, definition, scope, pre-export behaviour-factors to be considered, methods of entering foreign markets, importance of International markets, economic reasons for export. **International marketing:** Practices and problems, policies and economic forces and political considerations. **GATT:** Basic principles and emergence of WTO. Trade codes, application of WTO. **Import-Export Policies:** Present Agril. Export Policy of the Govt. under liberalized economic environment. IPR, TRIPS, TRIM, AoA etc.

Practical:

Time Value of Money, Estimation of Exchange Rate (Example- Money/Dollar), Central Bank- RBI, NABARD, Nationalization of Banks,Commercial Bank and Co-operative Bank, Crop Insurance Scheme, Regional Rural Bank, Asian Development Bank, World Bank, Study of EXIM/Foreign Trade policy, Study of Present Agril. Export Policy

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1,2&3	Money	1. Meaning/ Concept, 2. Importance of Money, 3.Evolution Of Money, 4.Qualities of good money, 5. Kinds of money	10
4	Functions of money	Different functions of money	3
5&6	Demand for and supply of money	Transitive, precautionary and speculative motives of Demand of money	6
7&8	Monetary standards	Monetary standards, Bimetallism, and Monometallism and Paper standard	6
9	Banking	Types of banks	3
10&11	Functions of Central Banks	Various functions of Central bank	6
12	National Bank for Agriculture and Rural Development (NABARD)	Various functions of NABARD	3
13&14	Co-operative and commercial banks	Various functions and types of Co-operative and commercial banks	6
15&16	Measures of credit control,	Qualitative and Quantitative of Measures of credit control	6
17	Monetary policy	Objective of Monetary policy	3
18	Nationalization of banks	Concept and effect of Nationalization of banks	3
19&20	Role of credit institutions in development of agriculture.	Role of Various institutions in Agril. Credit	6
21	International Trade	1.Meaning, definition 2. Scope, pre-export behavior to be considered 3. Methods of entering foreign market	15
22 & 23		4. Importance of international markets, economic reasons for export. 5.International marketing: Practice and problems	
24		6. policies and economic forces and political considerations	
25&26	GATT & WTO	Basic principles and emergence of WTO, trade codes, Application of WTO	6
27&28	Import-Export Policies:	Present Agril. Export Policy of the govt. under liberalized economic environment.	6
29,30,31 &32	IPR, TRIPS, TRIM, AOA	IPR, TRIPS, TRIM, AOA	12

Practical Exercises:

Exercise No.	Title
1	Study of Time Value of Money.
2&3	Estimation of Exchange Rate (Example- Money/Dollar)
4	Study of Central Bank-RBI: Organization, Functions
5	Study of Central Bank-RBI: Functions
6	Study of NABARD
7	Study of Nationalization bank
8	Study of Commercial Bank
9	Study of Co-operative Bank.
10 & 11	Study of crop insurance scheme.
12	Study of Regional Bank
13	Study of Asian Development Bank
14	Study of world Bank
15	Study of EXIM/Foreign Trade policy.
16	Study of Present Agril. Export Policy.

Suggested readings:

1) Text Book:

1. Dewett, K.K. Modern Economic Theory. Shyam Lal Charitable Trust, Ravindra Mansion Ramnagar, New Delhi –110 055.
2. R.R.Paul. Money, Banking and International Trade. Kalyani Publishers, Rajinder Nagar,Ludhiana-141008.
3. M.L.Jhingan.,VrindaMoney Banking,International Trade and Public Finance. Publications(P) Ltd.B-5, Ashish Complex (Opp.Ahlcon Public School), Mayur Vihar, Phase –I, Delhi-110 091.
4. Dewett, K.K, G.C. Singh and J.D. Varma. Elementary Economic Theory. S. Chand and Co., Ltd.,7361, Ram Nagar, Qutab Road, New Delhi-110 055
5. S.Subba Reddy, P.Raghu Ram,T.V.Neelakanta Sastry,I. Bhavani Devi.Agricultural Economics.Oxford & IBH Publishing Co.Pvt.Ltd. New Delhi.110049.

2) Reference Books:

1. Vaish, M.C. Monetary Theory.Ratan Prakashan, Educational and University Publishers, 21 DayanandMarg, Darya Ganj,New Delhi – 110 002.
2. Datta, Ruddar and K.P.M. Sundaram.Money, Banking and Trade. S. Chand and Co., Ltd., 7361, Ram Nagar, Qutab Road, New Delhi-110 055.

3) e-books:

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Course No. : MKT -121 **Course Title :Introduction to Agricultural Marketing**
Credit : (1+1=2) **Semester : II**

Theory:

Agricultural Marketing: Definition and concepts, scope and subject matter. Market and marketing: Meaning, definition, components of a market structure, importance of agricultural marketing, classification, types of markets. Market forces- Demand And Supply. Problems of Agril. Marketing: Defects in traditional Agril. marketing system and suggestions for improvement. Standardization: Standards and standardization, aims of standardization, significance of standardization, demerits of standardization. Basis of standards.Grading: A marketing function.Importance of grading in agriculture, grading in India. Warehousing: State and Central Warehousing Corporations, objectives, functions, advantages, Channels of Marketing: Meaning, definition, channels of different products, market functionaries and their role. Marketing Efficiency: Meaning, definition, marketing costs, margin, price spread, factors affecting the cost of marketing, reasons for higher marketing costs of farm commodities, ways of reducing marketing cost. Study of Market Intelligence and Market Integration: Meaning, definition, types of market integration. Producer's surplus: Marketable Surplus and Marketed Surplus.

Practical:

Studies on estimation of marketing cost, price spread, market margins. Study on standardization, grading, storage, warehousing. Marketing of food grains, fruits, vegetable, milk and eggs.Exercises on grade standards of various Agril.Products.

Lectures No	Topics	Weightage(%)
1	Agricultural marketing: definition and concepts, scope and subject matter.	6
2,3,4	Market and marketing: meaning, definition, components of a market, importance of agricultural marketing, classification markets.	20
5,6	Problems of agril. Marketing: defects in traditional agril. Marketing system and suggestions for improvement.	10
7	Standardization: standards and standardization, aims of standardization, significance of standardization, demerits of standardization. Basis of standards.	6

Teaching Schedule- Theory with weightages (%):

8	Grading: a marketing function. Importance of grading in agriculture, grading in India.	6
9,10	Channels of marketing: meaning, definition, channels of different products, market functionaries and their role.	15
11,12	Marketing efficiency: meaning, definition, marketing costs, margin, price spread, factors affecting the cost of marketing, reasons for higher marketing costs of farm commodities, ways of reducing marketing cost.	15
13,14	Study of market intelligence and market integration: meaning, definition, types of market integration	10
15	Producer's surplus marketable and marketed surplus.	6
16	Warehousing: state and central warehousing corporations, objectives, functions	6

Practical Exercises:

Exercises No.	Title
1	Study of various marketing functions.
2	Marketing of food grains. (marketing channel)
3	Marketing of fruits & vegetable(marketing channel)
4	Marketing of milk and eggs. (marketing channel)
5	Studies on estimation of marketing cost, price spread, market margins of food grains.
6	Studies on estimation of marketing cost, price spread, market margins of fruits & vegetable
7	Studies on estimation of marketing cost, price spread, market margins of milk and eggs
8	Study of grading and standardization.
9	Study of grade standards of various Vegetables.
10	Study of grade standards of various Fruits.
11	Study of grade standards of various Food grains.
12	Study of storage, warehousing.
13	Study of regulated market
14	Study of co-operative marketing.
15	Visit to weekly market/farmers bazaar
16	Visit to APMC

Suggested readings:

1) Text Book:

1. Acharya, S. S. And N. L. Agrawal. Agricultural marketing in India.(fifth edition) oxford and IBH publishing company pvt. Ltd., 66 Janpath, new Delhi - 110001.
2. S. S. China. Agricultural marketing in India. kalyani publisher, new Delhi 100 002.

2) Reference Books:

1. S. Subba reddy *et al* .agriculture economics.(2010) oxford and ibh publishing company Pvt. Ltd., 66 Janpath, New Delhi – 110001

3) e-books:

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Course No. : MKT -122 **Course Title: Marketing Institutions and Organizations**
Credit : (1+1=2) **Semester: II**

Theory:

Objectives, structure and functioning of Agricultural Marketing Institutions and Organizations. Agricultural Produce Market Committee, Cotton Corporation of India and State Cotton Federation, Food Corporation of India (FCI), State Trading Corporation (STC), National Co-operative Marketing Federation, Agricultural Processed Products and Export Development Authority (APEDA), Maharashtra State Agricultural Marketing Board (MSAMB), The National Agricultural Co-operative Marketing Federation of India (NAFED), Jute Corporation of India, Tobacco Board, Coconut Board, Grape Growers Association (*Mahagrape*), Mango Growers Association (*Mahamango)*, The Directorate of Marketing and Inspection (DMI), National Dairy Development Board (NDDB).Coffee Board and Rubber Board.

Practical:

Visit to different marketing institutions/organizations (located in the local district) for study the organization, their function and achievements in marketing of farm products.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightage (%)
1.	Agricultural marketing institutions and organizations	Objectives, structure and functioning	10
2.	Agricultural produce market committee	Objectives, APMC act. Structure and functioning	5
3.	Cotton corporation of India	Location, establishment, objectives and structure and functioning	05
4.	National co-operative marketing federation	Location, objectives and structure and functioning	05
5.	Food corporation of India (FCI)	Location, establishment year, objectives and functioning	05
6.	State trading corporation (STC)	Location, establishment year, objectives and functioning	05
7.	National co-operative marketing	Location, establishment year,	05

	federation	objectives and functioning	
8.	Agricultural processed products and export development authority	Location, establishment year objectives and functioning, various govt. scheme etc.	05
9	The national agricultural co-operative marketing federation of India (NAFED)	Location, establishment year, role of NAFED	05
10.	Jute corporation of India	Location and objectives and establishment year	05
11.	Tobacco board	Establishment year and use in agricultural marketing	2.5
12.	Coconut board	Establishment year and use in agricultural marketing	2.5
13.	Grape growers association (*MAHAGRAPE*)	Establishment year and functions and objectives of MAHAGRAPE	10
14.	Mango growers association (*MAHAMANGO*)	Location, establishment year and marketing	10
15&16	DMI and NDDB	Role, objectives, establishment year and functioning	15

Practical Exercises:

Exercises No.	Title
1	Visit to MAHAGRAPE
2.	Visit to MAHAMANGO
3.	Visit to MAHABANANA
4.	Visit to MAHAFED
5.	Visit to MAHAANAR
6.	Visit to HTC, Talegaon (Pune)
7.	Visit to MSAMB, Pune
8.	Visit to APMC
9.	Visit to Maharashtra cooperative floricultural development society, Pune
10	Visit to NAFED
11.	Visit to Warehouses
12.	Visit to Pack house and Godowns
13.	Study of PDS and visit to fair price shop
14	Case study of Farmer Producer Company
15	Study of farmers market
16	Study of corporate retailers in agricultural produce

Suggested readings:

1) Text Book:

1. Acharya, S.S. and N.L. Agrawal. Agricultural marketing in India. Oxford and IBH publishing company Pvt. Ltd. 66, Janpath, New Delhi – 1

2) Reference Books:

1. Memoria, C. B. And R.L. Joshi. Principles and practice of marketing in India. Kitab mahal, 15, thorn hill road, Allahabad.

3) e-books:

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Course No. : ABM-122 **Course Title: Agro-Based Industrialization**

Credit : (1+1= 2) **Semester: II**

Theory:

Agro-based Industries: Importance and need, classification of industries, role of agro-processing industries in the Indian economy. Types of agro based industries-sugar mills, cotton ginning mills, dal mills, rice mills, poha mills, fruit processing industries institutional arrangement, steps in setting up of agro-based industries. Constraints in establishing agro-based industries. Basis of development of agro-based industries in specific pocket e.g. sugar mills in Western Maharashtra, Ginning and processing of cotton in Vidarbha, Dal mills and Rice mills etc. Growth and modernization of these Agro based industries in different regions – Modernization of industries, Employment and income generation from agro based industries at macro level and overall impact in the development of the region /State. Potential agro-based industries- Grape wine making industries, soya-processing industries, mango pulp processing industries.

Practical:

Study of oil processing industry, Study of dal processing industry, Study of milk processing industry, Study of wine processing industry, Study of fruits processing industry, Study of vegetables processing industry, Study of paddy processing industry, Study of wheat processing industry, Study of sugar industry &Visit to agro-processing industries of different commodities.

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Subtopic	Weightage (%)
1	Agro-based Industries Importance and Need	Definition, Meaning, IMP., Need	5
2	Classification of Industries	Classification of Agro-based Industries on the various basis	5
3	Role of Agro-processing Industries in the Indian Economy	Role of agro-processing Industries in employment, Trading, EXIM etc its shares in Indian Economy	5
4,5,6	Types of Agro-based	Sugar Mills: Present status of sugarmills in	20

	Industries	India, Importance in development, Products and By Products. Cotton Ginning mills; Present status, Importance in development, Products and By Products Dal mills : Present status, Processing management :- Methods; Dry milling, wet milling, Rice mills : Present status, Processing, Products Fruit Processing Industries: Present status, Examples, Need and scope	
7	Steps in setting up of Agro-based Industries	1) Identification of Project 2) Market Analysis 3) Technical and Organizational Analysis 4) Financial and Economic Analysis 5) Feasibility Report Preparation 6) Finance 7) Government Aid 8) Monitoring and Evaluatioin	10
8,9,10	Constraints in establishing agrobased industries	1) Infrastructural constraints 2) Technological constraints 3) Social and the cultural constraints 4) Resource utilization constraints	20
11	Growth and modernization of Agro based Industries	1) Government Initiatives for growth, modernization and development of Agrobased Industries	10
12	Employment and income generation from agro based industriesat macro level and overall impact in the development	2) Employment and income generation from Agro-processing, Forward and backward, Export, Research, Transport.	5
13	Potential agro-based industries Grapewinemaking Industries	Present status Economic Importance Post Harvest management wine making process.	5
14	Soybean Processing	Present status Processing Procedure Products and by products	10
15	Mango pulp processing Industry	Present status Processing Management Products and By Products	10
16	Milk Processing	Present status, Production and Processing of Important value-added products,	5

Practical Exercises:

Exercises No.	Title
1	Study of Oil Processing Industry
2	Study of Dal Processing Industry
3 & 4	Study of Milk Processing Industry
5 & 6	Study of wine Processing Industry
7 & 8	Study of Fruits Processing Industry
9 & 10	Study of Vegetables Processing Industry
11	Study of Paddy Processing Industry
12	Study of Wheat Processing Industry
13 & 14	Study of Sugar Industry
15 & 16	Visit to Agro-Processing Industries

Suggested readings:

1) Text Book:

1. Srivastava, U.K. Agro-processing Strategy for Acceleration and Exports. Oxford University Press YMCA, Library Building, Jai Singh Road, New Delhi -110 001.
2. Diwase, Smita. Agri-Business Management. Everest Publishing House, Everest Lane, 536, ShaniwarPeth, AppaBalwantChowk, Pune – 411 030.

2) Reference Books:

3) e-books:

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Semester- III

Course No	Course Title	Credits
AGRO-233	Modern Farming Systems and Sustainable Agriculture	1+1=2
HORT-233	Post Harvest Technology of Horticultural Crops	1+1=2
SSAC-233	Soil Fertility, Fertilizers and Nutrient Management	1+1=2
PATH-231	Fundamentals of Plant Pathology	1+1=2
ENGG-232	Post-Harvest Technology of Agricultural Crops	1+1=2
EXTN-231	Communication Skills & Personality Development	1+1=2
ECON-233	Principles of Economic Theory	2+1=3
MKT-233	Principles of Marketing Management	1+1=2
MKT-234	Market and trade acts	2+0=2
ABM-233	Agri. Informatics	1+1=2
ABM-234	Human Resource Management and Development	2+1=3
	Total	**14+ 10=24**

Course No. : AGRO -233 **Course Title: Modern Farming System & Sustainable Agriculture**

Credit : (1+1=2) **Semester: III**

Theory:

Farming systems – Definition, scope, classification and components. Integrated Farming System (IFS), models for irrigated and rain fedsituation. Cropping systems – indices for evaluation of cropping systems.Organic farming – Definition, principles and components.Sustainable agriculture - Introduction, definition, goal and current concepts. Factors affecting ecological balance and ameliorative measures Land degradation and conservation of natural resources – low external input agriculture (LEIA) and high external input agriculture (HEIA). Irrigation problems Waste lands and their development.Precision Farming- Importance Scope and Components.

Practical:

Preparation of cropping scheme for irrigated situations; Preparation of cropping scheme for dryads situations; Study of existing farming systems in nearby villages; Preparation of integrated farming system model for wetlands; Preparation of integrated farming system model for dry lands; Preparation of enriched Farm Yard Manure; Preparation of Vermicompost; Visit to urban waste recycling unit; Study of profitable utilization of agricultural wastes; Visit to poultry and

dairy units to study resource allocation, utilization and economics; Visit to an organic farm to study various components and utilization; Study of degraded lands.

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Subtopic	Weightage (%)
1	Farming systems - Definition and Scope	a. Farming systems definition and introduction b. Scope of farming systems	5
2	Classification and Components	a. Classification of Farming Systems b. Components of Farming Systems c. Interactions between the components of farming systems d. Types of Farming Systems	16
3	Integrated Farming Systems (IFS)	a. Definition of IFS b. Factors influencing Integration of Farm Enterprises c. Advantages of IFS	6
4	Models for Irrigated and Rainfed situations	a. IFS for Irrigated low and uplands b. IFS for rainfed and dryland c. IFS for Island	5
5	Cropping systems – Introduction and Types	a. Cropping systems definition and introduction of related terms b. Classification of cropping systems c. Interactions, advantages and disadvantages of cropping systems	12
6	Indices for Evaluation of Cropping Systems	a. Simple value indices b. Biological indices c. Economic indices	5
7	Organic farming – Definition and Principles	a. Definition b. Concept c. Principles of organic farming d. Benefits and constraints of organic farming	10
8	Components of organic farming	Components of organic farming	8
9	Sustainable agriculture - definition, goal and current concepts	a. Definition b. Concepts, basic principles and goals of sustainable agriculture c. Management practices, advantages, disadvantages and components of sustainable agriculture	12

10	Factors affecting ecological balance and ameliorative measures	Factors affecting ecological balance and ameliorative measures	5
11	Land degradation and conservation of natural resources	Land degradation and conservation of natural resources	2
12	Low external input agriculture (LEIA) and High external input agriculture (HEIA)	Low external input agriculture (LEIA) and High external input agriculture (HEIA)	4
13	Irrigation problems	a. Quality of irrigation water b. Criteria for suitability of water for irrigation	4
14	Wastelands and their development	Wastelands and their development	2
15	Precision farming- importance and scope	Precision farming- importance and scope	2
16	Components of precision farming	Components of precision farming	2

Practical Exercises:

Exercise No.	Title
1	Preparation of cropping scheme for irrigated situations
2	Preparation of cropping scheme for dry land situations
3	Study of existing farming systems in nearby villages
4	Preparation of integrated farming system model for wetlands
5	Preparation of integrated farming system model for dry lands
6	Preparation of enriched farmyard manure
7	Preparation of vermi-compost
8	Visit to urban waste recycling unit
9	Study of profitable utilization of agricultural wastes
10	Visit to poultry unit to study resource allocation
11	Visit to dairy unit to study resource allocation
12	Utilization and computation of economics of dairy unit
13	Utilization and computation of economics of poultry unit
14	Visit to organic farm to study various components
15	Visit to organic farm to study their preparation methods
16	Study of degraded lands

Suggested readings:

1) Text Book:

2) Reference Books:

1. B.N. and Maiti S. 1984 Cropping systems - Theory and practice.Chatterjee.Oxford and IBH Publishing Co., Calcutta, India.
2. Palanniappan S.P. Cropping systems in tropics – Principles and practices –1985.Willey Eastern Ltd., New Delhi.
3. Panda S.G. Soil management and organic farming. 2006. AGROBIOS, New Delhi.
4. Thapa U. and Tripathi P Organic Farming ,. 2006. Organic Farming in India, Problems and Prospects
5. K Palanippan S.P. and Anandurai Organic Farming – theory and practice,. 1999.Scientific Publishers, Jodhpur.
6. Lampin, N. 1990 Organic Farming. Farming Press Books, Ips witch, U.K.

3) e-books:

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Course No. : HORT-233 **Course Title : Post Harvest Technology of Horticultural Crops**

Credit : (1+1=2) **Semester: III**

Theory:

Importance and present status of post harvest technology in horticultural crops in India and Maharashtra. Maturity, harvesting and handling in relation to extended shelf-life and storage quality of fruits, vegetables and flowers.Maturity and harvesting indices of fruits, vegetables and flowers.Factors responsible for maturity, ripening and deterioration of horticultural produce. Methods used for harvesting and post-harvest treatment for delaying ripening. Respiration and transpiration rate during packaging and storage. Methods of pre-cooling, grading, packaging, storage and transport of fruits, vegetables and flowers.Importance and scope of fruits and vegetable preservation.Selection of site for fruit and vegetable preservation unit.Principles and methods of preservation.Preparation of jams, jellies, marmalades, squashes, juices, syrups, preserves, crystallized fruits, chutney, pickle and ketchups.Spoilage of processed products. Post harvest management of cut flowers. Control of post harvest diseases of important fruits and vegetables.

Practical:

Studies on Maturity indices, harvesting of various fruits and vegetables.Pre-cooling, grading, packaging and storage of fruits and vegetables.Pre-harvest and post-harvest application of chemical substances.Harvesting, packaging, storage and marketing of cut flowers. Identification of different equipments used in processing of fruits and vegetables. Canning of fruits and vegetables.Preparation of jams, jellies, marmalades, squashes, juices, syrups, preserves, ketchup, pickles, chutney, etc.Drying of fruits and vegetables.Working out the economics of important processed products. Study of spoilage of different processed products. Visits to fruits and vegetables preservation units.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Subtopic	Weightage (%)
1	Importance and present status of post harvest technology in horticultural crops in India and Maharashtra.	Importance and present status of post harvest technology in horticultural crops in India and Maharashtra.	5
2	Maturity, harvesting and handling in relation to extended shelf-life and storage quality of fruits, vegetables and flowers.	Definition, Types of maturity, Methods of judging the maturity	8
3	Maturity and harvesting indices of fruits, vegetables and flowers.	Maturity and harvesting indices of fruits, vegetables and flowers.	7
4	Factors responsible for maturity, ripening and deterioration of horticultural produce.	Changes during ripening and Internal and external factors	8
5	Methods used for harvesting and post-harvest treatment for delaying ripening.	1.Chemicals used for hastening ripening 2.Chemicals that delay ripening	6
6	Respiration and transpiration rate during packaging and storage.	Factors responsible for respiration and transpiration	4
7	Methods of pre-cooling, grading	Advantages and disadvantages	5
8	Methods of packaging, storage and transport of fruits, vegetables and flowers.	Principles of packaging, Methods ,Advantages	10
9	Importance and scope of fruits and vegetable preservation.	Importance and scope of fruits and vegetable preservation.	4
10	Selection of site for fruit and vegetable preservation unit.	Selection of site for fruit and vegetable preservation unit.	4
11	Principles and methods of preservation.	Physical methods, chemical method, Fermentation, by other method. Methods of preservation Temporary &permanent method.	8

12	Preparation of jams, jellies, marmalades, squashes	Procedure of preparation of products	6
13	juices, syrups, preserves,	Procedure of preparation of products	7
14	crystallized fruits, chutney, pickle and ketchups	Procedure of preparation of products	8
15	Spoilage of processed products	Bacteria, moulds, enzymes, spoilage of canned product.	7
16	Post harvest management of cut flowers. Control of post harvest diseases	Bacteria, moulds, enzymes, spoilage of canned product	8

Practical Exercises:

Exercise No.	Title
1	Studies on Maturity indices, harvesting of various fruits and vegetables.
2	Pre-cooling, grading, packaging and storage of fruits and vegetables.
3	Pre-harvest and post-harvest application of chemical substances.
4	Harvesting, packaging, storage and marketing of cut flowers.
5	Identification of different equipments used in processing of fruits and vegetables.
6	Canning of fruits and vegetables.
7	Preparation of jams, jellies
8	Preparation of marmalades, squashes
9	Preparation of juices, syrups.
10	Preparation of preserves, ketchup.
11	Preparation of pickles.
12	Preparationof chutney.
13	Drying of fruits and vegetables.
14	Working out the economics of important processed products.
15	Study of spoilage of different processed products.
16	Visits to fruits and vegetables preservation units.

Suggested readings:

1) **Text Book:**

2) **Reference Books:**

1. Pantastico, E. R., B. Post Harvest Technology, Handling, Utilization of Tropical and Sub-tropical Fruits and Vegetables. The AVI Publishing Co.,West-Post, Connecticut, USA.
2. Salunke, D. K. and Desai, B. B. Post Harvest Biotechnology of Vegetables. II CRC Press, Boca Raton, Florida.

3. Kader, A. A. Post Harvest Technology of Horticultural Crops. Publication Co. 3311, University of California, Division of Agricultural and Natural Resources, California.
4. Varma, L. R. and V. K. Joshi. Post Harvest Technology of Fruits and Vegetables, Vol. II. Indus Publishing Company, New Delhi-110 027.
5. Shrivastva, R.D and Kumar Sanjeev. Fruits and Vegetables(Principle and Practices). 3rd Edition.
6. Saraswathy.S,T.L.Preethi,S.Natarajan.Post Harvest Management of Horticultural Crops.AGROBIOS (INDIA).
7. Chadda .K.L.Handbook of Horticulture.ICAR.
8. Jature,S.J,S.J Shinde andV.S.Khandare.A Text Book of Post Harvest Management &Value addition of Fruits and Vegetables Shri.Rajlakshmi Prakashan.Aurangabad.

3) e-books:

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Course No. : SSAC -233 **Course Title :Soil Fertility, Fertilizers and Nutrient Management**

Credit : (1+1 =2) **Semester: III**

Theory:

Soil as a medium for plant growth, soil fertility and productivity, methods of soil evaluation.Essential plant nutrients, macro and micronutrients and its role.Mechanism of nutrient uptake. Problematic soils: Saline, saline-sodic, sodic-acid soils and calcareous soils and their reclamation. Organic manures: FYM, compost, vermi compost, green manuring and its preparation, concentration, organic manure, biogas slurry, sewage and slugs, agro-industrial and urban wastes. Role of organic manures in soil fertility, organic and natural farming. Fertilizers-NPK fertilizers, classification, properties, reaction in soils.Mixed, complex and compound fertilizers. Fertigation, slow release fertilizers, bio-fertilizers. Fertilizer management: Use efficiency, handling and storage. Integrated nutrient management: Concepts, components, sources and utility, INM in relation to fertilizer use efficiency. Soil pollution by agricultural chemicals and sewage water.

Practical:

Determination of soil organic carbon, calcium carbonate, available soil NPK. DTPA extractable micronutrients and fertilizer recommendation; Plant analysis, plant tissue testing. Analysis of

organic manures: Organic carbon, total NPK, DTPA extractable micro-nutrient and C: N ratio. Fertilizer analysis: Urea, ammonium sulphate, potassium nitrate, murate of potash, super phosphate, rock phosphate, mix fertilizer and compound fertilize

Teaching Schedule- Theory with weightages (%):

Sr. No.	Topic	Weight age (%)
1, 2&3	Soil fertility and soil productivity :factors Essential nutrient elements and functions, deficiency symptoms. Mechanism of Nutrient transport / uptake to plants and nutrient availability	10
4&5	Role of microorganisms in organic matter decomposition and humus formation, importance of C:N ratio and pH in plant nutrition	10
6	Integrated plant nutrient management	7.5
7&8	Soil fertility evaluation methods: chemical, biological and by visual symptoms, critical levels of different nutrients and hidden hunger in soil. DRIS Approach, critical limit approach,	10
9	Manures and fertilizer classification and manufacturing process. Properties and fate of major and micronutrient in soils	10
10&11	NPK fertilizers: composition and application methodology, luxury consumption, nutrient reactions, deficiency symptom by visual diagnosis	10
12	Secondary & Micronutrient fertilizers their types, composition, reaction in soil and effect on crop growth. Fertilizer control order	7.5
13	Plant nutrient toxicity symptoms and remedial measures.	7.5
14	Soil test crop response and targeted yield concept	7.5
15	Biofertilizers: importance, types and use in horticultural crop. Nutrients use efficiency (NUE) and management.	10
16	Effect of potential toxic elements in soil and plant	10

Practical Exercises:

Exercise No	Title
1	Determination of organic matter from compost / FYM /oil cake (Ignition method)
2	Determination of soil available nitrogen (Subbiah and Asija,, 1956)
3	Determination of available phosphorus in soil (Olsen et al, 1954) for alkaline soils.
4	Determination of soil available potassium in soil
5	Determination of soil available sulphur in soil.
6	Determination of exchangeable Calcium and Magnesium in soil
7	Determination of exchangeable Calcium and Magnesium by Versenate (EDTA) Method.
8	Determination of soil Micronutrients
9	Determination of Lime requirement of Problem soils Determination of Lime requirement of acid soils (SMP buffer method) (for soils of pH less than 6) To estimate the Lime requirement of a soil (Hutchinson and MacLennan procedure)
10	Fertilizer Adulteration test / Identification of Adulteration in fertilizer / Detection of adulteration in fertilizers (Rapid test)

11	Determination of total nitrogen from FYM / Compost / oilseed cake and C : N ratio (By Kjeldahl method)
12	Determination of total phosphorus and potassium from compost / FYM.
13	Determination of (Amide nitrogen) from urea.
14	Determination of ammonical nitrogen content of ammonium sulphate. Determination of water soluble phosphorus in superphosphate (Pumberton method)
15	Determination of total potassium content of muriate of potash (by flame photometer).
16	Use of soil testing kit and Use of leaf colour chart for nutrient deficiency diagnosis

Suggested readings:

1) Text Book:

2) Reference Books:

1. Kanwar, J. S. Soil Fertility-Theory and Practice.Published by ICAR, New Delhi.
2. Tisdale, S.L., W.L. Nelson, J.D. Beaton and J.L. Havlin.Soil Fertility and Fertilizers.Published by Prentice - Hall of India, Ltd., New Delhi.
3. Brady, N. C. and Ray R. Well.The Nature and Properties of Soils.Pearson Education (Singapore) Pvt. Ltd. Indian Branch, 482 F.I.E., New Delhi.
4. Purohit, S.S. and Dushyent Gehlot.Trends in Organic Farming in India.AGROBIOS.Agro House, Behind Nasrani Cinema, Chopasani Road, Jodhapur.
5. Acharya, C.L., P.K. Ghosh and A. Subba Rao. Indigenous Nutrient Management Practices-Wisdom alive in India – 2001. Indian Institute of Soil Science, Nabi bagh, Berasia Road, Bhopal.
6. More, S.D., K.G. Kachhave, A.S. Dhawan and V.D. Patil.Organic Farming, Issues and Strategies. Atul Book Agency, Pune

3) e-books:

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Course No. PATH-231 **Course title: Fundamentals of Plant Pathology**
Credits: (1+1=2) **Semester: III**

Theory:

Introduction to the science of phytopathology, its objectives, scope and historical background.Classification of plant diseases, symptoms, signs, and related terminology. Parasitic causes of plant diseases (fungi, bacteria, viruses, phytoplasma, protozoa, algae and flowering parasitic plants), their characteristics and classification. Non-parasitic causes of plant diseases.Infection process.Survival and dispersal of plant pathogens.Plant disease epidemiology, forecasting and disease assessment.Principles and methods of plant disease

management.Integrated plant disease management.Fungicides classification based on chemical nature, Commonly used fungicides, bactericides and nematicides

Practical:

Familiarity with general plant pathological laboratory and field equipments.Study of disease symptoms and signs and host parasite relationship.Identification and isolation of plant pathogens.Koch'spostulates.Preparation of fungicidal solutions, slurries, pastes and their applications.

Teaching Schedule- Theory with weightages (%):

Lecture no.	Topic	Weightages (%)
1	Importance of plant diseases, scope and objectives of Plant Pathology in relation to the diseases Late blight of Potato, Coffee Rust, Downy mildew of Grapes, Dutch elm disease. Terms and concepts in Plant Pathology, Pathogenesis	5
2	History of Plant Pathology with special reference to Indian work History of Plant Pathology: History and development of Plant Pathology in ancient, dark, premodern, modern present eras. Contribution made by– Surpal, Theophrastus, Pliny, Iwanowski, Robert Hook, Anton van Leeuwenhoek, Needham, Linnaeus, Tillet, Prevost Robert Loch, Marshal Ward, Millardet, Jenson, Meyar, Burril, E.F. Smith, Erikson, Biffen, Iwanwasky, Stakman, Cragie, Luthra, Stanley, Bowden and Pierie, Doi and Asuyama, Butler, Mehta, Mundkur, Dastur, Kulkarni, Bhide, Uppal, Tirumalachar, Patel and Rangaswamy.	5
3	Classification of plant diseases (Classification of the plant basis of mode of survival. dispersal, plant parts affected, occurrence ,cause etc. Causes of Plant Disease Biotic (fungi, bacteria, fastidious vesicular bacteria, Phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoaand nematodes) and abiotic causes with examples of diseases caused by them. Study of phanerogamic plant parasites.(Phanerogamic plant parasites Cuscutaceae (stem parasite) Genus: Cuscuta, the dodders 2. Viscaceae (stem parasites) Genus: Arceuthobium, the dwarf mistletoes of conifers Phoradendron, the American true mistletoes of broad leaved trees Viscum, the European tree mistletoes Dendrophthoe, the giant mistletoes 3. Orobanchaceae (root parasite) Genus: Orobanche, the broomrapes 4. Scrophulariaceae (root parasite) Genus: Striga, the witchweeds)	10
4	Symptoms of plant diseases Sign and symptoms, Classification of symptoms (Hyperplasia, Hypoplasia, Necrosis, with categorization of different symptoms with suitable example), Diseases and symptoms due to abiotic causes. Deficiencies or excess of nutrients (e.g. 'Khaira' disease of rice due to Zn deficiency),Light, Moisture, Temperature, Air pollutants (e.g. black tip of mango), Lack of oxygen (e.g. hollow and black heart of potato), Toxicity of pesticides, Improper cultural practices, Abnormality in soil conditions	10

	(acidity, alkalinity, PH)	
5-6	Fungi general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, Fungi, General morphology, characters and somatic structures of fungi: Thallus, Branching habit of mycelium: Dichotomous, sympodial, lateral, opposite, verticilliate, monopodial etc.somatic structures: Rhizoides (rootlike), appressorium (pl. appressoria), haustorium(pl. haustoria), hyphopodium (pl. hyphopodia).Hyphal aggregations and tissues: P*lectenchyma* (i.e.woven tissue). *prosenchyma*(i.e. approaching a tissue) and *pseudoparenchyma* (a type of plant tissue). *stroma*(mattress), *sclerotium* (hard structure) and *rhizomorph* (root shaped). Reproduction (asexual and sexual): Reproduction in fungi (asexual and sexual). Reproduction in fungi: Fungi reproduce by three processes viz., (A) Vegetative, (B) Asexualand (C) Sexual reproduction. Vegetative reproduction (Fragmentation,Rhizomorph, Fission, Chlamydospores,Budding, Sclerotium etc. Asexual reproduction a. Exogenous . b. Endogenous: Sexual reproduction a. Monoecious or hermaphroditic, b. Dioecious: Four distinct phases of sexual reproduction are: somatogamy, plasmogamy, karyogamy and meiosis. These phases occur by any one of the following five general methods of sexual reproduction,(Gametic copulation – (a) Isogamy and (b) Anisogamy, Gametangial contact, Gametangial copulation , Spermatization, Somatogamy (Anastomosis)	10
7	Classification of fungi.Key to divisions, sub-divisions, orders and classes.(Classification of fungi. Key to divisions, sub-divisions, orders and classes) The classification of Ainsworth (1966 and 1972) be thought along with the distinguishing characters for the classification of Division, Sub-division, class, orders ,family and each important genera of family	5
8-9	Bacteria: general morphological characters,Classification and reproduction: General morphological characters Shape Size, Reproduction (Sexual and Asexual). Basic methods of classification Major divisions of bacteria on the basis of cell wall structure Kingdom : Prokaryotae Division I : Gracilicutes Division II : Firmicutes, Division III : Tenericutes ,Division IV : Mendosicutes and Classification on the basis of Bergey's Manual of Systematical Bacteriology (1984). Sexual and Asexual reproduction in bacteria (Binary fission, Transformation, Transduction and Conjugation) Viruses: nature, architecture, multiplication and transmission Viruses: nature, architecture, multiplication and transmission Architecture of viruses and viriods Morphologically, virus particles are (i) isometric (spherical, polyhedral) and (ii) anisometric Classification of viruses Mollicutes: general morphological characters. A. Mycoplasma and	10

	Spiroplasma Kingdom : Prokaryotae, Division : Tenericutes, Class : Mollicutes,Order : Mycoplasmatales Family : 1. Mycoplasmataceae Genus: *Mycoplasma* 2. Spiroplasmataceae Genus: *Spiroplasma* 3. Acholeplasmataceae Genus: *Acholeplasma* B. Fastidious vascular bacteria : There is no well accepted classification (taxonomy) made so far for these organisms. Hence classification for Rickettsia (RLO) and Fastidious bacteria (e.g.Xellella) are mentioned below: B1: Rickettsia (RLO) Kingdom : Prokaryotae, Division : Gracilicutes (Gram-ve bacteria), Class : Proteobacteria ,Sub-class : Alpha Proteobacteria ,Order : Rickettsiales ,Family : Rickettsiaceae Tribe : Rickettsiae B2. Fastidious vascular bacteria ,Kingdom : Prokaryotiae ,Division : Gracilicutes (Gram-ve bacteria) ,Class : Proteobacteria ,Sub-class : Gamma Proteobacteria,Order : Not classified,Family : Not classified ,Tribe : Not classified ,	
10	Survival and dispersal of plant pathogen	10
11	Mechanism of infection- Penetration and avenues of penetration	8
12	Epidemiology and factors influencing epidemic development and forecasting of plant diseases	10
13-14	Principles and methods of plant disease management A. Principles of plant disease management: There is six basic concept or principles or objectives lying under plant disease management.(Avoidance of the pathogen, Exclusion of the pathogen, Eradication of the pathogen, Protection of the host , Disease resistance, Therapy) B. Methods of plant disease management 1. Avoidance of the pathogen (Choice of geographical area, Selection of a field, Adjustment of time of sowing, Use of disease escaping varieties, Use of pathogen-free seed and planting material Modification of cultural practices) 2. Exclusion of inoculum of the pathogen (Treatment of seed and plating materials, Inspection and certification, Quarantine regulations, Eradication of insect vector) 3. Eradication of the pathogen (Biological control of plant pathogens, Eradication of alternate and collateral hosts, Cultural methods, Crop rotation, Sanitation of field by destroying/burning crop debris, Removal and destruction of diseased plants or plant parts, Rouging, Heat and chemical treatment of diseased plants, Soil treatment: by use of chemicals, heat energy, flooding and fallowing) 4. Protection of the host (Chemical control: application of chemicals (fungicides, antibiotics) by seed treatment, dusting and spraying,Chemical control of insect vectors,Modifications of environment, Modification of host nutrition	10

	5. Disease resistance (Use of resistant varieties: Development of resistance in host is done by Selection and hybridization for disease resistance,Chemotherapy,Host nutrition,Genetic engineering, tissue culture) 6. Therapy Therapy of diseased plants can be done by Chemotherapy,Heat therapy, Tree-surgery	
15-16	Nature, chemical combination, classification fungicides group (sulphur compounds Inorganic and organic (dithio - carbomates)), mercurial compound, heterocyclic nitrogenous compounds, organophosphorus compounds, oxathins , benzimidazoies , morpholines , organophosphorus , phenol derivatives chloroneb , triezoles triedimefon and antibiotics	7
	Mode of action of fungicides of group (sulphur compounds Inorganic and organic (dithio - carbomates)), mercurial compound, heterocyclic nitrogenous compounds, organophosphorus compounds, oxathins , benzimidazoies , morpholines , organophosphorus , phenol derivatives chloroneb , triezoles triedimefon and formulations of fungicides (Characteristic of an ideal fungicide, formulations of fungicides (Wettable powder , Dust ,Granules Emulsified concentrates, Solutions, Slurries or suspensions) and antibiotics	

Practical Exercise:

Exercise No.	Title
1.	Acquaintance with various laboratory equipments and microscopy
2.	General study of different structures of fungi.
3.	Study of symptoms of various plant diseases.
4.	Study of representative fungal genera
5.	Staining and identification of plant pathogenic bacteria
6	Study of phanerogamic plant parasites
7	Transmission of plant viruses
8	Study of morphological features and identification of plant parasitic nematodes.
9	Preparation of media
10	Isolation and purification of fungi and bacteria
11	Extraction of nematodes from soil
12	Koch's postulates
13	Study of fungicides and their formulations
14	Methods of pesticide application and their safe use
15	Calculation of fungicide sprays concentrations**.**
16	Collection and preservation of disease specimen

Suggested readings:

1) Text books:

1. Walia RK & Bajaj HK. 2003. *Text Book on Introductory Plant Nematology*. ICAR, New Delhi

2) Reference books:

1. Pathak, V. N. Essentials of Plant Pathology. Prakash Pub., Jaipur
2. Agrios, GN. 2010. *Plant Pathology*. Acad. Press.
3. Kamat, M. N. Introductory Plant Pathology. Prakash Pub, Jaipur
4. Singh RS. 2008. *Plant Diseases.*8th Ed. Oxford & IBH.Pub.Co.
5. Singh RS. 2013. *Introduction to Principles of Plant Pathology.*Oxford and IBH Pub.Co.
6. Alexopoulos, Mims and Blackwel. Introductory Mycology
7. Mehrotra RS & Aggarwal A. 2007.*Plant Pathology.*7th Ed. Tata Mc Graw Hill Publ. Co. Ltd.
8. Gibbs A & Harrison B. 1976.*Plant Virology - The Principles*. Edward Arnold, London.
9. Hull R. 2002. *Mathew.s Plant Virology*. 4th Ed. Academic Press, New York.
10. Verma JP. 1998. *The Bacteria*. Malhotra Publ. House, New Delhi.
11. Goto M. 1990. *Fundamentals of Plant Bacteriology*. Academic Press, New York.
12. Dhingra OD & Sinclair JB. 1986. *Basic Plant Pathology Methods*. CRC Press, London,Tokyo.
13. Nene YL & Thapliyal PN. 1993. *Fungicides in Plant Disease Control.* 3rd Ed. Oxford & IBH, New Delhi.
14. Vyas SC. 1993. *Handbook of Systemic Fungicides*. Vols. I-III. Tata McGraw Hill, New Delhi.
15. Rajeev K & Mukherjee RC. 1996. Role of Plant Quarantine in IPM. Aditya Books.
16. Rhower GG. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management in Agriculture. 2nd Ed. Vol. II.(Ed. David Pimental).CRC Press.
17. Singh RS & Sitaramaiah K. 1994.*Plant Pathogens – Nematodes*.Oxford & IBH, New Delhi.
18. Thorne G. 1961. *Principles of Nematology*.McGraw Hill, New Delhi.

3) *e-reading:* **http://ecourses.iasri.res.in/**

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Course No. : ENGG- 232 **Course Title :Post Harvest Technology of Agricultural Crops**

Credit : (1+1=2) **Semester: III**

Theory:

Importance of Post-harvest technology. Problems occurring in harvesting, threshing,transport drying, milling and marketing. Moisture content and its measurement. Drying and its importance: Methods of drying grains. Thin layer and deep bed drying (excluding mathematical expression).Equilibrium moisture content (excluding mathematical expression). Grain dryers.Food grain storage structures.Bulk storage structures.Unit operations in seed processing.Equipments for cleaning, sorting, grading and separation. Milling, Screen analysis, Principles of size reduction, size reduction machinery, Paddy Rice processing(Excluding mathematical expression and numerical), Technology of parboiling of paddy, advantages, disadvantages of parboiling, methods of parboiling. Oil expression and extraction.Screw and hydraulic methods.Material handling equipments (excluding design), Principles of refrigeration, and cold storage.

Practical:

Study of different moisture measuring methods, Determination of grain moisture content and numerical**,** Study of Sieve analysis and Fineness Modulus &numerical, Study of various types of grain dryers, Study of cleaning equipment, Study of different types of separators., Study of material handling equipments, Study of modern rice milling machineries, Study of pulse milling (Flow charts of wet milling and dry milling of pulses), Study of vapour compression system of refrigeration, Study of cold storage, Study of mechanical expression devices (Hydraulic press and screw press) &Visit to seed processing plant / cold storage unit / oil mill / dal mill / rice mill.

Teaching Schedule- Theory with weightages (%):

Lectures No.	Topic	Suntopic	Weightage (%)
1, 2	• Importance of Post Harvest Technology • Unit Operations in grain processing • Problems occurring during	• Importance of Post Harvest Technology • Definition of Agril. Processing, flow chart of unit operations • Definitions PHT, cleaning, grading,	5

	harvesting, threshing, transport, drying, milling and milling & marketing	sorting, milling, drying, etc. • Problems occurring during harvesting, threshing, transport, drying, milling and milling & marketing	
3	Moisture Content and its measurement	• Definition of moisture content • Representation of moisture content • Problems on wet-basis & dry basis • Moisture content determination methods	10
4	Drying and its importance: Methods of grain drying	• Drying and its importance • Early harvest & mechanical drying • Methods of grain drying: • Methods of Sun drying, features of sun drying • Methods of Mechanical drying, features of mechanical drying	20
5	Thin layer and deep bed drying	• Thin layer drying • Deep bed drying • Factors affecting the drying process	
6, 7	Grain dryers	• Mechanical dryers: a) flat bed dryer b) Continuous flow dryers- Mixing & Non-mixing type baffle dryer, LSU, Recirculating type c) Rotary dryer d) Tray dryer e) Spray dryer f) Solar dryer g) Tunnel dryer h) Tray Dryer	
8	Equilibrium moisture content	• Definition of EMC, Importance, • Methods for determination of EMC • Psychrometric chart, Uses of psychrometric chart	5
9	Food grain storage structures Bulk and Bag storage structures	• Types of storage structures: a) Traditional storage structures- Morai type, Bukhari type, Kothar type, Grain bins- Cylindrical, Rectangular bins b) Improved storage structures – Pusa bin, Pucca Kothi, Metal bins • Bag storage structure& design	10
10	Cleaning – Equipments for cleaning	• Definitions- cleaning, grading, sorting • Types of Screen openings • Cleaning equipments – Air screen cleaner - i) Vibratory ii) Rotary Screen cleaner	20

11	Grading and Separation equipment	• Graders – Seed grader • Separators – Disk separator, Magnetic separator, Indented cylinder separator, Velvet roll separator, Inclined draper belt, Specific gravity separator, Spiral separator	
12, 13	Milling	• Size reduction procedure • Size reduction Machinery- Jaw crusher, Hammer mill, Plate mill, Ball mill • Milling of paddy - Types of rice milling machinery: i) Huller ii) Under Runner disc sheller iii) Centrifugal dehusker iv) Rubber roll sheller v) Vertical whitening cone vi) Horizontal whitening cone	10
14	Technology of parboiling of paddy Principles of parboiling Advantages and disadvantages of parboiling	• Technology of parboiling of paddy • Principles of parboiling • Advantages and disadvantages of parboiling • Methods of parboiling A) Traditional methods i) Single boiling ii) Double boiling B) Modern method - CFTRI method	10
15	Material Handling Equipments	• Screw conveyor • Belt conveyor • Bucket elevator	10
16	• Principles of refrigeration and cold storage • Oil expression and extraction	• Definition – refrigeration, Vapour Compression Refrigeration System • Cold storage • Definition – Oil expression • Oil expression devices • Screw and hydraulic press	

Practical Exercises:

Exercise No.	Title
1	Study of different moisture measuring methods
2	Determination of grain moisture content and numerical
3	Study of Sieve analysis and Fineness Modulus&numerical
4 & 5	Study of various types of grain dryers
6	Study of cleaning equipment (Air screen cleaner, Rotary screen cleaner)
7 & 8	Study of different types of separators
9	Study of material handling equipments

10	Study of modern rice milling machineries
11	Study of pulse milling (Flow charts of wet milling and dry milling of pulses)
12	Study of vapour compression refrigeration system
13	Study of cold storage
14	Study of mechanical expression devices (Hydraulic press and screw press).
15 & 16	Visit to seed processing plant / cold storage unit / oil mill / dal mill / rice mill

Suggested readings:

1) Text Book:

1. K. M. Sahay and K. K. SinghUnit Operations of Agricultural Processing..Vikas Publishing House Pvt. Ltd., New Delhi.
2. A. M. Michael & T. P. Ojha. Principles of Agricultural EngineeringVol. I, Farm Power & Machinery, Farm Buildings and Post harvest technology. Jain Brothers., Jodhapur.

2) Reference Books:

1. A. Chakravarty Post Harvest Technology of Cereals, Pulses and Oilseeds.. Oxford and IBH, Publishing Com. Pvt. Ltd., New Delhi.
2. G.A. Henderson and R.C. Perry Agricultural Processing Engineering.. AVI Publishing Co. West-Port, Connecticut, USA.
3. C.W. Hall. Mohan Makhijani Drying Farm Crops. at Rekha Printers, New Delhi.
4. Sawant B.P., Potekar J. M. and H. W. Awari.A text book of Greenhouse and Post Harvest Technology. Nikita Publication, Latur

3) e-books:

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Course No. : EXTN- 231 **Course Title: Communication Skills and Personality Development**

Credit : (1+1=2) **Semester: III**

Theory:

Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication; listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences.

Practical:

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures.Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Weightage (%)
1,2	**Communication**: Meaning, Concepts and definitions, Process of Communication, Importance and Types of Communication.	12
3,4	**Communication skills**: Writing skills, Reading skills, Speaking skills, Listening skills,	12
5,6	Models of Communication, feedback– Types & characteristics of feedback	12
7	Nonverbal Communication and Body Language	12
8,9	**Audio-visual aids**: Audio aids: classification, visual aids: classification (projected & non projected), audio-visual aids: classification (projected & non projected)	12
10,11	**Personality:** Meaning, definition, popular and scientific view of personality, Types of personality, Personality Traits: Physical & Behaviour traits.	14
12,13	**Formation of personality/ Factors influencing personality:** Physical, heredity, culture and unique experiences.	12
14,15	**Socialization:** definition, types of socialization, agents of socialization, stages of socialization, importance of socialization	14
16	**Social mobility**: kinds of social mobility, factors influencing social mobility.	

Practical Exercises:

ExercisesNo	Title
1,2	Writing Skills: Business wring skills- 1. Appearance of letter, 2. Principles of wring business letter, 3. Form and style of business letter
3,4,5	Types of layouts of writing business letter- 1. Indented form, 2. Full block form, 3. Semi block form, 4. Modified block form, 5. Hanging indentation form
6	Preparing Project Proposals
7	Presentation and Evaluation of Presentation
8	**Dyadic Communication:** Face to face conversation, telephonic conversation, rate and clarity of voice, speaking and listening politeness telephone etiquettes
9	Organizing general group meetings
10	Salient features of participation in seminars and conferences
11	Conducting and practicing mock interviews

Suggested readings:

1) **Text Book:**
   1. Ray G.L. Extension Communication and Management, Kalyani Publishers, Ludhiana.
   2. A.K. Singh, Lakhan Singh and R. Roy Burman. Dimensions of Agricultural Extension, Aman Publishing House, meerut.
   3. Sagar Mondal. Textbook on Rural Sociology and Educational Psychology, Kalyani Publishers, Ludhiana.
2) **Reference Books:**
3) **e-books:**

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Course No. : ECON-233 **Course Title: Principles of Economic Theory**
Credit : (2+1=3) **Semester: III**

Theory:

Nature and significance of Micro and Macro-Economics. Utility function: Marginal Utility Analysis, Indifference curve; Budget line, Marginal rate of substitution, Consumer's equilibrium. Theory of demand and supply.Elasticity's of demand and supply.Theory of the firm-Equilibrium of the firm and industry under perfect competition, monopoly and monopolistic competition.Circular flow of income.National income estimation, concepts of national income and GNP deflator. Consumption, savings and investment functions. Concept of Multiplier.Business cycles-policies for economic stabilization.

Practical:

Law of Diminishing Marginal Utility; Derivation of Budget line and Indifference curves; Consumers 'equilibrium; Law of Demand; Law of Supply; Market Equilibrium; Elasticity of Demand and Supply; Production Function-in the case of Single Variable input and two variable input condition; Cost Function; Revenue Function; Price and output determination under perfect competition; Price and output determination under monopoly; Price and output determination under monopolistic competition; Preparation of National Income Accounts; Derivation of Aggregate demand and Aggregate supply curves; Calculation of multiplier.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Subtopic	Weightage (%)
1	Nature and significance of Micro and Macro-	Subject matter, Definition, Importance or utility and limitations of Micro and Macro-	7

	Economics	Economics	
2,3,4,&5	Utility function	**Assumptions of Marginal Utility Analysis.** **Law of Diminishing Marginal Utility (DMU):** Statement, Diagrammatic representation, DMU Curve, Limitations. Meaning of Marginal Utility. **Law of Equi-Marginal Utility**: Statement, Diagrammatic representation, Limitations, Practical Importance of law. **Indifference curve IC:** Definition and meaning of IC, Indifference schedule, Indifference map, Properties of IC, Applications of IC. Marginal rate of substitution and principle of diminishing marginal rate of substitution. **Budget line or Price line:** Meaning and explanation, Shifting of price line. **Consumers Equilibrium:** Equilibrium with indifference curves, conditions of equilibrium.	20
6&7	Theory of Demand and Supply	**Demand:** Meaning, Types, Demand Curve, Law of Demand, Demand curve and Human Behavior, Causes of change in demand. **Supply**: Meaning, Law of supply, Increase and decrease in Supply, Causes of change in supply.	7
8&9	Elasticity of Demand and Supply	**Elasticity of Demand:** Meaning, Types, Degrees, Practical Importance, Factors determining Elasticity of Demand, Methods of measuring price elasticity. Elasticity of Supply: Meaning, Degrees, Factors determining Elasticity of Supply.	7
10,11&12	Theory of Firm	Equilibrium of the firm, Conditions of firms equilibrium, Equilibrium of industry, Conditions of industries equilibrium **Perfect Competition:** Implications, Characteristics, Equilibrium in short run and long run. Monopoly: meaning, features, Equilibrium on short run and long run, Price discrimination.	14

		Monopolistic Competition: Meaning, Equilibrium in short run and long run.	
13,	Circular flow of Income	Meaning, difference between real flow and money flow, phases or stages of circular flow of income, Significance of Circular flow of Income.	4
14&15	National Income Estimation	Definition and Meaning of NI, Concepts of NI (GNP, NNP at market price, NNP at factor cost, Personal Income, Disposable Income), Measurement of NI (Production method, Income method and Expenditure method), Difficulties in measurement and significance of NI.	12
16	Nature and significance of Micro and Macro-Economics	Subject matter, Definition, Importance or utility and limitations of Micro and Macro-Economics	7
17,18,19 &20	Utility function	**Assumptions of Marginal Utility Analysis.** **Law of Diminishing Marginal Utility (DMU):** Statement, Diagrammatic representation, DMU Curve, Limitations. Meaning of Marginal Utility. **Law of Equi-Marginal Utility**: Statement, Diagrammatic representation, Limitations, Practical Importance of law. **Indifference curve IC:** Definition and meaning of IC, Indifference schedule, Indifference map, Properties of IC, Applications of IC. Marginal rate of substitution and principle of diminishing marginal rate of substitution. **Budget line or Price line:** Meaning and explanation, Shifting of price line. **Consumers Equilibrium:** Equilibrium with indifference curves, conditions of equilibrium.	20
21,22&2 3	Consumption, Saving and Investment functions	**Consumption:** Definition, meaning, Keynes Psychological law of consumption, Propensity to consume or consumption function, Factors determining consumption function, Importance of consumption	12

		function, Measures to raise Propensity to consume. **Saving and investment**: Role, Meaning, Forms of Investment, Marginal Efficiency of Capital, Investment Demand Curve, Factors influencing Marginal Efficiency of Capital.	
24&25	Multiplier	Concept of multiplier, Diagrammatic representation, Limitations, Uses and Importance.	7
26,27&28	Business Cycle	Meaning and Phases of Business Cycle, Characteristics, Cobweb theory of trade cycle, Policy for Trade cycle (Monetary and Fiscal).	10

Practical Exercises:

Exercise No	Title
1	Study of Law of Diminishing Marginal Utility.
2	Study of Applications of Indifference Curve Technique.
3&4	Study of Law of Demand and Supply.
5&6	Study of Elasticity of Demand and Supply.
7&8	Study of Production function with Single variable and Two variables Input.
9	Determination of Price and Output Under Perfect Competition.
10	Determination of Price and Output Under Monopoly.
11	Determination of Price and Output Under Monopolistic Competition.
12	Preparation of National Income Accounts.
13	Estimation of Aggregate Demand Curve.
14	Estimation of Aggregate Supply Curve.
15	Estimation of Multiplier.
16	Estimation of Budget line.

Suggested readings:

1) Text Book:

1. Dewett K. K., M. H. Navalur. Modern Economic Theory, S. Chand Publication, New Delhi.
2. M. L. Seth. Principles of Economics, Lakshmi Narain Agarwal Educational Publishers, Agra.

2) Reference Books:

1. Dewett K. K.,J. D. Verma. Elementary Economic theory, S. Chand Publication, New Delhi.
2. by S. Subba Reddy Agricultural Economics, Oxford and IBH Publ. Co. Pvt. Ltd

3) e-book:

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Course No. : MKT-233 **Course Title :Principles of Marketing Management**

Credit : (1+1=2) **Semester: III**

Theory:

Understanding Marketing Management, Marketing concept, Marketing mix, Market segmentation and Market targeting.Building consumers satisfaction, value and retention.Managing the marketing process and market planning.**Development of marketing strategies:** Positioning and differentiating the market offering through the product life cycle. Developing new market offerings.Designing global market offerings.**Shaping the market offerings:** Setting the product and brand strategy. Designing and Managing Services.Developing price strategies and programme.

Practical:

Case Studies on marketing strategies of different agro-based products. Case Studies on "Managing the Product Life Cycle". Study on different marketing activities carried out by different Companies.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Weightage (%)
1	Marketing management - Meaning, definition of marketing, marketing management & Marketing concepts	7
2	Difference between marketing and selling	6
3	Entities to be marketed in market place.	6
4	Functions of marketing management.	6
5	Marketing planning process	6
6	Marketing mix- Concept, definition, elements (7 P's)-only introduction to 7 P's	6
7	Classification of product (consumer and industrial)	7
8	Market targeting and market positioning. Market targeting- definition, patterns of target market selection.	6
9	Pricing strategies- Process of price setting	6
10	Types/various pricing strategies.	6
11	Market segmentation- Definition, types/ bases for segmenting consumer market, significance/importance	6
12	Product life cycle- features of each stage- Strategies to manage different stages of product life cycle.	7
13	New product development stages.	6

14	Branding- Concept, advantages and disadvantages, types/ brand options	6
15	Customer satisfaction, customer value, Customer satisfaction -concept, tools for measuring customer satisfaction, Customer value- concept, components of customer value	6
16	Global market offerings, Strategies to tap global market, Decisions involved in international marketing.	7

Practical Exercises:

Exercise no	Title
1	Study of agriculture marketing
2	Study of marketing strategies
3	Study of various strategies to manage various stages of PLC.
4	Case studyon -marketing strategies of different Beverages and fruit drinks.
5	Case studyon -marketing strategies of different Snacks .
6	Case studyon -marketing strategies of different Milk product.
7	Case study on- "managing the product life cyclefor beverages and fruit drinks.
8	Case study on- "managing the product life cycle for Snacks.
9	Case study on- "managing the product life cyclefor Milk product.
10	Study elements of Consumer sales promotion
11	Study elements of Dealers sales promotion
12	Study of Online Marketing
13	Case study of online marketing
14	Case study on- different marketing activities carried out by Beverages and fruit drinks companies
15	Case study on- different marketing activities carried out by different snacks companies
16	Case study on- different marketing activities carried out by different Milk companies.

Suggested readings:

1) Text Book:

1. Acharya, S. S. And N.L. Agrawal. Agricultural marketing in India. Oxford and IBH publishing co. Ltd., 66, janpath, new Delhi- 110 001.

2) Reference Books:

1. Kotler Philipet.al. Marketing management. Pearson education, delhi. The laws state college press, ames, iowa, usa 13th edition
2. Ramaswamy, V. S. And S. Namakumari. Marketing management – planning, implementation and control. Macmillan co. 866, Third Avenue, New-York – 10022. Fifth edition.

3. Rajan Ssaxena, marketing management. Tata McGraw-hill publication company ltd. New dehli 110 008.
4. Mukeshpandey, Deepali Tewari, the agribusiness book, idbc publishers Luckhnow 226 001 u. P. India. First edition.

3) e-books:

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Course No. : MKT -234 **Course Title :Market and Trade Acts**

Credit : (2+0= 2) **Semester: III**

Theory:

Evolution of market legislation.Procedures, need and scope for market legislation. Regulation of market.Growth and development of regulated markets. Review of Agricultural Produce Market Acts in Maharashtra and India. Regulated Marked Act, 1937, Organization of regulated markets, constitution of market committee, finance of the market committee, functions of market committee.Agriculture Produce (Grading and Marketing) Act- 1937.AGMARK, Cold Storage Order- 1964, Cold Storage- 1980. HACCP, FSSAI and FSSA 2006 & 2011, Prevention of Food /Adulteration Act-1954. All India Rural Credit Survey Committee Reports - 1954, Maharashtra Agricultural Produce Marketing (Regulation) Act -1963 and New Marketing Model Acts, Consumer Protection Act-1986. Central Warehousing Corporation Act- 1957.National Co-operative Warehousing Board Act -1956.State Warehousing Corporation Act - 1958.Weighing and Measurement Act.Current Export- Import Policy

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightage (%)
1.	Regulation of market, regulated market	Definition- regulated market. Evolution of market legislation, DMI functions, regulation of market	4
2.	Growth and development of regulated market	Regulated markets, history of regulated markets, objectives	4
3.	Regulated marketing act 1937	Introduction- features	3
4.	Organization of regulated markets	Introduction	3
5.	Constitution of market committees	Introduction	3
6.	Finance of the market committees	Introduction	3

7.	Functions of a market committee	APMC.- introduction	4
8.	Agricultural produce (grading & marking) act, 1937	The Maharashtra agricultural produce marketing (regulation) act- 1963- mission, classification of APMC, participants of the market.	4
9.	Agmark	Introduction.	3
10.	Cold storage order, 1964	Introduction- features	3
11.	Cold storage order, 1980	Introduction- features	3
12.	HACCP,	Introduction, concept, objectives, principles, benefits.	3
13.	ECOMARK	Introduction features.	3
14.	FSSAI and FSSA 2006 & 2011,	Introduction, features, principles, general provisions.	4
15.	Fruit product order,1955	Introduction- features	4
16.	Prevention of food adulteration act, 1954	Introduction- features	3
17.	All india rural credit survey committee 1951 (submitted report in 1954)	Introduction- features	4
18.	Agricultural produce marketing (regulation) act – 1963	Acts and its amendments till Date	4
19.	Consumer protection acts	Introduction- objectives, consumer education, rights, responsibilities.	4
20.	New marketing model acts	Salient features of model acts	3
21.	Central warehousing corporation act 1957	Introduction- functions	4
22.	National co-operative development corporation	Introduction- activities	4
23.	Central warehousing corporation	Introduction- functions	4
24.	State warehousing corporation	Introduction- functions	4
25	Weighing and measurement act	Introduction- functions	3
26	the national agricultural co-operative marketing federation of India (NAFED)	Objectives, activities/ functions.	4
27	Food corporation of India (FCI)	Introduction- function	4
28	EXIMpolicy	Introduction- features, recent EXIM policies.	4

Suggested readings:

1) Text Book:

1. Acharya, S. S. and N.L. Agrawal. Agricultural marketing in India. Oxford and IBH publishing co. Ltd. 66 Janpath, New Delhi. 110 001.5th edition.

2) Reference Books:

1. Mamoria, C.B. and R.L. Joshi. Principles and practices of marketing in India.KitabMahal, 15, thorn hill road, Allahabad.
2. Panvar, J.S. Beyond consumer marketing. Response books sage publications, New Delhi
3. Rajan Nijhawan, food safety and standards act 2006, rules 2011, regulations 2011. International law Book Company, church road, kashmere gate, Delhi. 12th edition.
4. S. Subbareddy, P. Raghu ram, Agricultural economics, oxford and IBH publishing company Pvt. Ltd. 2004

3) e-books:

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Course No. : ABM -233 **Course Title :Agricultural Informatics**

Credit : (1+1=2) **Semester: III**

Theory:

Introduction to Computers, Anatomy of Computers, Memory Concepts, Units of Memory, Operating System, definition and types, Applications of MS-Office for creating, Editing and Formatting a document, Data presentation, tabulation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, creating database, uses of DBMS in Agriculture, Internet and World Wide Web (WWW), Concepts, components and creation of web, HTML, XML coding.

Computer Programming, General Concepts, Documentation and Program Maintenance, Debugging programs, Errors. Introduction to Visual Basic, Java, Fortran, C/ C++, etc, concepts and standard input/output operations, Variables and Constants, Operators and Expressions, Flow of control, Inbuilt and User defined functions, programming techniques for agriculture.

e-Agriculture, concepts, design and development. Application of innovative ways to use information and communication technologies (IT) in Agriculture.ICT for Data Collection, formation of development prorammes, monitoring and evaluation of Programmers. Computer

Models in Agriculture: statistical, weather analysis and crop simulation models, concepts, structure, inputs-outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone mobile apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology, concepts, techniques, components and uses for generating valuable agri-information. Decision support systems, taxonomy, components, framework, classification and applications in Agriculture, DSS, Agriculture Information/Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning and crop calendars using IT tools.

Practical:

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix, Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power point for creating, editing and presenting a scientific Document, Handling of Tabular data, animation, video tools, art tool, graphics, template & designs. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data, handling macros. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW) and its components, creation of scientific website, presentation and management agricultural information through web. Introduction of various programming languages such as Visual Basic, Java, Fortran, C, C++, and their components Hands on practice on writing small programmes. Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/ Wofost. Preparation of Inputs file for CSM and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT tools. Use of smart phones and other devices in agro-advisory and dissemination of market information.Introduction of Geospatial Technology, demonstration of generating information important for Agriculture.Hands on practice on preparation of Decision Support System.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Sub topi	Weightage (%)
1.	Introduction to Computers, Operating System, definition and types, Application of MS-Office for document creation & Editing.	Operating System, Devices of computer Internal and External devices and MS-Office	10
2.	Interpretation and graph creation, statistical analysis, mathematical expression.	MS-Excel and Pie Chart and Table and Excel Calculation by using Formula Command	10
3.	Concept and types of database, uses of DBMS in Agriculture, World Wide Web (WWW)	What is DBMS, and How DBMS work in Agriculture, and Introduction of www	10
4.	Concepts and components. Introduction to computer programming languages,	Components of Computer and How computer operate by Programming Languages	10
5.	Concepts and standard input/output operation.	Inputs and Outputs devices and their operation	5
6.	e-Agriculture, concepts and application, Use of ICT in Agriculture.	Definition, and ICT in Agriculture	5
7.	Computer models for understanding plant processes.	Models for understanding plant processes.	5
8.	IT application for computation of water and nutrient requirement of crops.	How IT application for various automation system	5
9.	Computer-controlled devices (automated systems) for Agri-input management.	Computer-controlled devices their names and how used in Agri-input management	5
10.	Smartphone Apps in Agriculture for farm advises.	Various apps in Agriculture viz. Krishiking, Kisan World, APEDA, and various IT based Projects	5
11.	Market price, postharvest management, etc.	About Market Price and as per APMC and commodity market. And Postharvest Management of products for market.	5
12.	Geospatial technology for generating valuable agri-information.	Meaning, how use in agri-information	5
13.	Decision support systems,	Meaning, Decision support	5

	concepts, components and applications in Agriculture	systems for farmer	
14.	Agriculture Expert System.	Expert decision system for agriculture	5
15.	Soil Information Systems etc for supporting Farm decision.	Various Soil Information dept in college and university Jurisdiction	5
16.	Preparation of contingent crop-planning using IT tools.	Various contingent crop planning in IT.	5

Practical Exercises:

Exercise No.	Title
1	Study of computer Components, accessories, practice of important DOS Commands.
2.	Introduction of different operating systems
3.	File Management
4.	Use of MS-WORD and Power point
5.	Use of MS-EXCEL creating a spreadsheet.
6.	Use of statistical tools, writing expressions,
7.	Study of creating graphs and analysis of scientific data.
8.	Study of MS-ACCESS : Creating Database, Preparing queries and reports
9.	Study of Demonstration of Agri-information system
10	Study of Introduction to World Wide Web (www)
11	Study of Introduction of programming languages.
12	Study of Crop Simulation Models (CSM) such as DSSAT/CropSyst/Wofost
13	Computation of water and nutrient requirements of crops using CSM and IT tools.
14	Introduction of Geospatial Technology for generating valuable information for Agriculture
15	Study of Hands on Decision Support System
16	Study of Preparation of contingent crop planning.

Suggested readings:

1) Text Book:

2) Reference Books:

1. by Pradeep K. Sinha and PritiSinha Computer Fundamentals, III edition, BPB Publications, B-14, Connaught Place, New Delhi – 110 001.
2. by P.K. Sinha Computer Fundamentals, BPB Publications, B-14, Connaught Place, New Delhi – 110 001.
3. Mastering Office Professional for window 95, BPB Publications, B-14, Connaught Place, New Delhi – 110 001.

4. Statistical Methods for Agricultural workers by V.G. Panse and P.V. Sukhatma, ICAR, New Delhi.

3) e-books:

1..http://www.tutorialsforopenoffice.org/category_index/base.html

2.http://www.nrsc.gov.in/Agriculture

3. http://iasri.res.in/

4.http://mkisan.gov.in/downloadmobileapps.aspx

5. http://communicationtheory.org/berlos-smcr-model-of-communication

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Course No. : ABM -234Course Title: Human Resource Management and Development

Credit : (2+1=3) Semester: III

Theory:

Human Resources Management: Definition, Nature, Scope and objectives of HRM, Difference between HRM and PM, Importance of HRM, The changing environment of HRM, The changing role of HRM. **HRP / Manpower Planning**: Definition, Need HRP, Career Planning and Succession Planning.**Job Analysis:**Job Terminology, Process of Job Analysis, Job Description, Job Specification.**Human Resource Acquisition:** Meaning, Sources, and Process of Recruitment, Meaning, Process Test of Selection, Meaning, Objectives and Types of Interview, Meaning, Purpose, Process and Problems of Induction, Meaning and Problems of Placement.**Training and Development:** Meaning, Benefits and Process of Training, Methods and Problems of Training, Career Development, Meaning and Techniques of Executive Development, **Performance Appraisal**: Nature, Objectives and Methods of Performance Appraisal, Meaning and Types of Promotion, Meaning and Types of Transfers, Meaning of Demotion, Separation, Suspension, Redundancy, Retrenchment, Lay Off, (Meaning only)**Wage and Salary Administration:** Nature and Purpose, Compensation, Reward, Wage levels and Wage Structures, Minimum, Fair and Living Wage, Basic Kinds of Wage Plan, Ingredients of a Good Wage Plan, Types of Wages, Wage Differentials, Executive Compensation.**Rewards and Incentives**: Meaning and Features, Types of Rewards, Wage Incentives – Meaning and Objectives**Employee Benefits and Service**: Terminology and Meaning, Special Features of Fringe Benefits, Objectives & Classification of Fringe Benefit**Management of Grievances:** Meaning, Causes and Needs of Grievance Procedure.**Industrial Relations:** Definition, Objectives and Participants in Industrial Relations**Resolving Disputes**: Meaning, Causes & Settlement of Disputes, Method of Disputes Settlement (Meaning Only).

Practical:

Case Study on Human Resource Management**,** Case Study on Job Analysis, Job Description & Job Specification, Case Study on Manpower Planning**,** Case Study on Recruitment**,** Case Study on Selection**,** Case Study on Induction**,** Case Study on Training**,** Case Study on Management Development**,** Case Study on Performance Appraisal**,** Case Study on Employee Compensation**,** Case Study on Employee Benefits**,** Case Study on Rewards and Incentives**,** Case Study on Grievances Management.

Teaching Schedule- Theory with weightages (%):

Lecture No.	**Topic**	**Subtopic**	**Weightage (%)**
1, 2	Human Resources Management	Definition, Nature, Scope and objectives of HRM, Difference between HRM and PM, Importance of HRM, The changing environment of HRM, The changing role of HRM	**7**
3, 4	HRP / Manpower Planning	Definition, Need HRP Career Planning and Succession Planning	5
5, 6, 7	Job Analysis	Job Terminology: Task, Position, Job, Occupation., Job Rotation, Job Enlargement, Job Enrichment (Definition only), Definition, Purpose and Uses of job Analysis, Process of Job Analysis, Job Description: Definition and Components Job Specification: Definition and Components	7
8, 9	Recruitment	1. Meaning, Process of Recruitment 2. Sources of Recruitment 3. Internal verses External Recruitment: Advantages and Disadvantages	7
10, 11	Selection	1. Meaning and Process of Selection 2. Selection Tests: Types Interview: Meaning, Objectives and Types	7
12, 13	Induction	1. Induction: Meaning, Purpose. 2. Strategic Choice of Orientation 3. Induction Programme 4. Problems of Orientation	5
14	Placement	Placement: Meaning, Problems	5
15, 16, 17	Training, Development and Career Management	1. Three Terms: Training, Development and Education 2. The Benefits of Training	7

		3. The Training Process 4. Methods of Training 5. Impediments of Effective Training Career Development	
20, 21	Performance Appraisal	1. Nature and Objectives of Performance Appraisal 2. Performance Appraisal and Competitive Advantage 3. Methods of Performance Appraisal	7
22, 23	Promotion, Transfers, Separation	1. Meaning and Types of Promotion 2. Meaning and Types of Transfers 3. Meaning of Demotion, Separation, Suspension, Redundancy, Retrenchment, Lay Off, (Meaning only)	5
24, 25	Wage and Salary Administration	1. Nature and Purpose 2. Compensation, Reward, Wage levels and Wage Structures 3. Minimum, Fair and Living Wage 4. Basic Kinds of Wage Plan 5. Ingredients of a Good Wage Plan 6. Types of Wages 7. Wage Differentials 8. Executive Compensation	7
26, 27	Rewards and Incentives	1. Meaning and Features 2. Types of Rewards 3. Wage Incentives – Meaning and Objectives	5
28, 29	Employee Benefits and Service	1. Terminology and Meaning 2. Special Features of Fringe Benefits 3. Objectives of Fringe Benefit 4. Classification of Fringe Benefits	5
30	Management of Grievances	1. Meaning 2. Causes of Grievances 3. Need for Grievance Procedure	5
31	Industrial Relations	1. Definition and Objectives of IR 2. Participants in IR	5
32	Resolving Disputes	1. Meaning and Causes of Disputes 2. Settlement of Disputes 3. Method of Disputes Settlement (Meaning only)	5

Practical Exercises:

Exercise No.	Title
1	Case Study on Human Resource Management
2 & 3	Case Study on Job Analysis, Job Description & Job Specification
4	Case Study on Manpower Planning
5	Case Study on Recruitment
6	Case Study on Selection
7	Case Study on Induction
8 & 9	Case Study on Training
10	Case Study on Management Development
11	Case Study on Performance Appraisal
12	Case Study on Employee Compensation
13	Case Study on Employee Benefits
14	Case Study on Rewards and Incentives
15 & 16	Case Study on Grievances Management

Suggested readings:

1) Text Book:

1. K. Ashwathappa- Human Resource and Personnel Management- Tata McGraw Hill Publishing Co. Ltd.
2. . C. B. Mamoria and S. V. Gankar Personnel Management Text & Cases
3. Performance Appraisal, Theory & Practice- AIMA- Vikas Management Series, New Delhi- 1986.

2) Reference Books:

1. *Dr. Anjali Ghanekar*Human Resource Management...
2. Dr. C. B. Gupta- Sultan and Sons Human Resource Management-.

3) e-books:

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Semester- IV

Course No	Course Title	Credits
AGRO-244	Irrigation Water Management	1+1=2
ENGG-243	Farm Power and Machinery	1+1=2
STAT-241	Business Statistics	1+2=3
EXTN-242	Consumers Psychology in Business Management	1+1=2
ECON-244	Agril. Cooperation, Institutions and Management	2+1=3
MKT-245	Rural Marketing and Market Infrastructure	2+1=3
MKT-246	Input Marketing Management	1+1=2
ABM-245	Office Procedures for Agribusiness	0+1=1
ABM-246	Organizational Behaviour for Business management	2+0=2
ELE-HORT 244	High-tech Horticulture	1+2=3
ELE-ABM 2414	Agro Tourism	1+2=3
ELE-ABM 2415	Food Technology and Processing Management	1+2=3
	Total	**23**

Course No. : AGRO 244 **Course Title: Irrigation Water Management**

Credit : (1+1=2) **Semester : IV**

Theory:

Water resource development and utilization in India, Importance of irrigation, Soil water plant relationship, measurement of soil moisture, irrigation water, infiltration.Water requirement of important crops, Consumptive use and evapotranspiration, different irrigation efficiencies.**Irrigation methods:** border, check basin, furrow, sprinkler and drip irrigation. **Sprinkler irrigation:** types, components, design and layout and care and maintenance. **Drip irrigation:** Types, components, design and layout and care and maintenance. Fertigation and filtration aspects of micro-irrigation. Introduction to other pressurized irrigation system, rain gun, porous pipe etc.

Practical:

Determination of soil moisture by gravimetric method, Measurement of irrigation water by weirs, orifice and flumes, Measurement of infiltration and analysis of infiltration rate, Estimation of water requirement by different methods, Study of different components of drip irrigation system, Fertigation through different devices, Study of different components of sprinkler irrigation system, Estimation of irrigation efficiencies, Cost economics of drip/sprinkler system

and other pressurized irrigation systems, Care and maintenance of micro-irrigation system, Study of different filtration system, Visit to different pressurized irrigation system manufacturers.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightages (%)
1	Water resource development and utilization in India	a. Introduction b. Irrigation in Indian agriculture and present status c. Water budget of India d. Water resources and their development e. Sources of water for crop plants	4
2	Importance of Irrigation	a. Importance and Role of Water in Crop Production b. Importance of Irrigation c. Need of irrigation in Indian context d. Advantages of irrigation e. Harmful effects of excess irrigation	8
3	Soil, water, plant relationship	a. Introduction: soil system b. Basic soil physical properties influencing soil-water relationship c. Classification of soil water d. Soil water constants e. Water movement in soil-plant–atmospheric system	12
4	Measurement of soil moisture	a. Direct methods b. Indirect methods c. Methods of measuring water potential	6
5	Measurement of irrigation water	Different methods for measurement of irrigation water a. Volumetric method, b. Velocity area method, c. Direct discharge method, and d. Tracer method.	6
6	Infilteration and its measurement	a. Infilteration b. Factors influencing infiltration rate c. Measurement of Infilteration	4
7	Water requirement of important crops	a. Water requirement of crops: b. Factors affecting water requirement of crops c. Water requirement of important crops d. Methods of determining crop water requirements	8
8	Consumptive use and evapotranspiration	a. Classification of consumptive use of water by crops b. Factors affecting Evapotranspiration c. Methods of estimating Evapotranspiration	6

		d. Irrigation scheduling and its approaches	
9	Different irrigation efficiencies	a. Different irrigation efficiencies with formulae b. Water use efficiency and factors affecting it c. Techniques to increase Water Use Efficiency	6
10	Different irrigation methods (surface, sub-surface and pressurized irrigation methods)	Classification of irrigation methods with their advantages and disadvantages 1. Surface method or gravity method of irrigation a. Flooding b. Border strip method c. Check basin method d. Basin method e. Ring basin method f. Furrow method g. Surge irrigation 2. Sub surface or sub irrigation 3. Pressurized or micro irrigation - Drip irrigation, sprinkler irrigation and rain gun irrigation.	12
11	Sprinkler irrigation: types, components and design	a. Sprinkler irrigation b. Suitability, advantages and disadvantages c. Components of sprinkler irrigation system d. Working and types of sprinkler irrigation system	8
12	Layout, care and maintenance of sprinkler irrigation system	a. Layout of sprinkler irrigation system b. Operation and maintenance of sprinkler system	3
13	Drip irrigation: types, components, design,	a. Drip irrigation b. Suitability, advantages and disadvantages c. Components of drip irrigation system d. Working and types of drip irrigation	8
14	Layout, care and maintenance	a. Layout of drip irrigation system b. Operation and maintenance of drip system	3
15	Fertigation and filteration aspects of micro-irrigation	a. Fertigation b. Fertigation equipments c. Advantages and disadvantages of fertigation	4
16	Introduction to other pressurized irrigation system, raingun, porous pipe etc	a. Introduction to other pressurized irrigation system b. Raingun, porous pipe etc	2

Practical Exercises:

Exercise No.	Title
1	Determination of bulk density of soil
2	Determination of soil moisture by gravimetric method
3	Determination of soil water potential by Tensiometer
4	Measurement of irrigation water by weirs, orifice and flumes
5	Measurement of infiltration and analysis of infiltration rate
6	Estimation of water requirement by different methods
7	Study of different methods of irrigation
8	Study of different components of drip irrigation system
9	Study of different components of sprinkler irrigation system
10	Fertigation through different devices
11	Estimation of irrigation efficiencies
12	Cost economics of sprinkler irrigation system
13	Cost economics of drip irrigation system
14	Care and maintenance of micro-irrigation system
15	Study of different filtration system
16	Visit to different pressurized irrigation system manufacturers

Suggested readings:

1) Text Book:

2) Reference Books:

1. Michael, A.M. Irrigation: Theory and Practice. Vikas Publishing House Pvt. Ltd., Delhi.
2. Murthy, V. V. N. Land and Water Management. Kalyani Publishers, Ludhiana.
3. Michael, A.M. and T.P. Ojha. Principles of Agricultural Engineering. Vol. II, Jain Brothers, Jodhpur.
4. Shivnappan, R.K. Sprinkler Irrigation. Oxford IBM Publishing Co. Pvt.Ltd., New Delhi.
5. Shivnappan, R. K. Drip Irrigation. Keerti Publishers House, Trivandraum.
6. Radhey Lal. Irrigation Hydraulics. Saroj Prakashan, Allahabad.

3) e-books:

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Course No: ENGG-243 **Course Title: Farm Power And Machinery**

Credit : (1+1=2) **Semester : IV**

Theory:

Farm power in India : Sources. Scope of mechanization. I.C. engines, working principles, two stroke and four stroke engines. I.C. engine terminology, Components of I.C. Engine, different systems of I.C. engine. Tractors. Types, Selection of tractor and cost of tractor power. Tillage implements. Primary and

secondary tillage implements, Implements for intercultural operations seed drill, paddy transplanters, plant protection equipment and harvesting equipment: Equipment for land development and soil conservation.

Practicals:

Study of different components of I.C.Engine; Study of working of two stroke engine: Study of M. B. plough, Study of disc plough: Study of seed-cum-fertilizer drills-furrow opener, metering mechanism, and calibration; Study, maintenance and operation of tractor: Learning of tractor driving: Study, maintenance and operation of power tiller, study of different inter cultivation equipment in terms of efficiency, field capacity; Repairs and adjustments and operation of sprayers; Repairs and adjustments and operation of dusters; Study of paddy transplanters.

Teaching Schedule- Theory with Weightages (%):

Lecture No.	Topic	Subtopic	Weightage %
1	• Farm Power in India: Sources • Scope of Mechanization	• Farm Power in India : Sources 1) Human Power 2) Animal Power 3) Mechanical Power 4) Electrical Power 5) Renewable Energy • Scope of Mechanization ➢ Benefits of Farm Mechanization ➢ Limitations & Suggestions	20
2	• I.C. Engines, Working Principles, Two stroke and Four stroke engines • Components of I.C. Engine	• I.C. Engine Types • Petrol and Diesel Engine • Two Stroke and Four Stroke Engines • Working Principles • Comparison between petrol and diesel engine, two stroke & four stroke cycle engines • Components of Engine	
3 & 4	I.C. Engine Terminology	• Stroke Bore Ratio • Piston Displacement • Compression ratio • Displacement Volume • Horse Power • Break Horse Power • Thermal Efficiency • Mechanical efficiency • Examples	15
5 & 6	Different Systems of I.C.	• Different systems of I.C. Engines	

	Engine	1) Air supply system(Air Cleaner) 2) Fuel Supply Systems 3) Lubrication Systems 4) Cooling Systems	10
7 & 8	Tractors, Types, Selection of tractor	• Tractor – Introduction • Tractor types • Selection of tractor • Familiarization with power transmission system: Clutch, Gear, differential unit, Final drive, Power take-off • Cost of operation	10
9	Tillage implements, Primary and secondary tillage implements	• Tillage – Objectives/Functions • Primary and secondary tillage • Tillage implements • Primary tillage implements 1) Indigenous plough 2) Mould Board Plough 3) Disk Plough • Secondary Tillage implements 1) Harrow – Disk Harrow, Drag Harrow, Blade Harrow	20
10 &11	Sowing and Planting, Paddy Transplanter	Sowing: 1) Seed drill 2) Seed cum Fertilizer drill 3) Seed Metering Mechanisms 4) Calibration of Seed Drill Paddy Transplanter 1) Manual Rice Planter 2) Self Propelled Paddy Transplanter 3) Establishing modified mat nursery	
12	Implements for intercultural operations	• Types of cultivators • Equipment for weed control	
13	Harvesting and Threshing Equipments	• Harvesting equipments 1) Mowers 2) Reapers • Threshing - Methods and Power thresher • Combines	10
14 & 15	Plant protection equipments	• Sprayers - Components 1) Bucket type sprayer 2) Knapsack type sprayer 3) Compression type sprayer 4) Hand atomizer 5) Engine powered Sprayers	10

		• Dusters 1) Plungers type hand dusters 2) Rotary type 3) Knapsack type 4) Power operated dusters 5) Air Plane dusters	
16	Equipment for land development and soil conservation	• Land leveling 1) Land leveling by draft animals 2) Land leveling by tractor drawn 3) Chisel plough 4) Disk Harrow 5) Bund Former	5

Practical Exercises:

Exercise No.	Title
1	Study of different components of Internal Combustion Engine
2 & 3	Study of working of Two Stroke and Four Stroke cycle engine
4	Study of Mould Board Ploughs
5	Study of Disk Ploughs
6	Study of Furrow Openers
7	Study of Seed cum Fertilizer drill
8 & 9	Study of Metering Mechanism and Calibration of Seed Drill
10	Study of Repairs, Maintenance and Operation of Tractor
11	Study of Maintenance and Operation of Power Tiller
12	Study of different Inter Cultivation equipments in terms of Efficiency, Field Capacity
13	Study of Repairs, Adjustments and Operation of Sprayers
14	Study of Repairs, Adjustments and Operation of Dusters
15	Study of Paddy Transplanters
16	Learning of Tractor Driving

Suggested Readings:

1) Text Books:

1. Elements of Agricultural Engineering. Dr. Jagadishwar Sahay. Forth Edition, 2004.
2. Principles of Agricultural Engineering. Vol-I. T. P. Ojha and A. M. Michael. Jail Brothers, New Delhi.

2) Reference Books:

1. Farm Tractor –Repair and Maintenance by S.C. Jain and C.R. Rai.
2. Elements of Farm Machinery. A. C. Shrivastava. Oxford & IBH Publishing.
3. Farm Machinery and Equipment. Smith and Wilkes.

3) Ebooks:

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Course No. : STAT -241 **Course Title : Business Statistics**

Credit : (1+2=3) **Semester :IV**

Theory:

Definition of statistics, meaning, scope, statistics and industry, its applications, uses and misuses of statistics in business.Frequency distribution, raw data, the array frequency distribution, determining classes and class interval, cumulative frequency distribution.Graphic presentation of data.Measures of central tendency, AM, Median, Mode, GM, HM for grouped and ungrouped data. Characteristics of mean, mode and median, weighted mean their uses and applications. Dispersion, Range, Mean Deviation, Variance, Standard Deviation, Properties of SD, relative measures of dispersion for grouped and ungrouped data, Skewness, Kurtosis and moments.Probability and probability distribution.Definition of probability, mathematical probability.Empirical probability and axiomatic approach.Events, sample space, probability of independent and dependent events.Generalization and extensions of the law of probability formula.Discrete probability distribution.Binomial and Poisson distribution and its parameters.Normal distribution, its properties and procedure of fitting the normal curve.Tests of hypothesis-two-sided test, one sided test, confidence limit.Critical region, power of a statistical test. Study of student's 't' distribution. One sample, two sample 't' test. 'F'-test, χ^2 test, uses and applications.Study of simple correlation and regression. Scatter diagram. The least-square criteria for fitting simple regression.Tests of hypothesis for slope and correlation coefficient.The standard errors of estimates.Multiple and partial correlation, multiple regression up to three variables. The normal equation with least squares estimates. The matrix theory approach in solving the normal equations and testing the significance of partial regression coefficients. Coefficient of multiple determination and its significance. Time series and index number analysis.

Practical:

Classification of data (problems on exclusive and inclusive classification).Computation of AM,GM,HM,Median,Mode for discrete ungrouped data & grouped data.Computation of AM, GM, HM,.Median and Mode for continuous series.The estimation of measures of dispersion, range, mean deviation from averages, variance, standard deviation, standard error and relative measures such as CV, coefficient of MD.The computation of range, MD, variance, standard deviation, standard error and CV coefficient of MD for grouped data.Student's't' test for one

sample, paired 't' test and unpaired 't' test and 'F'-test.Computation of χ^2 for one sample 2 x 2 and n x k contingency table.Calculation of correlation coefficient and regression coefficient. Y = a + bx, X = a^1 + b^1y and testing significance of r and b.Computation of three variable multiple linear regression equation by using matrix inverse and testing significance of partial regression coefficient and R^2. Fitting of Binomial and Normal distribution.Fitting of linear, semi-log parabolic trend equations to time series data.Fitting of modified exponential, Gompertz, and Logistic growth curve.Seasonal variations-By methods of simple averages and ratio to moving average method.Seasonal variations by ratio to trend method and method of link relatives.Measurement of cyclic and irregular variation.Construction of Index Numbers.Procedure of base shifting, deflation of indices.

Teaching Schedule- Theory with weightages (%):

Lecture No	Topics	Subtopic	Weightage(%)
1	Introduction to Statistics	Definition of statistics, meaning, scope, statistics and industry, its applications, uses and misuses of statistics in business.	6
2 & 3	Classification, Frequency distribution & Graphical representation of data	Frequency distribution, raw data, the array frequency distribution, determining classes and class interval, cumulative frequency distribution. Graphic presentation of data	6
4	Measure of Average	Measures of central tendency, AM, Median, Mode, GM, HM for grouped and ungrouped data. Characteristics of mean, mode and median, weighted mean, their uses and applications	12
5	Measure of Variation	Dispersion, Range, Mean Deviation, Variance, Standard Deviation, Properties of SD, relative measures of dispersion for grouped and ungrouped data	12
6	Skewness, Kurtosis & Moment	Measures& Types of Skewness & Kurtosis, Concept of Moment	8
7	Probability: Concept, Definitions & Theory	Probability: Definition of probability, mathematical probability. Empirical probability and axiomatic approach. Events, sample space, probability of independent and dependent events. Generalization and extensions of the law of probability formula.	12

8	Probability & Theoretical distributions.	Discrete probability distribution. Binomial and Poisson distribution and its parameters. Normal distribution, its properties and procedure of fitting the normal curve	12
9 &10	Test of hypothesis	. Tests of hypothesis-two-sided test, one sided test, confidence limit. Critical region, power of a statistical test. Study of students'' distribution. One sample, two sample't' test. 'F'-test, χ^2 test, uses and applications	12
11 & 12	Measures of association (Simple)	Study of simple correlation and regression. Scatter diagram. The least-square criteria for fitting simple regression	4
	Test of hypothesis for correlation & Regression	Tests of hypothesis for slope and correlation coefficient. The standard errors of estimates. Multiple and partial correlation, multiple regression up to three variables.	4
13	Theory of Estimation	The normal equation with least squares estimates	2
14 & 15	Coefficients of correlation & regression (Partial & Multiple	The matrix theory approach in solving the normal equations and testing the significance of partial regression coefficients. Coefficient of multiple determinations and its significance.	4
16	Time series & Index number analysis	Concept, Types & Definitions	6

Practical Exercises:

Exercise No	Title
1	Classification of data Classification of data (problems on exclusive and inclusive classification).
2 & 3	Measures of Central Tendency Computation of AM, GM, HM, Median, Mode for discrete ungrouped data and grouped data.
4	Measures of Central Tendency Computation of AM, GM, HM,. Median and Mode for continuous series
5 , 6 & 7	Measures of Dispersion The estimation of measures of dispersion, range, mean deviation from averages, variance, standard deviation, standard error and relative measures such as. Coefficient of MD.
8 , 9 & 10	Measures of Dispersion

	The computation of range, MD, variance, standard deviation, standard error and CV coefficient of MD for grouped data.
11 & 12	Test of Significance Student's' test for one sample, paired' test and unpaired' test and 'F'-test.
13	Test of Significance Computation of χ^2 for one sample 2 x 2 and n x k contingency table.
14 & 15	Coefficient of Correlation Calculation of correlation coefficient and regression coefficient. Y = a + bx, $X = a^1 + b^1y$ and testing significance of r and b.
16, 17 & 18	Coefficient of Regression Computation of three variable multiple linear regression equation by using matrix inverse and testing significance of partial regression coefficient and R^2 .
19	Probability Distributions. Fitting of Binomial and Normal distribution.
20, 21,22, 23, 24 & 25	Time series Analysis& Index Number Analysis Fitting of linear, semi-log parabolic trend equations to time series data. Fitting of modified exponential, Gompertz, and Logistic growth curve. Seasonal variations-By methods of simple averages and ratio to moving average method. Seasonal variations by ratio to trend method and method of link relatives. Measurement of cyclic and irregular variation. Construction of Index Numbers. Procedure of base shifting, deflation of indices.

Suggested readings:

1) Text Book:

2) Reference Books:

1. Croxton, F. E., D.J. Cowden and Ben, W. Bolch. Practical Business Statistics. Prentice Hall of India Pvt. Ltd. Publication.
2. Gupta, S.C. Fundamentals of Statistics. Himalaya Publishing House.
3. Gupta, S.C and V.K. Kapoor. Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi- 110 002

3) e-books:

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Course No. : EXTN 242 **Course Title: Consumer Psychology in Business Management**

Credit : (1+1=2) **Semester :IV**

Theory:

Psychology: Concept, Meaning, definitions, scope and importance. **Perception:** Meaning, definitions, determinants of perceptions, general principles, errors in perceptions. **Attitude:** Meaning and characteristics, formation of stereotypes and prejudices, factors in attitude change. **Consumer buying:** The decision making process. Consumer information processing, consumer learning process.**Consumer preferences:** Post-purchase processes, situational influence. Social classes and buying behaviour.**Emotion:** Concept, meaning, definition, motivation and emotion, type of emotion, theories of emotion, expressive components of emotions. **Learning:** Definition, principles, indicators theories of learning and experimental learning, factor affecting learning. **Consumer spending:** Consumer spending and savings, consumer behaviour and the marketing manager, product positioning, marketing mix development.

Practical:

General Household surveys for consumers preferences, To work out the income and expenditure pattern of consumers. Market survey visit and collect the relevant factors and information, market survey of commodity choices To study the different types of market operation in area & function, Visit to Agri mall or shop.

Teaching Schedule- Theory with weightages (%):

Lecture No	Topic	Weightage (%)
1,2	**Psychology:** Concept, Meaning, definitions, scope and importance.	12
3,4	**Perception:** Meaning, definitions, determinants of perceptions, general principles, errors in perceptions.	12
5,6	**Attitude:** Meaning and characteristics, formation of stereotypes and prejudices, factors in attitude change.	12
7,8	**Consumer buying:** The decision making process. Consumer information processing, consumer learning process.	12
9,10	**Consumer preferences:** Post-purchase processes, situational influence. Social classes and buying behaviour.	12
11,12	**Emotion:** Concept, meaning, definition, type of emotion, theories of emotion: James and C.G. Lange theory, Cannon's theory	14
13,14	**Learning:** Definition, principles, elements of learning and factor affecting learning.	12
15,16	**Consumer spending:** Consumer spending and savings, consumer behaviour and the marketing manager, product positioning, marketing mix development.	14

Practical Exercises:

Exercise No	Title
1	Law of demand
2	Law of supply
3	Engle's law of family expenditure
4	Elasticity of demand
5	Elasticity of supply
6	Law of diminishing marginal utility
7,8	To workout the income and expenditure pattern of consumers
9,10	Household surveys for consumers preferences, programme
11,12	market survey of commodity choices and relevant factors

Suggested readings:

1) Text Book:

2) Reference Books:

1. Atwater F. Psychology for leaving, Adjustment, Growth and Behaviour Today. Prentice Hall of India, New Delhi.
2. Back C. Robert. Psychological factors at work, Recognition and control ILO, Geneva, Occupational Safety and Health Series No.56.
3. Back C. Robert. Apply Psychology Understanding People. Prentice Hall Engle woods Cliffs, New Jersey.
4. Baron, R.A. Psychology. Prentice Hall of India, New Delhi.
5. Chakraborty, Ajitha. Social stress Mental Health, A Social Psychiatric field study of Calcutta. SAGE Publication, New Delhi.
6. Chattopadhyaya, Aparna. What's your emotional IQ. Pustak Mahal, New Delhi.
7. Davar, Bhargavir and Parmeshvar Bhatt. Psychology analysis as a human science beyond fundamentalism. Sage Publication, New Delhi.
8. Morgan, C.T. Klng, R.a. Robinson, N.M. Introduction to psychology – Tata McGraw Hill Publishing Co., New Delhi.
9. Hans Raj Bhatia. A Textbook Educational Psychology.
10. Rogers, Evertt M. Diffusion of Innovations, New York The Free Press.
11. Shiffman, L.G. and L.L. Kaunk. Consumer Behaviour. Prentice-Hall of India Pvt. Ltd., M-97, Connaught Circle, New Delhi. 110 001.

3) e-books:

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Course No. : ECON 244 Course Title: Agricultural Co-operation, Institutions and Management

Credit : (2+1=3) Semester :IV

Theory:

Co-operation: Meaning, Definition, principles of co-operation and its application in agriculture. Importance and role of co-operation in agriculture and rural development. Co-operation compared with capitalism, socialism, communism and co-operative movement in India.

Co-operative marketing and Processing Institutions: Institutional, non-institutional and multi-agency approach, forms of co-operative, Co-operative education and training. State co-operative Union and NCDC, co-operative administration and HRM. **Co-operative Management**: Nature and Functions, professional Management of Co-operatives, role of leadership in co-operative Management.

Practical:

To study of primary Agricultural Co-operative Credit society, District Central Co-operative bank, state Co-operative bank, M.S. Co-operative Bank for Agricultural and Rural development. Forms of Co-operatives.Procedure for obtaining loans.Formulation of loan proposal.Economic feasibility of a farm credit proposal.Study of co-operative Marketing, Study of processing of cereals, pulses and oilseeds managed by co-operatives, study of NCDC.Preparation of loan proposal for horticultural garden, Visit to different cooperative credit institutions, Visit to agribusiness cooperatives, Problems in cooperatives and remedies to overcome the same.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightages (%)
1	Co-operation	Meaning, Definition	3
2&3	Principles of co-operation	Various principles of co-operation and its application in agriculture	6
4	Characteristics of co-operation	Various Characteristics of co-operation	3
5	Type of loan	On the basis of period -Short Term loan, Medium Term Loan, Long term Loan	3
6	Agencies Involved in Agricultural Finance	Institutional and non-institutional agencies involved in agricultural finance	3
7	Role of co-operation	Importance and role of co-operation in agriculture and rural development	6
8&9	Co-operation Midway between capitalism&	Characteristics, Similarity and Midway of Co-operation between capitalism and	6

	socialism	socialism,	
10&11	Co-operative movement in India	co-operative movement before and after independence	6
12	Study of Co-operative Marketing.	Defination, objective, functions of co-operative marketing	3
13	Co-operative Marketing Structure	NAFED, SCMF,RCMF,PCMF	4
14	Agencies involved in Agricultural marketing	NAFED, SCMF,RCMF,PCMF FCI, STC	3
15	Study of Co-operative Processing / Processing Co-operatives.	Defination, objective, functions of co-operative Processing	3
16	Different types co-operative processing in Agriculture	Sugar Industry, Dal mill, Oil mill,rice mill,cotton industry, etc. Objective, Management, source of working capital	3
17	Study of forms of co-operatives.	Various forms of co-operatives	3
18&19	Co-operative Education	1.Different levels of Education, 2.Different Institutions of Education,NCUI,SUI	6
20	Co-operative Training	1.Different levels of Training, 2.Different Institutions of Training , NCCT	3
21	Study of NCDC.	Objective, Functions of NCDC	3
22	Co-operative administration	Co-operative administration in Co-operatives	3
23	Human Resource Management in co-operatives	HRM:-Functions ,Nature	3
24	Study of Primary Agricultural Co-operative Credit Society (PACCS).	Objective, Functions, Area of Operation, Management, Source of working capital, Overdues, Rate of interest of PACS	3
25	Study of District/ Central Co-operative Bank (DCB/CCB).	Objective, Functions, Area of Operation, Management, Source of working capital, Overdues, Rate of interest of DCB	3
26	Study of State Co-operative Bank (SCB).	Objective, Functions, Area of Operation, Management, Source of working capital, Overdues, Rate of interest of SCB	3
27	Study of Primary Land Development Bank(PLDB)	Objective, Functions, Area of Operation, Management, Source of working capital, , Rate of interest of PLDB	3
28	Study of State Land	Objective, Functions, Area of Operation,	3

	Development Bank(SLDB)	Management, Source of working capital, Rate of interest of SLDB	
29	Nationalization of banks	Concept, effect of Nationalization of banks	3
30	Co-operative Management	Nature and Functions, Structure of Management	6
31	Professional Management of Co-operatives	Role of Professional Management of Co-operatives	3
32	Role of leadership in co-operative Management.	Different qualities and role of leadership	3

Practical Exercises:

Exercise No.	Title
1	Study of Primary Agricultural Co-operative Credit Society (PACCS).
2	Study of District/ Central Co-operative Bank (DCB/CCB).
3	Study of State Co-operative Bank (SCB).
4	Study of M.S. Co-operative Bank for Agricultural and Rural development (PLDB & SLDB).
5	Study of Forms of Co-operative
6&7	Study of Co-operative Marketing: Objective, functions Co-operative Marketing Structure:-3 tier, 2 tier Structure, NAFED
8&9	Study of Co-operative Processing / Processing Co-operatives: Objective & Functions Study of different co-operative processing sectors.
10	Study of National Co-operative Development Corporation (NCDC).
11	Preparation of Loan Proposal for Obtaining Loans & Scrutiny of Proposals
12	Study of Economic Feasibility Tests of Farm credit Proposal- Three R's of Credit and Three C's Of Credit.
13	Preparation of Loan proposal for Maintaining Crossbreed Cows or any other.
14	Preparation of Loan proposal for horticultural garden.
15	Problems in co-operatives and remedies to overcome the same.
16	Visit to different co-operative credit institutions

Suggested readings:

1) Text Book:

1. Umesh C.Patnaik and Ananta K.Roy. Co-operation and Co-operative Management.kalyani publishers,Ludhiana-141 008.
2. G.R.Madan. Co-operative Movement in India. Mittal Publications,Daryaganj,New Delhi-110 002.

3. Sarkar A.N. Agri Business Co-operative Management. Everest Publishing House, Everest Lane, 536, Shaniwar Peth, Appa Balwant Chowk, Pune – 411 030.
4. R.R.Paul. Money, Banking and International Trade.
   Kalyani Publishers, Rajinder Nagar,Ludhiana-141 008.
5. M.L.Jhingan. Money, Banking,International Trade and Public Finance.
   Vrinda Publications(P) Ltd.B-5, Ashish Complex (Opp.Ahlcon Public School), Mayur Vihar, Phase –I, Delhi-110 091.

2) Reference Books:

1. Mamoria, C.B. and R.D. Saxena. Co-operation in India, Kitab mahal, 15-Thorn Hill Road , Allahabad.
2. Joshi, S.S and Charles V. Moore. Essentials of Farm Financial Management. Today and Tommorrow's printed and Publishers-22 B-5, Original Road, Karol Baugh, New Delhi - 110005.
3. S.B.Verma,G.P.Sah,S.C.Pathak. Rural credit and Co-operative Development.Deep & Deep Publications Pvt.Ltd.F-159, Rajouri Garden, New Delhi-110027.
4. Dr.V.D.Varkey,V.G.Vartak.Co-operative Management.Pragati Books Pvt.Ltd.119,Budhwar Peth ,Jogeshwari Mandir Lane,Pune-411002.

3) e-books:

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Course No.: MKT -245 Course Title: Rural Marketing and Market Infrastructure

Credit : (2+1=3) Semester : IV

Theory:

Profile of rural marketing, definition, classification, strategies, characteristics, changing pattern of rural market, problems in rural marketing.Rural marketing in India – Difference between urban and rural market, study of rural resources.Rural marketing and research – Sources for conducting marketing research, dos and don'ts for rural marketing and rural industries.Rural segmentation - Targeting and positioning. Rural product and prices – Introduction, packing, pricing methods, rural branding. Rural distribution / channels of distribution, functions of rural sales persons. Rural communication – Introduction, types, factors affecting rural communication, problems. Market infrastructure – Meaning, facilities included and its importance.

Practical:

Visits to various rural markets including daily, weekly bazaars etc and their complete profile studies. Studies of market infrastructure such as market yard, grading and methods of saleCase study on Rural marketing.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Subtopic	Weightages (%)
1&2	Profile of rural marketing	Introduction, definition of rural marketing, classification of rural marketscharacteristics of rural markets	12
3&4	Aspects of Rural Marketing	Changing Patterns In rural Demand, Problems In Rural Marketing	
5 & 6	Rural marketing in India	Difference between urban and rural market, study of rural resources	8
7, 8 & 9	Rural marketing and research	Rural marketing research, Sources for conducting rural marketing research- 1. Primary sources 2. Secondary sources Rural research methods Do's and don'ts for rural marketing research	8
10, 11, 12 & 13	Rural market segmentation, targeting and positioning	Introduction- rural step framework, Segmentation- identify segment variables, segment the market, develop the profile, select the target market, evaluate the market, evaluate the segments, targeting, positioning	12
14, 15, 16 & 17	Rural marketing mix	Rural product- Product life cycle, Rural product strategy, Rural packaging, Rural packaging strategy, Rural branding	12
18, 19, 20 & 21	Rural marketing mix	Rural price- Rural pricing objectives Rural pricing strategies Methods of pricing	12
22, 23, 24	Rural distribution	Physical distribution, Channels of distribution	8
25, 26, 27	Rural sales force management	Strategic planning for rural sales force management Important traits for rural salespersons Functions of rural salespersons	10

28, 29, 30	Rural communication	Introduction Factors affecting rural media Types of rural media Problems of rural communication	10
31, 32	Market infrastructure	Meaning , Facilities included & its importance	8

Practical Exercises:

Exercise No	Title
1,2,3	Study various rural markets including daily, weekly bazaars
4&5	Study of rural pricing methods
7&8	Study of rural Product strategy adopted by different companies
9	Study of market yard In local area.
10	Study of grading methods adopted in surveyed market
11	Study of method of sales adopted in surveyed market.
12,13	Study of market infrastructure facilities available in market. and their importance.
14,15,16	Case studies on rural marketing.

Suggested readings:

1) Text Book:

2) Reference Books:

1. Acharya, S.S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH publishing company Pvt. Ltd. 66, Janpath, New Delhi – 1.
2. Memoria, C.B. and R.L. Joshi. Principles and Practice of Marketing in India". Kitab Mahal, 15, Thorn hill Road, Allahabad.Ramtishen, Y. Rural and Agricultural Marketing. VES College of Arts, Science and Commerce, Mumbai. Jacob Publishing House.

3) e-books:

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Course No. : MKT -246 Course Title: Input Marketing Management

Credit : (1+1=2) Semester: IV

Theory:

Scope and importance of agricultural input marketing management. Study of demand and supply scenario of major agro-inputs: seeds, fertilizers, agro-chemicals, farm machineries and electricity. Production organizations in seeds, fertilizes, agro-chemicals. Various types of Credit for procurement of inputs. Study of Marketing of various inputs, various Marketing channels, problems

in marketing and suggestion to overcome the problems. Branding and packaging for major agro-inputs

Practical:

Visit to seed organizations (MSSC, Mahabeej, NSC etc.) – Study of production, pricing, transportation and promotion of seeds.Study of Chemical fertilizer production Units.Public sector, Co-operative Sector, Private Sector Companies and their products range.Study of Demand and Supply of chemical fertilizers and gap therein.Types of agro-chemicals used as agricultural inputs.Visit to Agricultural Exhibition. Role of Agricultural exhibitions in marketing of Agro-inputs.Market survey of local market to know potentiality of different crop seeds, fertilizers, various plant protection chemicals and farm machineries

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightages (%)
1, 2	Scope and importance	Scope of input marketing, Importance of input marketing management	08
3, 4	Study of demand and supply scenario of major agro inputs	Scenario of major agro inputs- Seeds, Agro- chemicals, Farm machineries, Electricity	12
5, 6, 7	Production organizations of agro inputs	Public, private and cooperative units in production of Seeds, Agro- chemicals, Fertilizers-	20
8, 9 , 10	Credit for procurement of inputs	Sources of agricultural credit- Non- institutional sources and institutional sources	20
11, 12, 13	Study of marketing of various inputs	Marketing of fertilizers, seeds, agro-chemicals, Farm machineries, Various marketing channels,	20
14	Study of marketing of various inputs	Branding and packaging for major agro inputs.	12
15, 16	Study of marketing of various inputs	Problems/defects in marketing of inputs and suggestions to overcome the problems	08

Practical Exercises:

Exercises No	Title
1	Visit to seed organizations (MSSC, Mahabeej, NSC etc.) – study of production, pricing, transportation and promotion of seeds.
2	Study of chemical fertilizer production units.
3	Public sector, co-operative sector, private sector companies and their products range.
4	Study of demand and supply of chemical fertilizers and gap therein.
5	Types of agro-chemicals used as agricultural inputs.
6	Visit to agricultural exhibition. Role of agricultural exhibitions in marketing of agro-inputs
7, 8, 9 & 10	Market survey of local markets to know potentiality of different crop seeds, fertilizers, various plant protection chemicals and farm machineries

Suggested readings:

1) Text Book:

2) Reference Books:

1. Acharya, S.S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH Publishing Company Pvt. Ltd., 66, Janpath, New Delhi – 1.Memoria, C.B. and R.L. Joshi. Principles and Practice of Marketing in India. Kitab Mahal, 15, Thorn hill Road, Allahabad

3) e-books:

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Course No. : ABM -245 **Course Title: Office Procedures for Agribusiness**

Credit : (0+1= 1) **Semester :IV**

Practical:

based on office documents, drafting (Letter, demi-official, purchase, enquiry, quotations, purchase orders, queries and replies), payments, billing and preliminary requirements, files, filing system and indexing, report and publication procedure, Government and private offices. Study of these offices and their functioning.

Practical Exercises:

ExercisesNo.	Title
1	Study of office its Nature and Function
2	Study of office records and records management
3	Study of Indexing
4 , 5	Study of Filing System
6, 7	Study of different forms of Communication
8	Study of Drafting Business Letter

9	Study of Drafting Enquiry Letter
10	Study of Repairs to the Enquiry letter
11	Study of Drafting the Order letter
12	Study of Drafting the Complaint letter
13	Study of Drafting the Sales letter
14 , 15	Study of Report Writing
16	Study of ISO Certification Organization

Suggested readings:

1) Text Book:

2) Reference Books:

1. Civil Service Rules, Government of Maharashtra.
2. Maharashtra Agricultural Universities Account Code.
3. Accounts books prescribed for post-recruitment examination of State Government.
4. Bhalla, V.K. Invest Management (Security and portfolio Management). S. Chand and Co., Ltd., 7361, Ram Nagar, Qutab Road, New Delhi-110 055.Pillai, R.S.N. and Bagavati. Office Management. S. Chand and Co., Ltd., 7361, Ram Nagar, Qutab Road, New Delhi-110 055

3) e-books:

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Course No. : ABM -246 **Course Title: Organizational Behaviour for Business Management**

Credit : (2+0=2) **Semester :IV**

Theory:

Organization and its analysis: Nature of organization, scope and significance of Organizational Behaviour, relevance of Organizational Behaviour in today's business environment. **Personality and Motivation:** Objectives, Introduction, Meaning, Personality determinants, Personality traits. **Motivation:** Types, Characteristics, Theories of motivation-Early theories and Contemporary theories. Motivation at different levels. How to motivate subordinates. **Social Groups-** meaning, definition, classification, factors considered in formation of organisation. Motivation in group formation.**Social organisations-** meaning, definition, types of organisation. **Team Building:** Introduction, Systematic Approach, Information stage, Reviewing in order to improve, Analyzing skills, Feedback of observations, Supportive development building on ideas, Contributions in a group, Degrees of Agreement, Aspirations. **Leadership Development**:

Understanding leadership, Theories of leadership-Trait theory, contingency theory, Situational leadership theory, Organizational theory, Power theory, Ethical Assessment theory, and Transactional or Transformational leadership. Negotiation Skills: Negotiation, simple Negotiation Model, Guidelines on negotiation, Positional bargaining, Positions and Interests.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	weightages (%)
1.	Organisation and its analysis	Nature of organization, its meaning and scope	16
2.		Significance of organization Behaviour	
3.		Relevance of organizational Behaviour in today's business environment	
4.	Personality	Objectives, Introduction and Meaning	18
5.		Personality determinants and traits	
6 & 7		Theories of Personality	
		Levinson theory of adult life stages	
		Hall's career stage model.	
		Chris argyris immaturity to maturity continuum	
		Edgar Schein's socialization process	
8.	Motivation	Types, characteristics of motivation	16
9.		Theories of motivation : Early theories	
10.		Contemporary theories	
11.		Motivation at different level	
12.		How to motivate sub-ordinates	
13.	Team Building	Introduction and Systematic approach	16
14 & 15		Information stage. Reviewing in order to improve Analysing skills Feed back of observation	
16,17,& 18.		Supportive development building on ideas Contribution in group degree of agreement Aspiration	
19.	Leadership Development	Understanding leadership	18
		Theories of leadership	
20.		Trait theory	
21.		Contingency theory	
22.		Situational leadership theory	
23.		Organisational theory	
24.		Power theory	

25.		Ethical Assessment theory	
26.		Transactional or transformational leadership	
27.	Negotiation Skills	Meaning of Negotiation	16
28.		Simple Negotiation Model	
29.		Positional Bargaining and Position and interest	

Suggested readings:

1) **Text Book:**
2) **Reference Books:**
   1. Korman, Abrahim K-Organizational Behaviour.
   2. Khanka, S.S. - Organizational Behaviour.
   3. Singh and Chhabra-Organizational Theory and Behaviour.
   4. Maslow, A.H.-Motivation and Personality.Mattock, John- How to be better negotiator
3) **e-books:**

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Elective courses (any three)

Course No: ELE-HORT-244 **Course Title: Hi-tech Horticulture**

Credits: (1+2=3) **Semester: IV**

Theory:

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods, Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding, Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

Practical:

Types of polyhouses and shade net houses, Intercultural operations, tools and equipments identification and application, Micro propagation, Nursery-protrays, micro-irrigation, EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightages (%)
1	Introduction & importance; and scope of hi-tech horticulture in India. Nursery management and mechanization;	**15**
2	Protected cultivation advantages and constraints	05
3	Environmental control in green house-temperature, light, $Co_{2,}$ Relative Humidity and ventilation methods and techniques	10
4	Modern field preparation and planting methods. micro propagation of horticultural crop	10
5	Micro irrigation system and its components.	05
6	EC, Ph best fertilizers scheduling	05
7 & 8	Hi-tech canopy management of horticultural crops	05
9 & 10	High density orcharding in Mango, Guava, Papaya, Citrus Pineapple.	10
11	Remote sensing and geographical information system (GIS)	05
12	Differential Geo Positioning systems (DGPS)	05
13 & 14	Components of Precision farming and application of Precision farming in horticultural crops (Fruits, Vegetables and ornamentals crops Two Crops each)	15
15	Mechanize harvesting of produce.	05
16	Post harvest management for exports	05

Practical Exercises:

Exercise No.	Title
1 & 2	Tools and equipments, identification and application-1
3 & 4 & 5	Study of different types of polyhouse and shed houses
6 & 7 & 8	Intercultural operations in hi-density orchids
9 & 10	Intercultural operations in vegetables and flowers
10 & 11 & 12	Plant architecture
13,14,& 15 & 16	Micropropagation of horticultural crops
17 & 18 & 19 & 20	Hi- tech nursery production techniques in portrays
21 & 22	Hi-tech irrigation systems
23 & 24 & 25	Soil and water EC, Ph, measurement and Fertigation
26 & 27 & 28	Precision farming techniques used in horticultural crops
29 & 30	Visit to hi-tech floriculture
31 & 32	Visit to hi-tech field, fruit crops, and vegetables crops.

Suggested readings:

1) Text Book:

2) Reference Books:

1. T. A. More, Karale A.R. and Patil M.T. 2001. Hi-tech horticulture, CAFT (Fruits) MPKV, Rahuri

2. Balraj singh.2005. Protected cultivation of vegetables crops, Kalyani Publisher, New Delhi.
3. Patil, M. T. and Patil P.V. 2004. Commercial Protected Floriculture, MPKV, Rahuri.
4. Prasad and KumarCommercial Floriculture –Proceeding of International Seminar on Protected cultivation in India, Held at Bangalore 1997.
5. V. Nelson.Paul.,Greenhouse operation and management-
6. S.D. Varale. 2003, Protected Cultivation of horticulture crops, CAFT(Fruits), MPKV, Rahuri.
7. Mavi, H.S. Introduction to Agro-metrology, Oxford and IBH Publishing Co., New Delhi.

3) e-books:

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Course No. : ELE-ABM-2414 **Course Title: Agro-Tourism**

Credit : (1+2=3) **Semester: IV**

Theory:

Agro-tourism: Introduction, importance, scope, forms of agro-tourism, advantages and implementations, introduction to Indian culture. Govt. policies and legislations in respect of tourism and agro-tourism and environment protection laws.Requirements for Agro-tourism.Farm, forest, garden, fish tank/ponds, residential huts, etc.Constraints in operation and management of Agro-tourism activities. Management of resources – Human resources, Natural resources and Garbage management at Agro-tourism centre. Entrepreneurship development: Role and functions,**Hospitability**: Food and beverages and accommodation services.**Communication skill and service;** Capital investment, sources and capital budgeting. **Project proposal**- Preparation and feasibility tests, Accounts and record keeping etc. Marketing strategies for Agro-tourism products and services.Publicity of tourism- Advertisement and use of media.

Practical:

Visit to various near by agro-tourism centers. Study of different types of Agro- tourism centers and services offered by them etc. Report on agro-tourism project.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Introduction	1. Importance 2. Scope 3. Forms 4. Advantages 5. Implementation 6. Requirements for Agro-tourism. Farm, forest, garden, fish tank/ponds, residential huts, etc 7. Indian Culture	25
2	Role of Govt. and laws	1. Govt. policies and legislations in respect of tourism and agro-tourism and environment protection laws.	10
3	Trends and constraints in AT	1. Constraints in operation and management of Agro-tourism activities.	10
4	Resource Management in AT	1. Human Resources 2. Natural Resources 3. Garbage & waste Management	15
5	Entrepreneurship development	1. Role and function 2. Hospitability Food and beverages and accommodation services. 3. Communication skill and service	10
6	Project Proposal	1. Capital investment, 2. sources and capital budgeting. 3. **Project proposal**- Preparation and feasibility tests, 4. Accounts and record keeping etc	15
7	Marketing in Agro Tourism	1. Marketing strategies for Agro-tourism products and services. 2. Publicity of tourism- Advertisement and use of media.	15

Practical Exercises:

Exercise No.	Title
1	Visit to near by Agro – tourism center and prepare a successful entrepreneur story with facilities provided by them
2	To study types of Tourism in India
3	To study various factor Why people travel to Agro tourism center
4	To study considerations before start of Agro tourism center

5	To study basic requirements to start Agro Tourism center
6	To study Guidelines to start Agro Tourism Centre
7	To study best management practices on Agro tourism center
8	To study services provided on Agro Tourism center
9	To study Agro tourism: Performance, problems and prospects for the farmers in Maharashtra
10	To study Indian Agro Tourism Industry : Challenges and strategies
11	Development of Agro tourism destination : Classification of Assets
12	Development of Agro tourism destination : Assessing the Resources
13	To study various ideas for Agro tourism recreation
14	Preliminary Evaluation : A snapshot of your potential for Agro tourism
15	SWOT Analysis : for Agro Tourism enterprise
16	To study key technique of success in Agro tourism
17	To study Human Resource management and customer service at Agro tourism center
18	To study Development of Agro tourism marketing plan
19	To study Four "P"s of Agro tourism Marketing
20	To study promotional strategies for Agro tourism marketing
21	Developing website for agro tourism marketing
22	Developing information broacher for agro tourism marketing
23	Maharashtra krishi paryatan vistar yojana – 2012
24	Study of Maharashtra state Agri & rural tourism Cooperative federation (MART)
25	Study of MTDC
26	Study of ITDC
27	Study of Tourism organizations in India
28	Preparation of Business plan for Agro tourism
29	Preparation of Project Proposal for Agro tourism
30	Visit to Agro tourism Centre

Suggested readings:

1) **Text Book:**
2) **Reference Books:**
   1. Available recent literature ad publications, Government policies on Agro-tourism.
   2. Talwar, Prakash Traval and Tourism Management Gyan Boks Pvt., Ltd., Ansari Road, Darya Ganj, New Delhi-110002.
   3. Bagri, S.C. Trends in Tourism promotion 2003. International Books distributors, 9/3, Rajpur Roaad, Dehradun-248001 Uttarkhand (India).
3) **e-books:**

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Course No. : ELE-ABM-2415 Course Title: Food Technology and Processing Management

Credit : (1+2=3) **Semester :IV**

Theory:

Present status of food industry in India, organization in food industry, Introduction to operations of food industry, Deteriorative factors and hazards during processing, storage, handling and distribution,Basic principles of food processing, food preservation by manipulation,Application of energy, radiations, chemicals and biotechnological agents,Packaging of foods,Analysis of costs in food organization,Risk management,Laws and regulations related to food industry and food production and marketing, quality management, Prevention of food adulteration, ISO standards,Case studies on project formulation, milk and dairy products, cereal milling, oil-seed and pulse milling, oil and fat processing,Case studies on sugarcane milling, honey production, baking, confectionery,Case studies on processing of fruits- fruit jam, jellies etc,Case studies on fruits and vegetable storage and handling,Case studies on vegetables processing-tomato ketchup etc.,Case studies on egg, poultry, fish, meat handling and processing,

Practical:

Demonstration of various machineries used in food processing,Preservation of food by using chemicals,Preservation of food by irradiation,Food preservation by fermentation,Packaging of food by using paper boards, plastic films, tetra packs etc.,Quality evaluation of raw material,Evaluation of food standards,Visit to fruit and vegetable market for quality assessment,Visit to units with ISO standard/HACCP certification,Preparation of project reports for cereal, legume, oilseed, milk & milk products, fruit and vegetable processing units.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Present status of food industry in India	Present scenario of food processing industries in Maharashtra, India and World	10
2	Organizations in food industry	Government Institutes and Departments dealing with Food Processing Industries	
3	Introduction to operations of food industry	Introduction to various types of operations i.e. grading, sorting, peeling, blanching, storage, etc.	5
4 & 5	Deteriorative factors and hazards	Deteriorative factors and hazards during processing, storage, handling and distribution	10
6	Basic principles of food	Basic principles of food processing	

	processing		10
7	Food preservation	Food preservation by chemicals, irradiation and fermentation	
8	Application of energy, radiations, chemicals and biotechnological agents	Application of energy, radiations, chemicals and biotechnological agents	10
9 & 10	Analysis of costs	Analysis of costs in food organization	15
11	Risk management	Risk management	10
12 & 13	Laws and regulations	Laws and regulations related to food industry and food production and marketing	10
14	Quality management	Quality management	10
15	Prevention of food adulteration	Prevention of food adulteration	5
16	ISO standards	ISO standards	5

Practical Exercises:

Exercise No.	Title
1	Demonstration of various machineries used in food processing
2	Preservation of food by using chemicals, irradiation and fermentation
3	Packaging of food by using paper boards, plastic films and tetra packs
4	Quality evaluation of raw material
5	Evaluation of food standards
6	Preparation of project reports for cereals processing unit
7	Preparation of project reports for pulse processing unit
8	Preparation of project reports for oilseeds processing unit
9	Preparation of project reports for milk and milk products processing unit
10	Preparation of project reports for fruits processing unit
11	Preparation of project reports for vegetables processing unit
12	Case studies on project formulation
13	Case studies on milk and dairy products
14	Case studies on cereal milling
15	Case studies on oil-seeds processing
16	Case studies on pulse processing
17	Case studies on oil and fat processing
18	Case studies on Sugarcane milling
19	Case studies on Bakery / confectionary products
20	Case studies on processing of fruits – jam, jellies, etc.
21	Case studies on vegetable processing – tomato ketchup etc.
22	Case studies on fruits and vegetable storage & handling

23	Case studies on egg and poultry handling & processing
24	Case studies on fish / meat handling and processing
25	Determination of per unit cost of processing and net profit per unit
26	Numericals on Break Even Point for processing unit
27 & 28	Determination of Net Present Worth and Internal Rate of Return
29	Visit to fruits and vegetable processing units
29 & 30	Visit to sugarcane processing unit / bakery / confectionary / egg, poultry / fish / meat processing unit
31	Visit to fruit and vegetable market for quality assessment
32	Visit to units with ISO Standard / HACCP Certification

Suggested readings:

1) Text Book:

2) Reference Books:

1. Acharya, S. S. &Aggarwal, N. L. 2004. Agricultural Marketing in India. Oxford & IBH.
2. Early, R.1995. Guide to Quality Management Systems for Food Industries. Blackie.
3. Jelen, P. 1985. Introduction to Food Processing. Reston Publishing.
4. Potly, V.H. &Mulky, M. J. 1993. Food Processing. Oxford & IBH.
5. Krammer A and Twigg BA. 1973. Quality Control in Food Industry, Vol. I, II, AVI Publ.
6. Ramaswamy H and Marcotte M. 2006. Food Processing : Principles and Applications. Taylor and Francis.
7. Verma L.R. and Joshi V.K. 2000. Post Harvest Technology of Fruits and Vegetables. Indus Publ.

3) e-books:

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Semester- V

Course No	Course Title	Credits
ENT-352	Integrated Pest Management	1+1=2
ECON-355	Structure and Dynamics of Indian Agriculture	1+1=2
ECON-356	Farm Management & Production Economics	2+1=3
MKT-357	Product Promotion Methods	1+1=2
MKT-358	Trading of Agricultural Commodity-I	1+1=2
ABM-357	Strategic Business Management	1+1=2
ABM-358	Production Management, Planning and Control	1+1=2
ABM-359	Inventory and Risk Management	1+1=2
ABM-3510	Agro-processing Management	1+1=2
ELE-ABM 3516	Food safety and standards	2+1=3
ELE-MKT 3511	Export Import Management	1+2=3
ELE-MKT 3512	Retail Management	1+2=3
	Total	**22**

Course No. : ENT -352 **Course Title: Integrated Pest Management**

Credit : (1+1=2) **Semester: V**

Theory:

Definition of IPM, Scope of IPM, Importance of IPM, Principles of IPM, Components/Tools of IPM-(Cultural method, Physical method, Mechanical Method, Biological method, Legal method-Insecticide Act-1968, HPR, Chemical method, Resent trends (NCIPM)). IPM strategies for–(Cash crops- Sugarcane, cotton. Cereals- Paddy, Wheat,Jawar,Bajra. Pulses- Pigeon pea.Oilseed crops- Ground nutFruits- Mango, Grapes, Pomegranate, Citrus, Banana, Vegetable crops- Brinjal, Okra, Tomato, Chilly, Onion, Cabbage and cauliflower, Food safety standards&Pesticide residue and their management.

Practical:

Formulation of insecticides, Classification of Insecticides and hazards, Status of chemical and bio-pesticides India according to CIB Central Insecticide Board, Insecticide act , Plant protection appliances, Production ofBio-pesticides- HaNPV, SlNPV&Bio-agents- *Chrysoperla, Cryptolaemus* and *Trichogramma.* Visit to pesticide manufactures / Agro service centre and make visit report.

1. Definition of IPM, Scope of IPM, Importance of IPM
2. Principles of IPM
3. Components/Tools of IPM-
   - i. Cultural method
   - ii. Physical method
   - iii. Mechanical Method

iv. Biological method
v. Legal method-Insecticide Act-1968
vi. HPR
vii. Chemical method
viii. Resent trends (NCIPM)

4. IPM strategies for
   i. Cash crops- Sugarcane, cotton
   ii. Cereals- Paddy, Wheat,Jawar,Bajra
   iii. Pulses- Pigeon pea
   iv. Oilseed crops- Ground nut
   v. Fruits- Mango, Grapes, Pomegranate, Citrus, Banana
   vi. Vegetable crops- Brinjal, Okra, Tomato, Chilly, Onion, Cabbage and cauliflower
5. Food safety standards
6. Pesticide residue and their management

Practicals:

1. Formulation of insecticides
2. Classification of Insecticides and hazards
   - Status of chemical and bio-pesticides India according to CIB Central Insecticide Board
   - Insecticide act
3. Plant protection appliances
4. Production of
   a) Bio-pesticides- HaNPV, SlNPV
   b) Bio-agents- *Chrysoperla, Cryptolaemus* and *Trichogramma*
5. Visit to pesticide manufactures / Agro service centre and make visit report.

Suggested readings:

1) Text Book:

2) Reference Books:

1. Dhaliwak, G. S. and R. Arora. Integrated Pest Management- Concepts and Approaches. Kalyani Publishers, New Delhi.
2. Dhaliwal G. S., Ram sing and Vikas Jindal. A text book of Integrated Pest Management, Kalyani Publishers, New Delhi
3. Shrivastava K. P., A Text book of Applied Entomology, Kalyani Publishers, New Delhi.- Vol.1 and Vol.2
4. Saxena R. C. and Srivastava R. C., Entomology At a Glance, Agrotech Pub., Udaipur

3) e-books:

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Course No. : ECON -355Course Title :Structure and Dynamics of Indian Agriculture
Credit : (1+1=2) Semester :V
Theory:

Indian Economy: Pattern of Agriculture Holdings, Fragmentation, Sub-Division and Consolidation of Land Holdings. Place of Agriculture in National Economy and Comparison with other Countries. Different Types of Revolutions in India. Agricultural Productivity: Trends, Causes and Consequences of Low Productivity in India. Green Revolution: New Strategy in Development of Indian Agriculture, High Yielding Varieties (HYV) Programme, Irrigation Development Agriculture and Farm Mechanization. Five Year Plans- Silent Features, NITI Ayog, Place of Agriculture in National Planning, Problems of Food Security.

Practical:

Indian Agriculture Scenario SWOT Analysis, All India production of Milk , Eggs, Meat, Woo, All India Fish Production (Lakh Tones), Wool & Silk Production Status, Live Stock Census, India's Agricultural Export Potential, Measures Being Adopted to Increase Production, Demographic Profile of Indian Population

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Subtopic	Weightage (%)
1	Place of Agriculture in National Economy and Comparison with other Countries	Place of Agriculture in National Economy and Comparison with other Countries	7
2	Pattern of Agriculture Holdings	Meaning of Agricultural Holding, Economic, Basic, Optimum and Family holdings, Size pattern of holdings in India (Recent Year) , Categories of holdings, no. of holdings and area operated.	6
3 &4	Fragmentation, Sub-Division and Consolidation of Land Holdings.	Meaning, definition, advantages, disadvantages, causes and remedies of fragmentation and sub division of holding. Consolidation meaning, definition, Consolidation through co-operative societies, co-operative movement and restriction on fragmentation and subdivision	12

5	Agricultural Productivity: Trends, Causes and Consequences of Low Productivity in India	Agricultural Productivity: Trends, pre independence and post independence Causes and Consequences of Low Productivity in India ,possibilities/ suggestions to increase production.	8
7	Different Types of Revolutions in India.	Different Types of Revolutions in India. Rainbow Revolution- Revolution in production of Oil seed, Milk, Fish, Shrimp,Masselay,Meat/Tomato, Fruits/Apple, Fertilizer and Eggs	6
8	Green Revolution: New Strategy in Development of Indian Agriculture	Important features, Achievements and failures of green revolution, Second green revolution / evergreen revolution	10
9	High Yielding Varieties (HYV) Programme	High Yielding Varieties (HYV) Programme-Role of seed, Irrigation, Fertilizers, plant protection, mechanization, transport, capital and human labour.	6
10	Irrigation Development in Agriculture	Irrigation development in India, Impact of irrigation , problems and possibilities of future development	6
11	Farm Mechanization	Meaning, Definition, Types, Scopes, advantages and disadvantages,	7
12&13	Five Year Plans- Silent Features	Plan period, Outlay, share, growth rates and achievements in the field of agriculture in brief.	12
14	NITI Ayog	History of planning commission, NITI ayog, organization, working, role for agricultural development	6
15	Place of Agriculture in National Planning	Place of Agriculture in National Planning	6
16	Problems of Food Security	Meaning, Definition, Dimensions, importance, Indian food security system, Buffer stock, PDS, Problems and suggestions for achieving food security.	8

Practical Exercises:

Exercise No	Title
1 & 2	Indian Agriculture Scenario SWOT Analysis.
3, 4 & 5	All India production of Milk , Eggs, Meat, Wool.
6	All India Fish Production (Lakh Tones).
7 & 8	Wool & Silk Production Status.
9	Live Stock Census
10, 11 & 12	India's Agricultural Export Potential.
13 & 14	Measures Being Adopted to Increase Production
15 & 16	Demographic Profile of Indian Population

Suggested readings:

1) Text Book:

1. Mamoria, C.B. Agricultural Problems of India. Kitab Mahal, Allahabad.
2. by S. Subba Reddy Agricultural Economics, Oxford and IBH Publ. Co. Pvt. Ltd.

2) Reference Books:

1. By Ruddar Datta and K. P. M. Sundharam, S..Indian Economy, Chand Publications.
2. General Studies Indian Economy by Pratiyogita Darpan.
3. Website of NITI Aayog (Planning Commission).

3) e-books:

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Course No. : ECON-356 **Course Title: Farm Management and Production Economics**

Credit : (2+1=3) **Semester: V**

Theory:

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labor income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop

and livestock enterprises. Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies**,** Crop/ livestock/ machinery insurance – weather based crop insurance, features, determinants of compensation.

Practical:

Preparation of farm layout.Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination.Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.

Teaching Schedule- Theory with weightages (%):

Lectures No	**Topics**	**Subtopic**	**Weightage (%)**
1 & 2	Farm Management,	Meaning and concept of farm management, objectives and relationship with other sciences like Agronomy, Soil Science.	5
3	Farm	Meaning and definition of farms, its types and characteristics, factor determining types and size of farms.	5
4 & 5	Principles of farm management	Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm,	10
6 & 7		factor-product, factor-factor and product-product relationship	10
8		law of equi-marginal returns	5
9		Principles of opportunity cost and	
10		Law of comparative advantage.	
11 & 12	cost concept	Meaning and concept of cost, types of costs and their interrelationship	5
13 , 14 & 15	Farm Income measures	Importance of cost in managing farm business and estimation of gross farm income, net farm income,	5

		family labor income and farm business income.	
16, 17&18	Farm business analysis	Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises.	5
19	Farm records	Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm,	5
20		farm inventory,	5
21	Farm Financial Records	Balance sheet.	5
22		, profit and loss accounts	5
23	farm planning	Meaning and importance of farm planning and budgeting	5
24 & 25	farm budgeting	, partial and complete budgeting, steps in farm planning and budgeting-linear programming,	10
26	farm resources	appraisal of farm resources, selection of crops and livestock's enterprises.	5
27 & 28	risk and uncertainty	Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies**,** Crop/ livestock/ machinery insurance – weather based crop insurance, features, determinants of compensation.	10

Practical Exercises:

Exercise No	Name of Exercise
1	Basic terms and concepts
2	Seven types of production costs and their Classification
3	Computation of seven types of production Costs
4	Farm cost concepts and their imputation Procedure
5	Depreciation methods
6	Farm holding survey – 1
7	Farm holding survey – 2
8	Livestock-Farm Survey
9	Estimation of cost of cultivation and farm income measures of major crops
10	Farm inventory analysis
11	Farm financial analysis – Preparation of Networth statement
12	Analysis of Balance sheet
13	Preparation of farm plans
14	Preparation of Enterprise budget and Partial budget
15	Study of farm management aspects related to College Farm

Suggested readings:

1) **Text Book:**
2) **Reference Books:**

1. Dhondyal, S. P. Farm Management: An Economic Analysis. Friends Publications, 90, Krisnapur, Meerut – 250 002.
2. Johl, S.S and T.R Kapur. Fundamentals of Farm Business Management. Usha Raj Jumar for Kalyani Publishers, 11 Rajendar Nagar, Ludhiana – 114 008,
3. Singh, I.J. Elements of Farm Management Economics. Affiliated East West Press (Pvt.) Ltd., New Delhi.
4. Kahlon, A.S and Karam Singh. Economics of Farm Management in India: Theory and Practice. Allied Publishers (Pvt) Ltd, 15 J.N. Heredia Marg, Ballard Estate, Mumbai- 400

3) **e-books:**

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Course No. : MKT -357 **Course Title :Product Promotion Methods**

Credit : (1+1=2) **Semester : V**

Theory:

Product Promotion: Meaning and importance, pricing, promotional policies and practices. Market communication.**Planning:** Planning in marketing managerial process, steps and strategic options.Product differentiation and product positioning.**Product Marketing:** Market segmentation of consumer and industrial markets, selecting and promoting target markets. **Product-mix:** meaning, classification, life cycle and components. Marketing channels- Meaning, push and pull strategies. Promotion skills of wholesalers and retailers.**Product Pricing:** Definition, price-mix, pricing strategies and communicating prices. Psychology of human behaviour in product promotion - culture and sub-culture, values of consumer behaviour, social groups. Organizational buying, message-source, structure, varieties and contents etc.**Advertising:** History, definition, classification, function and organization of advertising campaign. Elements, objectives and designing of advertising strategy and opportunities.Measuring advertising performance.Sales promotion, planning, objectives, techniques of consumers' promotion management. Sale force trade promotions and public relations, sales promotion effect. **Product Selling:** Personal selling, types, process and models. Managing sales force, personal selling and promotion mix, preliminary considerations in

planning.Framework, strategies in international marketing, major players in international markets, promoting and international strategies.

Practical:

Study the promotion skills of wholesalers and retailers. Study the promotion strategies implemented by various agri-based companies for different agricultural commodities and their products (Foodgrains, fruits, milk and milk products, etc.). Study the role of advertising in Agriculture sector. Visit to advertising agencies promoting agro-based product etc

Teaching Schedule- Theory with weightages (%):

Lecture no.	Topics	Subtopic	Weightage (%)
1 & 2	Product promotion concept	Introduction-definition,meaning, importance, objectives, pricing, promotional policies and practices and tools.	12
3	Market communication	Definition, meaning, elements of marketing communication, process of marketing communication.	6
4	Planning	Definition, meaning, steps of planning in marketing managerial process, product differentiation and product positioning concept and difference between them.	6
5	Product marketing	Market segmentation concept, meaning, importance, definition, types of market segmentation of consumer market and industrial market, selecting and promoting target markets.	6
6	Product mix	Product mix meaning, definition, and classification. Definition of product, types of product, components of product, marketing channels meaning and definition, push and pull strategies meaning, definition and difference between them, promotion skills of wholesaler and retailers.	6
7	Product life cycle	Meaning, definition, stages of plc.	6
8 & 9	Product pricing	Meaning, different strategies of product pricing used in product promotion, meaning of psychology of human behaviour, factors influencing psychology of human behaviour such as culture ,sub-culture values ,social	7

		class, etc.	
10	Human buying behavior	Meaning, definition, factors affecting on it.	6
11	Advertising	Meaning, definition, history, classification, functions, importance, elements.	6
12	Advertising campaign	Elements, definition, objective, designing advertising campaign, measuring advertising performance.	6
13	Sales promotion	Meaning, definition, importance, objectives, tools of sales promotion.	7
14	Sales force management	Meaning, definition, managing the sales force strategies.	6
15	Product selling	Meaning and definition, types, process, models, process of personal selling.	6
16	International marketing	Meaning, definition, importance, strategies in international marketing, major players in international markets, promoting international strategies.	8

Practical Exercises:

ExercisesNo.	Title
1	Study of product promotion. Introduction-definition, meaning, importance, objectives
2	Study of promotion skills use by wholesaler. (any agriculture wholesale product).
3	Study of promotion skills use by retailer.(any retail store,shop,mall)
4	Study of product promotion tools used in product promotion. Leaflets, pamphlets, video, audio ,poster ,charts, banners, television, newspaper etc.
5	Study of promotional pricing strategies used in product promotion. Meaning, different strategies of product pricing used in product promotion such as leader pricing, odd pricing, multiple , price bundling , discounts etc
6	Study of product life cycle- Product mix meaning, definition, and classification. Definition of product, types of product, components of product, and retailers, meaning, definition, stages of plc.
7	Study of human buying behavior- Meaning, definition, factors affecting on it. Meaning of psychology of human behaviour, factors influencing psychology of human behaviour such as culture ,sub-culture values ,social class
8,9,10	Study of the promotional strategies implemented by various agri-based industries such as food grains , fruits ,milk and milk products
11	Study of advertising Meaning, definition, history, classification, functions, importance, elements.
12	Study of formation of advertising campaign

	Elements, definition, objective, designing advertising campaign, measuring advertising performance.
13	A case study on role of advertising in agriculture sector –it includes examples of agricultural product.
14	International marketing- Meaning, definition, importance, strategies in international marketing
15	A case study on major players in international markets. Promoting international strategies. Study of major players in international markets related to agriculture industry

Suggested readings:

1) Text Book:

1. Samuel, elison. Elements of productions planning and control, navneet prakashan ltd.kalbadevi road, mumbai 400 002, by arrangement with m/s universal publishing corporation.
2. Kotler, phillip and gary armstrong, principles of marketing .prentice –hall of india pvt ltd, new delhi -110001.acharya,s.s and n.l agarwal. Agriculture marketing in india. Oxford and ibh publishing company pvt. Ltd.66,janpath,new delhi-110001
3. Diwase smita. Agri-business management. Everest publishing house, everest lane,536,shaniwar peth, appa balwant chowk,pune-411030.

2) Reference Books:

1. Burnett, john j.promotion management.virendra kumar arya for a.i.t.b.s publisher and distributor (regd.) J-5/6 krishna nagar, delhi-110051.

3) e-books:

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Course No. : MKT- 358 **Course Title: Trading of Agricultural Commodity-I**

Credit : (1+1=2) **Semester : V**

Theory:

Importance of agricultural commodities in agricultural marketing. Marketing of cereals- rice, wheat and jowar.Marketing of pulses-mung, tur, gram, udid etc. Average cost of processing wheat into wheat flour, paddy to rice, whole pulses in to split pulses, comparison of different rice milling methods. Study on price spread of important crops and producer's share in consumer's rupee. Marketing of mango, citrus and grapes.Marketing of vegetables.Improving efficiency in commodity marketing.Role of co-operative and regulated market in commodity marketing.

Practical:

Study of producers price, marketing cost, price spread, market margin, producers share in consumers rupee for important cereals, pulses, fruits and vegetables. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for wheat. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for jowar. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for bajra. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for cow pea. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for green gram. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for grapes. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for mango. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for banana. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for chilli. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for brinjal. To estimate the producers price , marketing cost, price spread, market margin, producers share in consumers rupee for raddish. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for bitter gourd. To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for ridge gourd.

Teaching Schedule- Theory with weightages (%):

Lectures No	Title	Weightage (%)
1.	Importance of agriculture commodities in agriculture marketing	7
2.	Marketing of Cereals, Rice.	6
3.	Marketing of Cereals -Wheat and Jowar.	6
4.	Marketing of pulses -Mung , Tur.	6
5.	Marketing of pulses - Gram and Udid	6
6.	Average cost of processing of wheat into wheat flour.	7
7.	Average cost of processing of paddy to rice.	7
8.	Average cost of processing ofwhole pulses into split pulses.	7
9.	Comparison of different Rice milling methods	6

10.&11.	Study on price spread of important crops and producer's share in consumer's rupee	12
12.	Marketing of mango , citrus , grapes	6
13.	Marketing of vegetables	6
14.	Improving efficiency in commodity marketing	6
15&16	Role of co – operative and regulated market in commodity marketing	12

Practical Exercises:

Exercise No.	Title
1	Study of producers price, marketing cost, price spread, market margin, producers share in consumers rupee for important cereals, pulses, fruits and vegetables
2	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for wheat
3	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for jowar
4	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for bajra
5	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for cow pea
6	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for green gram
7	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for grapes
8	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for mango
9	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for banana
10	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for chilli
11	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for brinjal
12	To estimate the producers price , marketing cost, price spread, market margin, producers share in consumers rupee for radish
13	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for bitter gourd
14	To estimate the producers price, marketing cost, price spread, market margin, producers share in consumers rupee for ridge gourd

Suggested readings:

1) Text Book:

1. Acharya, S.S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH Publishing company Pvt. Ltd., 66, Janpath, New Delhi 110001.

2) Reference Books:

1. Mamoria, C.B. and R.L. Joshi. Principles and Practice of Marketing in India. KitabMahal, 15, Thorn hill Road, Allahbad

3) e-books:

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Course No. : ABM -357 Course Title: Strategic Business Management

Credit : (1+1=2) Semester: V

Theory:

Introduction to Business Policy: Nature, Scope, Objectives and Importance of Business Policy **Introduction to Strategic Management**: Definition, Framework, Dimensions, Levels, Tasks, Elements and Benefits of Strategic Management. **Strategic Management Process, Strategic Intent:**Vision, Mission, Business Definition, Goals & Objectives.**Environmental Analysis:**Environmental Sectors, Environmental Scanning & Appraising the Environment. **Organizational Analysis:** Dynamics of Internal Environment, Organizational Capability Factors. Techniques used for Organizational Appraisal (Enlist Only) and Value Chain Analysis.**Corporate Level Strategies** – Concentration, Integration, Diversification**Corporate Level Strategies –** Internationalization, Cooperation. **Corporate Level Strategies –** Stability, Retrenchment & Restructuring.**Strategic Analysis & Choice:** Process of Strategic Choice, Strategic Analysis**,** Subjective Factors in Strategic Choice**,** Contingency Strategies&Strategic Plan.**Strategic Implementation:** Nature & Barriers of Strategic Implementation**,** Interrelationship of Formulation & Implementation**,** A Model of Strategy Implementation**,** Project Implementation**,** Procedural Implementation&Resource Allocation.Types of Organizational Structure, Stakeholders & Strategic Management**,** Corporate Governance and Strategic Management**,** Corporate Culture and Strategic Management**,** Corporate Politics & Power**,** Personal Values & Business Ethics.**Strategic Evaluation & Control:** Strategic Control, Operational Control & Techniques of Strategic Evaluation & Control

Practical:

Study on Strategic Management Process.Study on Strategic Intent.Study on Environmental Analysis.Study on Strategic Alternatives.Study on Strategy Implementation.Study on Strategy Strategic Evaluation & Control.Case Studies on above stated topics.Visit to Agro based Industry.To prepared a report on strategic Management of visited Industry.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightage (%)
1	Introduction to Business Policy	1. Nature, Scope, Objectives and Importance of Business Policy	7
2	Strategic Management	1. Introduction, Framework of Strategic Management 2. Definition, Dimensions and Levels of Strategic Management 3. Tasks, Elements and Benefits of Strategic Management	10
3	Strategic Management Process	1. Strategic Management Process	10
4	Strategic Intent	1. Understanding Strategic Intent 2. Vision 3. Mission 4. Business Definition 5. Goals & Objectives	10
5, 6	Environmental Appraisal	1. Concept of Environment 2. Environmental Sectors 3. Environmental Scanning 4. Appraising the Environment	10
7	Organizational Appraisal	1. Dynamics of Internal Environment 2. Organizational Capability Factors 3. Considerations in Organizational Appraisal 4. Techniques used for Organizational Appraisal (Enlist Only) 5. Value Chain Analysis	10
8	Introduction to Corporate Level Strategies – Concentration, Integration, Diversification	1. Corporate Level Strategies 2. Concentration Strategies 3. Integration Strategies 4. Diversification Strategies	6
9	Introduction to Corporate Level Strategies – Internationalization, Cooperation	1. Internationalization Strategies 2. Cooperative Strategies	6
10	Introduction to Corporate Level Strategies – Stability,	1. Stability Strategies 2. Retrenchment Strategies	6

	Retrenchment & Restructuring	3. Combination Strategies 4. Corporate Restructuring	
11	Strategic Analysis & Choice	1. Process of Strategic Choice 2. Strategic Analysis 3. Subjective Factors in Strategic Choice 4. Contingency Strategies 5. Strategic Plan	10
12, 13, 14 & 15	Strategic Implementation: Structural &Behavioural	1. Nature of Strategic Implementation 2. Barriers to Strategy Implementation 3. Interrelationship of Formulation & Implementation 4. A Model of Strategy Implementation 5. Project Implementation 6. Procedural Implementation 7. Resource Allocation 8. Types of Organizational Structure 9. Stakeholders & Strategic Management 10. Corporate Governance and Strategic Management 11. Corporate Culture and Strategic Management 12. Corporate Politics & Power 13. Personal Values & Business Ethics	10
16	Strategic Evaluation & Control	1. An overview 2. Strategic Control 3. Operational Control 4. Techniques of Strategic Evaluation & Control	5

Practical Exercises:

ExerciseNo.	Title
1	Study on Strategic Management Process
2 & 3	Case Study on Strategic Management Process
4	Study on Strategic Intent
5 & 6	Case Study on Strategic Intent
7	Study on Environmental Analysis
8 & 9	Case Study on Environmental Analysis
10	Study on Strategic Alternatives
11 & 12	Case Study on Strategic Alternatives
13	Study on Strategy Implementation
14	Case on Strategy Implementation
15	Study on Strategy Strategic Evaluation & Control
16	Visit to Agro based Industry Report on Strategic Management in visited Industry.

Suggested readings:

1) Text Book:

1. by Azhar Kazmi Strategic Management & Business Policy, Tata McGraw – Hill, Third Edition.
2. by M. V. Kulkarni Business Policy & Strategic Management, Everest Publishing House.
3. by Saroj Datta, Jaico Strategic Management Publishing House.
4. byThomas L. Wheelen & J. David HungerConcepts in Strategic Management & Business Policy Toward Global Sustainability

2) Reference Books:

1. R. David Strategic Management. Fred Prentice Hall International
2. . Dr. Azhar Kazmi Business Policy & Strategic Mgt - Tata Mc Graw Hill Publi. Co. Ltd.
3. Beni Banerjee Strategic Management.
4. Jauch Lawrence R & William Business Policy & Strategic Mgt. Glueck McGraw - Hill Book Co.

3) e-books:

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Course No.: ABM- 358 Course Title: Production Management, Planning & Control
Credits: (1+1=2) Semester: V

Theory:

Introduction, meaning and role of production management in agriculture.Elements of production, design and process planning.Effect of technological changes on the production management.Factors influencing the plant location in Agri-business activities.

Agricultural Production Planning and Control: Nature, basic functions of production planning and control, its objective, different system of manufacture production cycle, scheduling and control of production and its control procedures and devices. Total quality management, considerations, stage of quality control, standard and specifications, quality assurance and quality circles. Scheduling psychology, methodology and control techniques.Legal aspects of quality control.

Resource Planning and Budgeting: Importance and techniques, methods to study work measurement. Nature and objectives of production planning and control.Variables subject to control. Production control for contentment's, intermittent and project system. Production

forecasting and production inventories. Aggregate planning, guidelines, graphic and chart planning.

Resource Management: Management of resources: Meaning, concept, source of supply of material, selection and evaluation, purchase management-Cost reduction. Store Management-location, storage methods and documentation of Government policies.

Practical:

Study of production management aspects of selected agri-business units, Visit to selected agri-business units, Discussion with entrepreneurs, Points to be considered while preparing the reports on agri-business management, Layout - example of large enterprise that consist of many small and medium plants, Scheduling a planning function and expedition control function of small firms, Preparation of memorandum, explaining merits of COS and outline how the changeover is going to take place and define the responsibility of each section in the new organization, Production planning and control: Nature, basic function of production planning and control, its objective, variants in different system of manufacture production cycle, Resource planning and budgeting – Importance and technique, work study, method of study, work measurement ,Source of supply of material – selection and evaluation, Purchase management – Cost reduction, stores management, location storage method and documentation, Institutions engaged in providing service/ facilities, Government polices, Production control for contemns, entrepreneurs and project system, Production forecasting and production inventories' Total quality management, considerations. Stages of quality control. Quality control standards, specifications, quality assurance and quality circles.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topics	Weightage (%)
1	Functions of PPC	12.50
2	Production procedure	12.50
3	Manufacturing systems	6.25
4	Sales forecasting and estimating	12.50
5	Plant layouts	6.25
6	Production orders	6.25
7	Batch production – Quantities, batch size determination.	12.50
8	Scheduling – forms of scheduling & problems in scheduling.	12.50

9	Production Control – elements of control procedure	6.25
10	Quality control –stages in QC	6.25
11	Work Study & work measurement	6.25

Practical Exercise:

Exercise No.	Tittle
1	Study of production procedures/processes followed in agro- processing units.
2	Study of various manufacturing systems used in pulses/cereals milling units.
3	Study of plant layouts of different types of agro-processing units
4	Study of production planning & demand forecasting in agro-processing units
5	Study of production scheduling & batch size determination in agro-processing unit
6	Study of quality control practices/ procedures followed in processing units
7	Study of an agro-processing unit having continuous production system(sugar mill)
8	Study of an agro-processing unit having batch production system(rice mill, dal mill, oil mill)
9	Study of production control methods/ elements followed in agro-processing unit
10	Visit to a large scale processing unit.
11	Study of manufacturing systems followed in beverages industry(Cold drinks, fermented drinks etc.)
12	Study of purchase methods followed by processing units in raw material purchasing.
13	Study of quality control systems followed by large scale food processing units
14	Study of work measurement systems/ methods followed in different units
15	Study of seasonality & trends of production volumes for last five years for various agro-processed products.
16	Study of various determinants of production volume for major agro-processed products.

Text book:

1. Samuel Elion Elements of PPC –

Referance book:

1. Production & operations management

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Course No. : ABM 359 **Course Title: Inventory & Risk Management**

Credit : (1+1=2) **Semester: V**

Theory:

Introduction to Inventory – Definition, types and its need.Cycle of inventory management. Order Quantity – Economic Order Quantity (EOQ) Model. Safety stock.Pricing of raw material and valuation of stock. Monitoring and control of Inventories – ABC Analysis, Just-in-time inventory control. Criteria for judging inventory system. Inventory management in India.Storage and Warehousing. Inventory record keeping and their types. Risk-Meaning, importance and types, minimization of risks.

Practical:

Estimation of Economic Order Quantity (EOQ).Estimation of cost of carrying and ordering inventories.Estimation of optimal level of safety stock. Visits to private companies for observing their working in inventory and stock management etc. Hypothetical examples on risk minimisation.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Inventory Introduction	1. Definition 2. Meaning & Importance 3. Types 4. Needs 5. Scope, 6. SKU and SOU	10
2	Inventory Management	1. Definition 2. Meaning 3. Scope 4. Importance 5. Needs 6. Objectives 7. Symptoms of poor inventory management	4
3	Cycle of Inventory Management	1. Counting Cycle 2. Definition 3. Benefits 4. Procedure	3
4	Order Quantity on the basis of Mathematical Approach	Economic Order Quantity (EOQ) Model on the basis of Mathematical approach	3
5	Order Quantity on the	Economic Order Quantity (EOQ) Model on the	3

	basis of Trial and Error Approach	basis of Trial and Error approach	
6	Safety Stock	1. Definition 2. Meaning 3. Need 4. Factors influencing level of safety stock, 5. Steps to determine Safety Stock Level	10
7	Pricing of raw material and valuation of stock	Different method of pricing of raw material and valuation of stock	6
8& 9	Monitoring and control of Inventories	1.Definition 2.Meaning 3.Importance 4.Steps of Monitoring and controlling inventory in godown 5.Different techniques of monitoring and controlling inventory general techniques, ABC Analysis, JIT Analysis, Lead Time Analysis	10
10	Criteria for judging Inventory	1. Comprehensibility, 2. Adaptability 3. Timeliness	3
11	Inventory management in India.	1. Importance 2. Techniques 3. FSN,ABC,JIT,Lead Time Analysis 4. Objectives 5. Criteria's 6. Challenges.	3
12	Storage	1. Definition 2. Meaning 3. Need 4. Storage practices followed in India 5. Types of risks involved in Storage	10
13	Warehousing	1. Definition, 2. Meaning 3. Need 4. Types 5. Difference between Public and private warehouse 6. Functions 7. Cost associated with warehouse.	10
14	Warehousing corporations of India	1.Different warehousing corporations 2. Functions.	3
15	Inventory record keeping	1. Definition 2. Need, 3. Types	6

16	Risk	1. Definition 2. Meaning 3. Need 4. Difference between Risk and Uncertainty 5. Types	10

Practical Exercises:

Exercise. No.	Title
1	Study of Inventory
2	Estimation of EOQ Model
3	Estimation of EOQ Model On The Basis of Mathematics
4	Estimation of EOQ Model On The Basis of Trial And Error
5	Estimation of Cost of Carrying And Ordering of Inventory
6	Study of Safety Stock
7	Estimation of Safety Stock Levels
8	Study of Storage Structures Found in India
9	Study of Record Keeping
10	Study of Warehousing
11	Study of Warehousing Corporations Found in India
12	Study of Risk
13	Study of Risk Minimization
14	Case study on Risk minimization
15	Visit and Study of Inventory Management of any Private Firm
16	Visit and Study of Inventory Management of any Public Firm

Suggested readings:

1) Text Book:

1. Acharya, S. S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH Publishing Co. Ltd., 66, Janpath, New Delhi- 110 001.
2. Prasana Chandra. Financial Management. McGraw Hill Book, New York.
3. Smita Diwase, Indian Agriculture and Agri. Business Management, KRISH Resource Management Network.

2) Reference Books:

1. Pandey, Mukesh and Deepak Tiwari. Rural and Agricultural Marketing. International Book Distribution Co., New Delhi.
2. Samuel Elison. Elements of Productions Planning and Control, S.A. Shroff, Navneet Prakashan Ltd. Kalbadevi Road, Mumbai 400 002

3) e-books:

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Course No. : ABM -3510 **Course Title :Agro-Processing Management**

Credit : (1+1=2) **Semester :V**

Theory:

Role of agro-processing industries in the Indian economy.Status and potential of Indian Agro-processing industries.Foodgrains, commercial crops, fruits and vegetable processing, livestock processing, fishery products etc.Government policies relating to agro-processing unit.Interdependence of agro-processing industries, Problem of agro-processing units.Guideline for financing of agro-processing industries in India. SWOT Analysis, Plan and strategy to develop agro-processing industry, Government initiatives in promoting food processing industry, policy of Department of Food Processing industry, Plans of Ministry of Food Processing Industries, Legal aspects related to food processing industry, Processing zones.

Practical:

Preparation and follow-up of proposals of processing units like Oil mills, Dal Mills, Fruits and Vegetables Processing Industries, Sugar factories, Milk processing units, Wine making units etc. Exercises on economics of processing of agricultural commodities.Study of agro-processing industries of different commodities - Foodgrains, Fruits, Vegetables, Milk and Milk products etc.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Introduction	• Definition – Agro. Processing, Food Processing, Agro. Processing Management • Importance of Food Processing 1) From consumers point of view 2) From producers point of view	20
2	Role of Agriculture & Agro. Processing Industries in Indian Economy	Role of Agriculture & Agro. Processing Industries in Indian Economy 1) Contribution to National Income 2) Fulfillment of Food requirement 3) Share in International Trade 4) Maintaining Price Stability 5) Capital Formation 6) Employment Generation 7) Industrial Development 8) Export & Import Earnings 9) Reduce Post Harvest Losses	

		10) Agriculture Growth Rate	
3	Status and Potential of Agriculture and Agro. Processing Industries	Status and Potential of Agriculture and Agro. Processing Industries • India's position in Agriculture and Food Processing in World in various commodity • Post Harvest Losses • Status of Indian Food Process Industries in World	
4 & 5	Foodgrains, Commercial Crops, Fruits & Vegetable Processing	• Foodgrains Processing Industries 1) Rice Processing Industry 2) Wheat Processing Industry 3) Pulse Processing Industry 4) Oilseeds Processing Industry • Fruits and Vegetable Processing Industries	15
6	Livestock Processing, Fishery Products	• Live-stock Processing Industries 1) Meat & Poultry Processing 2) Milk & dairy Industry • Fish Processing Industry	
7	Government Institutes and Departments dealing with Food Processing Industries	Government Institutes and Departments dealing with Food Processing Industries	10
8	Sub-Sectors of Food Processing,	• Sub-Sectors of Food Processing 1) Grain milling sector 2) Fruits & Vegetable Processing Sector 3) Milk Processing Sector 4) Meat & Poultry Sector 5) Others • Types of Agro. Industries 1) Agro-based Industries 2) Agro-related industries 3) Agro-allied industries 4) Agro-services instries	
9	Problems/Challenges before Food-processing industries	Problems/Challenges before Food-processing industries	10
10	Investment in the Food Processing Sector	Investment in the Food Processing Sector 1) Domestic investment 2) Foreign Direct Investment	
11	SWOT Analysis	1) Strengths of Agro-Processing Industries in India	

		2) Weakness 3) Opportunities 4) Threats	10
12	Strategy to develop Food-processing industry	Strategy to develop Food-processing industry 1) Contract Farming 2) Institutional Finance 3) Comprehensive law 4) Quality Control 5) Proper Packaging	15
13	Government initiatives in promoting food processing industry	Government initiatives in promoting food processing industry 1) Initiatives in XII Five year Plan 2) Fiscal Incentives for a) Income Tax b) Service Tax c) Custom Duty	
14	Policies adopted by Department of Food Processing industries Export Processing Zones	Policy adopted by Department of Food Processing industries Export Processing Zones	20
15	Plans of Ministry of Food Processing Industries	Plans of Ministry of Food Processing Industries 1) Infrastructure Development Scheme 2) Cold chain, Value addition &Preservation infrastructure 3) Strengthening of Institutions 4) Quality assurance 5) Research & Development	
16	Legal aspects related to food processing industry	Legal aspects related to food processing industry 1) Industrial Licensing Policy 2) Small Scale Reservations Licensing 3) Guidelines regarding Foreign Investment in the Sector 4) Acts applicable to the Food Processing Industry i) Prevention of Food Adulteration and Act ii) Essential Commodity Act iii) Taxation law	

Practical Exercises:

Exercise No.	Title
1	Processing and preparation of proposal for Dal Mill
2 & 3	Processing and Preparation of proposal for Rice Mill
4	Processing and preparation of proposal for Edible Oil Mill
5 & 6	Processing and preparation of proposal for Potato and Banana Chips Manufacturing Unit
7	Processing and preparation of proposal for Mango Processing Unit
8	Processing and preparation of proposal for Tomato Processing Unit
9	Processing and preparation of proposal of Sugar Factory
10	Processing and preparation of proposal of Wine Making Unit
11	Processing and preparation of proposal of Milk Processing Unit
12 & 13	Determination of per unit cost of processing and net profit per unit
14	Estimation of net profit per annum and break even point for given processing Unit
15 & 16	Visit to Agro. Processing Industries of different Commodities – Food grains, Fruits and Vegetables, Milk and Milk Products

Suggested readings:

1) Text Book:

1. Srivastava, U.K. Vathsala. Agro-processing Strategy for Acceleration and Exports. Oxford University Press YMCA, Library Building, Jai Singh Road, New Delhi -110001.
2. Pandey, Mukesh and Deepak Tiwari. Rural and Agricultural Marketing. International Book Distribution Co. New Delhi.
3. Diwase, Smita. Agri-Business Management. Everest Publishing House, Everest Lane, 536, Shaniwar Peth, Appa Balwant Chowk, Pune.

2) Reference Books:

1. Rajagopal. Organizing Rural Business Policy Planning and Management. Sage Publication, New Delhi.
2. Official website of Ministry of Food Processing Industries, Annual Report.

3) e-books: Official Website of NABARD Bank, Bankable projects

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Course No. : ELE-ABM-3516 **Course Title: Food Safety and standards**

Credit : (2+1=3) **Semester : V**

Theory:

Food quality: physical, nutritional, microbial and sensory, quality control; Hazards in supply chain, biological, chemical and physical hazards, natural contaminants, allergens, Food adulteration, toxicities due to hazards, Food infection and intoxication, risk analysis, and detection and epidemiology of food borne pathogens. ISO Food Safety Management Systems.potential risks of food borne bioterrorism, bioterrorism protection measures, Personal hygiene and sanitary food handling.

Quality management and quality assurance: Total quality management, good manufacturing practices, good agricultural practices, good laboratory practices; ISO. HACCP: Principles, implementation; Plan documentation, types of records; Auditing: Surveillance, audit, mock audit, third party quality certifying audit, Certification, certification procedures, certifying bodies, accrediting bodies, international bodies.

Risk assessment and management during food preparation. Microbial standards of fresh and processed foods.

Concept of Quality management systems in India; Sampling procedures and plans; Food Safety and Standards Act, 2006, AGMARK, BIS, Global GAP, Global Food safety Initiative; BRC, SQF, SGS, Food Codex; Export import policy, Labeling issues. export documentation; and food safety.

Practical

Estimation of CFU of water, Estimation of TDS in water.Estimation of *Listeria* and *E. Coli/ Salmonella /Shigella/ Staphylococcus* from food samples.Estimation of fungal toxins from food samples.Heavy metal detection (lead),Estimation of any one commonly used pesticide,HACCP for food industries by taking few models,Study of national and international microbial quality standards,Visit to export oriented food processing industry,

Teaching Schedule- Theory with weightages (%):

Lecture	Topics	Weightage (%)
1-4	Food quality: physical, nutritional, microbial and sensory, quality control	4
5-9	Hazards in supply chain, biological, chemical and physical hazards, natural contaminants, allergens, Food adulteration, toxicities due to hazards,	5
10-12	Food infection and intoxication, risk analysis, and detection and epidemiology of food borne pathogens.	3
13-15	ISO Food Safety Management Systems.potential risks of food borne bioterrorism, bioterrorism protection measures, Personal hygiene and sanitary food handling.	3
16-18	Quality management and quality assurance: Total quality management, good manufacturing practices, good agricultural practices, good	3

Lecture	Topics	Weightage (%)
	laboratory practices; ISO. HACCP: Principles, implementation;	
19-21	Plan documentation, types of records; Auditing: Surveillance, audit, mock audit, third party quality certifying audit, Certification, certification procedures, certifying bodies, accrediting bodies, international bodies.	3
22-23	Risk assessment and management during food preparation. Microbial standards of fresh and processed foods.	2
24-25	Concept of Quality management systems in India; Sampling procedures and plans;	2
26-28	Food Safety and Standards Act, 2006; Domestic regulations; AGMARK, BIS, Global GAP	3
29-30	Global Food safety Initiative; BRC, SQF, SGS, Food Codex; Export import policy, Labeling issues. export documentation; and food safety.	2
	Total	**30**

Practical Exercise:

Exercise No	Title	No. of Experiments
1	Estimation of CFU of water, Estimation of TDS in water.	2
2	Estimation of *Listeria* and *E. Coli/ Salmonella /Shigella/ Staphylococcus* from food samples.	2
3	Estimation of fungal toxins from food samples.	2
4	Heavy metal detection (lead)	2
5	Estimation of any one commonly used pesticide	2
6	HACCP for food industries by taking few models of food industry	2
7	Study of national and international microbial quality standards	2
8	Visit to export oriented food processing industry	2
	Total	**16**

Suggested readings:

1) Text Book:

1. W.C. Frazier and D.C. Westhoff Food Microbiology., 4th Edn. Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Ronald H. Schmidt and Gary E Food Safety Handbook.. Rodrick. 2003. John Wiley & Sons, Inc., Hoboken. New Jersey, USA.
3. R.E. Hester and R.M. Harrison Food Safety and Food Quality.. 2001. Royal Society of Chemistry, Cambridge, UK.
4. GrahamGraham, H. D The Safety of Foods (Sicherheit von Lebensmitteln).

5. Auflage. AVI Publishing Co., Inc., Westport, Connecticut (USA)
6. Owin R. Fenema Food Chemistry (New Edition).
7. S. Deshpande Handbook of Food Toxicology., CRC Press. 2002.
8. SS. Roday Food Hygiene and Sanitation.,Tata McGraw-Hill Education
9. M.R. Adams and M.O. Moss Food Microbiology.
10. Inteaz Alli Food Quality Assurance: Principles and Practices.. 2004. CRC Press, Boca Raton, FL, USA.
11. Food Plant Sanitation: Design, Maintenance, and Good Manufacturing Practices.Michael M. Cramer. 2013. CRC Press, Boca Raton, FL, USA.
12. Furia Regulatory status of Direct Food Additives. TE.1980. CRC Press.
13. Jellinek G Sensory Evaluation of Food - Theory and Practice.. 1985. Ellis Horwoood.
14. Krammer A &Twigg Quality Control in Food Industry. BA.1973. Vol. I, II. AVI Publ.

2). Reference Books:

3). e-books:

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Course No. : ELE-MKT-3511 **Course Title :Export Import Management**

Credit : (1+2=3) **Semester : V**

Theory :

Nature and scope of International Trade- Meaning and importance of International trade. Trade in domestic and International markets. Advantages and disadvantages of International trade. Salient features of International trade. Theories of International Trade- Theory of Absolute Cost Advantage, Theory of Comparative Cost Advantage and Modern theory of International Trade. Terms of trade – meaning and classifications.Free trade -Meaning, Advantages and Disadvantages. Protection - Meaning, Arguments for protection, Methods of protection: Dumping, Tariffs, Subsidies, Import quotas, cartels, Commodity Agreements. Balance of Payments- Meaning, structure and India's balance of payments position. Foreign Exchange- Foreign exchange rate, types of foreign exchange rate, mechanisms of determining foreign exchange. Instruments of international payments. Foreign Exchange Market – meaning and functions. Exchange control. Devaluation.Foreign exchange reserves.WTO-establishment and

functioning.Agreement on Agriculture.Impact of AOA on agricultural trade.Export Management-Commodities exported from India. Important importing countries.Trends in exports.Types of export- Direct and indirect exports. Export Houses – their terms and conditions to facilitate export. Procedure to become an exporter. Export licensing. Steps involved in export. Agricultural export promotion agencies- APEDA, KAPPEC, MPEDA, Commodity Boards.EXIM policies.Locating the foreign importers, SPS stipulations of importing countries for agricultural products.Importance of LC, Bank guarantee & insurance.

Practical:

Study of exports of food grins, Study of exports of commercial crops, Study of exports of spices Study of exports of plantation crops, Study of exports of processed crops, Study of exports of CODEX Standards , Study of exports of procedures, Study of procedure for acquiring exporter's license Analysis of different forms and documents required in exporting a commodity, Estimation of Balance of Payments, Estimation of trend in international prices and its comparison with domestic prices, Identification of exporters and importers for various agril. Products, Exercises on determination of foreign exchange rates, Presentation of outcomes of various rounds of WTO summits, Estimation of Terms of Trade.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightage (%)
1.	Nature and scope of International Trade	Meaning and importance of International trade. Advantages and disadvantages of International trade. Salient features of International trade	10
2.	Theories of International trade	Theory of Absolute Cost Advantage, Theory of Comparative Cost advantage and Modern theory of International Trade.	10
3	Terms of trade	Meaning and classification.	10
4	Free trade	Meaning, Advantages and Disadvantages	
5	Protection	Meaning, Arguments for protection, Method of protection: Dumping, Tariffs, Subsidies, Import quotas, cartels, Community Agreements	
6	Balance of Payments	Meaning, structure and India's balance of payments position.	

7 & 8	Foreign Exchange	Foreign exchange rate, types of foreign exchange rate, Mechanism of determining foreign exchange. Instruments of international payments	20
9	Foreign Exchange Market	Meaning and function. Exchange control. Devaluation. Foreign exchange reserves	
10	World Trade Organization	Establishment and functioning.	10
11	Export Management	Agril. Commodities exported from India. Improvement importing countries. Trends in exports.	20
12	Types of export	Direct and indirect export	
13	Export Houses	Terms and conditions to facilitate export. Procedure to become an exporter. Export licensing. Steps in export	
14	Agricultural export promotion agencies	APEDA, KAPPEDC, MPEDA, Commodity Boards.	10
15	Exim policies	Latest Exim Policies	10
16	Locating the foreign importers	SPS stipulations of importing countries for agricultural products, Importance of LC, Bank guarantee and insurance.	

Practical Exercises:

Exercise No	Title
1 & 2	Study of exports of selected food grains,
3 & 4	Study of exports of selected commercial crops,
5 & 6	Study of exports of spices
7 & 8	Study of exports of plantation crops
9 & 10	Study of exports of processed crops
11 & 12	Study of CODEX Standards for export
13 & 14	Study of export procedure
15 & 16	Study of procedure for acquiring exporter's license
17,18	Study of documents required in exporting a commodity.
19 & 20	Estimation of Balance of Payments
21 & 22	Estimation of trends in international prices of food grains and its comparison with domestic prices
23 & 24	Estimation of trends in international prices of Selected commercial crops and its comparison with domestic prices
25	Estimation of trends in international prices of Selected processed food products and its comparison with domestic prices

26	Exercise on determination of foreign exchange rates
27	Study of EXIM Banks
28	Study of Market integration
29	Study of Market Intervention
30	Study of selected Agricultural Export Promotion agency.
31	Study of WTO
32	Study of EXIM Policy

Suggested readings:

1) Text Book:

2) Reference Books:

1. Rathor B.S. and J.S.Rathor (1998). Export Marketing, Himalaya Publishing House, "Ramdoot", Dr. Bhalerao Marge, Girgaon, Mumbai – 400004.
2. Dacosta G. S. and S. B. Gaddamwar (First Ed. 1998) Exports of Agricultural Commodities from India. Himalya Publishing House. "Ramdoot". Dr. Bhalerao Marge, Girgaon, Mumbai-400004.
3. Singh R. P. implication of GATT/WTO on Agriculture and Rural Development (Proceedings of the Seminar, March 14-16, 1996.) NIRD, Rajendranagar, Hyderabad – 30 (A.P.)
4. Balagopal T.A.S.). Export Management."Ramdoot" (13th ed. 1998Dr. Bhalerao Marge Girgaon, Mumbai – 400004.
5. Puri V.K. (1997-2002), How to export, Neha Publication, New Delhi – 110001.
6. Varma M.M. and R. K. Agarwal. (1998). Foreign Trade Management.
7. , Nai sarak King Books, Educational Publishers, 1684, Delhi – 110006.
8. Mamoria C. B. and R.L. Joshi, (1971) Principles and Practice of Marketing in India, Kitab Mahal, 15, Thorn hill Road, Allahabad.
9. Acharya S. S. and N. L. Agarwal, Agricultural Marketing in India. Oxford and IBH Publishing Company. Pvt. Ltd. 66, janpath. New Delhi – 110001.

3) e-books:

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Course No. : ELE-MKT-3512 **Course Title :Retail Management**

Credit : (1+2=3) **Semester : V**

Theory:

Introduction to Retail management Evolution of retailing, meaning, retailing and retail management, Retailing in India.Types of retailers- stores formats by location, store formats by ownership, store formats by merchandise categories, store formats by size, store formats by price, store formats and non store formats. Organized retailing and unorganized retailing, trends in retailing – special- convenience, growing diversity of retailing formats, e-commerce, franchise, mail order catalog, etc.Retail location and retail layout - importance of location decision, selection of city/area, selection of a specific site. Types of location – free standing location, neighborhood services, highway stores, business associated location, cost factor in location decision. Types of consumer goods - consumer goods, shopping goods, specialty goods, FMCGS – Fast Moving Consumer Goods. Retail layout patterns – layout guidelines, external factors and internal factors, building interiors. Retail market, segmentation – market and market segmentation, market approaches, benefits of market segmentation – marketing mix, merchandising decision, promotion campaign. Criteria for market segmentations dimension of segmentation, demographic segmentation, psychographic segmentation. Retail strategies – develop vision and mission statements, operational excellence, produce differentiation, customer intimacy, growth strategy, market expansion strategy, market penetration, market development, product range development, diversification. Retail merchandising – merchandising planning, merchandising hierarchy, SKU, range planning, planogram, buying function – advantages of an open to buy plan. Category management – category vision, definition, category role, assessment strategies, balanced score card, tactics, category implementation, markups and markdowns in merchandise management, shrinkage in retail merchandise management, gross margin return on inventory (GMROI) Supply chain management in retailing definition, ISC, vender management, EDI, warehouse management. Retail marketing and advertising – retail marketing strategies, retail marketing mix, customer relationship management (CRM).Direct marketing – direct mail, catalogues and mail order, telemarketing, electronic retailing, micro-marketing advertising in retailing – advantages, types of advertising, advertising campaign.Brand management – branding, brand management of retail outlets. Merchandise management – target market and competition, analysis, planning, merchandise budget plan, inventory plan, and criteria for selection of suppliers. Pricing and Communication – Introduction, Concept of Retail Price, Retailing Pricing Strategies – Demand Oriented Pricing, Market Skimming, Penetration Pricing, Price Bundling, Leader Pricing, Multi Unit Pricing, Every Day Low Pricing and it’s benefits,

Odd Pricing, Single Pricing, Multiple Pricing, Prestige Pricing. Methods for setting Retail Prices – Cost based method, Competition based method, Demand oriented pricing method. Pricing Adjustments, Retail Promotion Strategy – Introduction, Selection of Promotion Mix-Control, Flexibility, Credibility, Cost. The Retail Marketing Mix- Product, Price, Place, Promotion, Presentation, Customer Service, People. Advertising-objectives, Significance, Benefits. Types of Advertising- Persuasive Advertising, Informative Advertising, Corporate Advertising, Financial Advertising, Classified Advertising. Steps involved in Retail Advertising Campaigns – Selecting Advertisement objectives, Retail operations – Areas of retail operations, Stores operating parameters, Customer conversion ratio, Returns of net sales, Transaction per hour, Sales per transaction, Hourly customer traffic. Stocks – Average selling price, average stock price, Stock turnover / inventory turnover, Franchising in retailing – franchising, types of franchise agreement. Retail Information System and Advantages of retail data base of RIS.

Practical:

Exercise on Booming Retailing in India,Exercise on Functions Perform by Retailer and Wholesaler,Exercise on Retail Formats found in India, Survey of Public Retail store,Survey of Private Retail Format,Survey of Co-operative Retail Store,Survey of Traditional Retail Formats,Exercise on Non-store Retail Formats,Exercise on Franchisee concept ,Exercise on any Hypermarket,Exercise onprocess of Retail Location ,Exercise on Store Design,Exercise on Store Administration,Exercise on Consumer Goods,Exercise on Retail Consumer Behaviour,Exercise on Market Segmentation of consumers ,Exercise on Retail Consumer Behaviour,Exercise on Retail Marketing Strategy,Estimation of Retail Pricing,Exercise on Promotional Pricing Strategy,Exercise on Factors Influencing Indian Retail Industry,Exercise on Merchandising Procurement Process ,Exercise on Retail Advertising,Exercise on Brand image,Exercise on Labeling,Exercise on Packaging,Exercise on Product Promotional Tools,Exercise on New Emerging Trends in Retailing ,Exercise on Supply Chain Management in Retailing,Exercise on Sales Promotion used in retailing,Exercise on Technology Distribution in Retailing,Case Study of any Retail Formats study Operation Management.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1	Introduction to Retail Management	Definition, Meaning ,Importance & Scope, Evolution of retailing, Benefits to national economy , Overview of	10

		Indian Retail Industry , Present scenario, Challenges, Function of retailer and wholesaler, Career Opportunities, Needs	
2	Types of retailers	Classification of retail formats, stores formats by location, store formats by ownership, store formats by merchandise, categories, store formats by size, store formats by price, store formats and non-store formats, Traditional, Specific retail formats**,** Organized retailing and unorganized retailing	10
3	Trends in Retailing	Special- Convenience, Growing Diversity of Retailing Formats, E-Commerce, Franchise, New trends, Mail Order Catalog	3
4	Retail Location	Retail location and retail layout – importance of location decision, Market area analysis, Factors affecting the store location, Current Location trends, Trade area analysis, Selection of city/area, selection of a specific site, Types of location, Site Evaluation, Advantages and Disadvantages, Retail layout patterns – layout guidelines, external factors and internal factors, building interiors, Internal and External Factors affecting store layout	10
5	Concept of consumer goods	Definition, Meaning and importance, Types of consumer goods, FMCGS – Fast Moving Consumer Goods, Product life cycle, factors affecting consumer behavior, Factors affecting n Indian Retail	3
6	RetailMarket Segmentation	Definition, Meaning, Importance, Types, Market Segment	3
7	Marketing Mix, Product Mix	Definition, Meaning &Importance, Elements	3
8	Retail Strategies	Meaning, Business model, Steps /process of Strategy Formulation, Vision and mission, Mission, Product Positioning and Differentiation, CRM, Retail Market Communication Mix	6
9	Merchandising	Meaning, Importance, Types, Role, Principles of Merchandising, Steps in Merchandising Planning and decision, Merchandising Procurement Process, Classifications of merchandise, Tools, SKU and SOU	10
10	Category Management	Definition, Meaning and Importance, category vision, category role, Assessment strategies, Balanced score card,Markups and markdowns in merchandise management, Gross margin return on inventory (GMROI)	3
11	Retail Pricing	Meaning, Importance, Need, Elements, Factors, Estimation of retail price	6
12	Promotional pricing	Introduction, Concept of Retail Price, Retailing Pricing	6

	strategies	Strategies – Demand Oriented Pricing, Market Skimming, Penetration Pricing, Price Bundling, Leader Pricing, Multi Unit Pricing, Every Day Low Pricing and it's benefits, Odd Pricing, Single Pricing, Multiple Pricing, Prestige Pricing. Methods for setting Retail Prices	
13	Retail Advertising	Definition, Meaning &importance, Type, Elements, How to form advertising campaign	6
11	Supply chain Management	Meaning, Importance and role, Objectives, Components, Categories, Reasons for carrying inventory, Inventory Management, Vendor Performance analysis, CPFR, Warehousing, Retail Logistics, Channel Management:definition, meaning, importance, Role, Distribution, decision	6
13	Retail Advertising	Meaning, Importance and role, Objectives, Types, Steps to for Advertising campaign, Advantages and Disadvantages	6
14	Branding Packaging, Labeling	Meaning, Importance, Need, Elements, Process of formation, Inventory management	3
15	Retail Promotional Tools,Sales Promotional Activities	Product Promotion Tools And1Techniques Used By Retailer, Need, POP	3
16	Technology and tools	Definition, Meaning, Bar-coding, RFID, Electronic payment system.	3

Practical Exercises:

Exercise No.	Title
1	Exercise on Booming Retailing in India
2	Exercise on Functions Perform by Retailer and Wholesaler
3	Exercise on Retail Formats found in India
4	Survey of Public Retail store
5	Survey of Private Retail Format
6	Survey of Co-operative Retail Store
7	Survey of Traditional Retail Formats
8	Exercise on Non-sore Retail Formats
9	Exercise on Franchisee concept
10	Exercise on any Hypermarket
11	Exercise on process of Retail Location
12	Exercise on Store Design
13	Exercise on Store Administration
14	Exercise on Consumer Goods
15	Exercise on Retail Consumer Behaviour

16	Exercise on Market Segmentation of consumers
17	Exercise on Retail Consumer Behaviour
18	Exercise on Retail Marketing Strategy
19	Estimation of Retail Pricing
20	Exercise on Promotional Pricing Strategy
21	Exercise on Factors Influencing Indian Retail Industry
22	Exercise on Merchandising Procurement Process
23	Exercise on Retail Advertising
24	Exercise on Brand image
25	Exercise on Labeling
26	Exercise on Packaging
27	Exercise on Product Promotional Tools
28	Exercise on New Emerging Trends in Retailing
29	Exercise on Supply Chain Management in Retailing
30	Exercise on Sales Promotion used in retailing
31	Exercise on Technology Distribution in Retailing
32	Case Study of any Retail Formats study Operation Management

Suggested readings:

1) Text Book:

1. Kotler, Phillip and Gary Armstrong. Principles of Marketing. Prentice- Hall of India Pvt. Ltd, New Delhi – 110 001.
2. Prasana Chandra. Financial Management. McGraw Hill Book, New York.
3. Retailing ManagementSwapnaPradhan,McGraw Hill

2) Reference Books:

1. Burnett, John J. Promotion Management. Virender Kumar Arya for A.I.T.B.S Publisher and Distributor (Regd.) J-5/6 Krishan Nagar, Delhi – 110 051.
2. A.V.Kulkarni Distribution and Retail Management.,NiraliPrakashan.
3. M.V.Kulkarni Retail Marketing Managemennt.,Everest Publication House.

3) e-books:

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Semester –VI

Course No	Course Title	Credits
BOT-362	Environmental Studies and Disaster Management	2+1=3
PATH-362	Integrated Disease Management	1+1=2
EXTN-363	Entrepreneurship Development and Business Management	1+1=2
ECON-367	Financial Management in Agri-Business	2+1=3
MKT-369	Trading of Agricultural Commodities-II	1+1=2
MKT-3610	Commodity Market	1+1=2
ABM-3611	Managerial Accounting	1+1=2
ABM-3612	Market Survey and Price Analysis	0+2=2
ABM-3613	Supply Chain Management	1+1=2
ELE-ABM 3617	Value Chain in Agriculture	1+2=3
ELE-ECON 368	Recent Advances in Banking	2+1=3
ELE-ECON 369	Planning, Formulation and Evaluation of Business Projects	1+2=3
	Total	**23**

Course No. : BOT -362 Course Title :Environmental Studies and Disaster Management

Credit : (2+1=3) Semester : VI

Theory:

Unit 1: Multidisciplinary nature of environmental studies Definition, scope and importance **Unit 2:** Natural Resources: Renewable and non-renewable resources Natural resources andassociated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefitsh and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. **Unit 3:** Ecosystems • Concept of an

ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following ecosystem :- a. Forest ecosystem, b. Grassland ecosystem, c. Desert ecosystem, d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **Unit 4:** Biodiversity and its conservation:- Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation.Hot-sports of biodiversity.Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India.Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. **Unit 5 :** Environmental Pollution: definition, cause, effects and control measures of :- a. Air pollution, b. Water pollution, c. Soil pollution, d. Marine pollution, e. Noise pollution, f. Thermal pollution, g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.Pollution case studies.**Unit 6:** Social Issues and the Environment: From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dyes. Wasteland reclamation.Consumerism and waste products.Environment Protection Act- Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation.Public awareness.**Unit 7:** Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare.Role of Information Technology in Environment and human health.Case Studies.**Unit 8:** Field work: Visit to a local area to document environmental assets river/forest/grassland/hill/mountain, visit to a local polluted site-Urban/Rural/Industrial/Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

Disaster Management
Theory:

Unit-1 :-Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. **Unit-2** :-Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.**Unit-3**:-Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction.Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media.Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightage (%)
1.	Environmental studies:- Nature, Definition, scope and importance	3
2.	Natural Resources:-Renewable and non-renewable resources, Natural resources and associated problems.	
3-6	a) Forest resources: Use and over-exploitation, deforestation. Timberextraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer pesticide problems, water logging, salinity. e) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of non-conventional energy sources. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.	16
7	Role of an individual in conservation of natural resources.Equitable use of resources for sustainable lifestyles.	
8.	Ecosystems: -Concept of an ecosystem,Structure and function.	14
9.	Study of Producers, Consumers and Decomposers,Energy flow in the ecosystem. Ecological succession, Food chains, food webs andecological pyramids.	

10.	Types of Ecosystem Introduction, characteristic features, structure and function of Forest ,Grassland, Desert and Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	
11-12	Biodiversity: - Introduction, definition, genetic, species & ecosystemdiversity and bio-geographical classification of India, Value of biodiversity.	12
13-14	Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-spots of biodiversity, Threats to biodiversity: Endangered and endemic species of India., Conservation of biodiversity:	12
15-17	Environmental Pollution:- Types of pollution, definition, cause,effects and control measures ofAir , Water, Soil, Marine, Noise, Thermal pollutions and Nuclear hazards.	14
18	Solid Waste Management: causes, effects and control measures ofurban and industrial wastes. Role of an individual in prevention of pollution.	
19-20	Carbon Credit: Concept, Exchange of carbon credits. CarbonSequestration, Importance, Meaning and ways.	08
21-22	Environmental ethics: Climate change, global warming, acid rain,ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.	
23-24	Environment (Protection) Act, Air (Prevention and Control ofPollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act and Forest Conservation Act.Issues involved in enforcement of environmental legislation. Public awareness.	08
	Human Population and the Environment: /Population growth, variation among nations, population explosion.Environment and human health: Human Rights, Value Education.	04
26-27	Natural Disasters- Meaning and nature of natural disasters, theirtypes and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves.	10
28	Climatic change: global warming, Sea level rise, ozone depletion.	
29-30	Man Made Disasters: - Nuclear disasters, chemical disasters,biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, 08 industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.	08
31-32	Disaster Management:-Concept, Effect to migrate natural disaster atnational and global levels. International strategy for disasterreduction. National disaster management framework; financial arrangements. Role of NGOs, community -based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Police and other organizations.	03

Practical Exercises:

Exercise No	Title
1.	Study of collection, processing and storage of effluent samples.
2.	To estimates solids in water samples.
3.	To measure the dissolved O2content in pond water by Winkler's method.
4.	Estimation of respirable and non respirable dust in the air by usingportable dust sampler.
5.	Determination of sound level by using sound level meter.
6.	Study of community structure.
7.	Study of pond / River/ hill slopes ecosystem -abiotic and biotic components.
8.	Study of grass land and agro-ecosystem and measurement of their productivity.
9.	Crop adaptation to different ecosystems. A. Hydrophytes
10.	Crop adaptation to different ecosystems. B. Mesophytes
11.	Crop adaptation to different ecosystems. C. Xerophytes
12.	Crop adaptation to different ecosystems. D. Halophytes
13.	Study and Visit of flora and Fauna.
14.	Visit to local polluted site - Urban / Rural: observations and remedial control measures.
15.	Visit to local polluted site - Industrial: observations and remedial control measures.
16.	Collection, identification, herbarium, maintenance and study of plants grown in various ecosystems.

Suggested readings:

1) Text Book:

1. by Erach BharuchaText book of Environmental Studies for undergraduate courses University Grants Commission, New Delhi.
2. by P.D. Sharma Ecology and Environment, Rastogi Publication. Meerut.
3. by S.S. Purohit, *Q.J.* Shammi and A.K. Agrawal Environmental Sciences, StudentEdition, Jodhpur.
4. by M.Prasanthrajan and P.P.Mahendran., A text book on Ecology and Environmental Science Agrotch Publishing Acad~my, Udaipur-313002.
5. The biodiversity of India, Maplin Publishing Pvt. Ltd., Ahmadabad.
6. by Sarthak Singh Disaster Management. Oxford Book Company.
7. by Dr. B.K. Khannnaand Nina KhannaDisaster - Strengthening community Mitigation and Preparedness. New India Publication Agency.
8. by Amrit Kaur Laboratory Manual of Ecology and Environmental Studies, ParagonInternational Publisher, New Delhi.

2) Reference Books:

3) e-books:

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Course No. : PATH 362 **Course Title: Integrated Disease Management**

Credit : (1+1=2) **Semester : VI**

Theory:

Introduction, History of Plant Pathology: History and development of Plant Pathology in different eras, contribution made by different scientists in IDM &significant plant diseases. Definitions and objectives of Plant Pathology: Concepts of disease, Important plant pathogenic organisms: Different groups like fungi, bacteria, fastidious bacteria, viruses and phytoplasma with examples of diseases caused by them, Disease: economic importance and losses caused by plant diseases, Basic procedures in the diagnosis of plant diseases. Definition of IDM, concept, advantage and importance.Principle approaches to IDM: Direct action against the pathogen, genetic modification of the host to resist disease and modification of the environment. Exclusion: Legislation (Quarantines, Regulation measures), eradication, protection. Epiphytotic diseases, epidemic and diseases forecasting in IDM. Present status of fungicides / bio-agents in India, their use and restriction in plant disease control. Integrated control in a perennial crops, and annual crops. Development of IDM strategy for important crops, Cash crops- Sugarcane, cotton, Cereals- Paddy, sorghum, wheat, Pulses- Pigeon pea, Oilseed crops- Ground nut, Fruits- Mango, Grapes, Pomegranate, Banana, General IDM strategies for Vegetable crops

Practical:

Acquaintance to Plant Pathology laboratory and equipments, Preparation of culture media for fungi and bacteria, Isolation techniques, Demonstration of Koch's postulates, Collection, preparation of mounts, and diagnosis of disease samples and their preservation. Isolation of pathogens from the collected samples and their identification.IDM components and implementation of IDM strategies.Phytosanitory measures and certification.Impact of IDM implication.Fungicides: fungicide formulations, commonly available fungicides in market Method of their application of fungicides. Bio-agents: Different bioagents, their methods of application and diseases controlled. Visits to field / orchard, visit to bio agent mass multiplication laboratory.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Subtopic	Weightage (%)
1	Introduction	Importance of Plant Diseases, Scope	6-7
2 & 3	History of Plant Pathology	History and development of Plant Pathology in ancient, dark, premodern, modern and present eras.Contribution of renowned scientists of plant pathology	5-6
4	Definitions and objectives of Plant Pathology : Concepts of disease	Terms of Plant Pathology, Branches of Plant Pathology. Types of Plant Diseases	4-6
5 & 6	Important Plant Pathogenic organisms	Important plant pathogenic organism, different groups : Fungi, Bacteria, Fastidious bacteria, viruses and Phytoplasma with examples of diseases caused by them	6-8
7	Disease : Economic importance and losses caused by plant diseases	Economic losses caused by plant diseases in different eras of history of plant pathology	4-5
8	Basic Procedure in the diagnosis of plant diseases	Laboratory Tests of Plant Disease Diagnosis, Types of Plant diseases	4-5
9	Definition of IDM, Concept, advantage and importance	Definition of IDM, Concept, advantage and importance	4-5
10 & 11	Principal approaches to IDM	Direct action against the pathogen, genetic modification of the host to resist disease and modification of the environment. Exclusion: Legislation (Quarantines, Regulation Measures), eradication, protection, Epiphytotic diseases, epidemic and diseases forecasting in IDM	6-8
12 & 13	Present status of fungicides/bioagents in India, their use and restriction in plant disease control	Different group of Fungicides, Characters of ideal fungicides, Classification of Fungicides, Methods of application of Fungicides	6-8
14	Integrated control in a perennial crops, and annual crops	Disease Management strategies of all perennial and annual crops	5-6
15 & 16	Development of IDM strategy for important crops	Sugarcane, cotton, paddy, sorghum, wheat, pigeon pea, ground nut, mango, grapes, pomegranate, banana, vegetable crops	6-8

Practical Exercises:

Exercise No	Title
1	Acquaintance of Plant Pathology laboratory and equipments
2	Preparation of Culture media for Fungi and Bacteria
3 & 4	Isolation techniques and demonstration of Koch's postulate
5 & 6	Collection, preparation of mounts, and diagnosis of disease sample and their preservation
7 & 8	Isolation of pathogen from the collected sample and their identification.
9 & 10	IDM components and implementation of IDM strategies.
11	Phytosanitory measures and certification
12 & 13	Fungicides : Fungicides formulation, commonly available fungicides in market
14	Methods of application of fungicides
15	Bioagents : Different bioagents, their methods of application and diseases controllrd.
16	Visits to field / orchard, visit to bio agent mass multiplication laboratory

Suggested readings:

1) Text Book:

1. by R.S.Singh Introduction of Principles of Plant Pathology, Oxford and IBH Publ. Co., New Delhi (1996)
2. by V.N.Pathak Essentials of Plant Pathology, Prakash Publ.,Jaipur (1972)
3. By G.N.Agrios Plant Pathology 4th edition Academic. Press, New York (1997)
4. by M.N.Kamat Introductory Plant Pathology by, Prakash Publ, Jaipur (1967)
5. by R.S.Singh Plant Diseases
6. by H.C.Dube Introductory Plant Pathology
7. Dube, H.C. Pathology.

2) Reference Books:

1. Singh, R. S. Introduction to principles of plant pathology. Oxford and IBH Pub. Co., New Delhi.
2. Pathak, V. N. Essentials of plant pathology. Prakash Pub., Jaipur
3. Agrios, G. N. Plant pathology. 5th edition, Published by a division of Reed Elsvier India Pvt., Ltd., New Delhi (2005)
4. Kamat, M. N. Introductory Plant Pathology. Prakash Pub, Jaipur
5. Singh, R. S. Plant diseases
6. Alexopoulos, Mims and Blackwel.Introductory Mycology Introductory Plant.

3) e-books:

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Course No. : EXTN -363 **Course Title: Entrepreneurship development and Business Management**

Credit : (1+1=2) **Semester : VI**

Theory:

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programmes and institutions for entrepreneurship development, Impact of economic reforms on Agribusiness/ Agri enterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agri-entrepreneurship and rural enterprise.

Practical:

Assessing entrepreneurial traits, problem solving skills, managerial skills, financial skill, HRM skill, Business analytical skill and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs, case study on ED.

Teaching Schedule- Theory with weightages (%):

Lecture No	Topic	Weightage (%)
1,2	**Entrepreneur**: Concept, Characteristics, functions & classification of entrepreneurs	12
3,4	**Entrepreneurship:** Concept, Role of Entrepreneurship in Economic development, **Factors affectingEntrepreneurial Growth:** Economic factors, Non-Economic factors, Barriers to entrepreneurship.	12
5,6	**Policies & Programmes for entrepreneurs**: Small scale industrial policies, industrial policy resolution 1948,1956,1977,1980,1990,1991	12
7,8	**Entrepreneurial Development Programmes (EDP):** Introduction, meaning, phases in entrepreneurial development, importance of EDP, objectives of EDP	12
9,10	**Institutions for Entrepreneurship Development:** Entrepreneurship Development Institute of India, National Institute for Entrepreneurship and Small Business Development, Centre for Entrepreneurship Development their objectives & Activities.	12
11,12	**Enterprise:** Concept & Definition. Types of enterprises, difference	14

	between small & large enterprises **Small scale enterprises:** Steps in setting up small scale enterprises, role of small scale enterprises in economic development	
13	**Agri Business Management:** Meaning, definition and scope of agri – business.	12
14,15	Importance of agri-business in Indian economy, Characteristics or features of Agri-business constraints in agri business management.	14
16	**Farming as a business**: Characteristics of farming	
	Total	**100**

Practical Exercises:

Exercise No	Title
1	Assessing Entrepreneurial traits
2	Problem solving skills of an Entrepreneur
3	Managerial skills of an Entrepreneur
4	Financial skills of an Entrepreneur
5	HRM skills of an Entrepreneur
6	Identification and selection of business idea
7,8	Preparation of business plan
9,10	Proposal writing
11,12	Visit to Entrepreneurship development Institute

Suggested readings:

1) Text Book:

1. V. Gangadhar *et al.* Entrepreneurship Development.Kalyani Publishers, Ludhiana.
2. J.M. talathi *et al.* Introduction to Agricultural Economics & Agribusiness Management.Ane Books Pvt.Ltd. New Delhi
3. Ellis, R.S., Educational Psychology. D.N. Van No Strand Co. Inc. New York.
4. Entrepreneurship Development Institute of India (1987), Developing New Entrepreneurs, EDIT, Ahmedabad, NISIET. Library : 338-93/EDI/87/25104.
5. Khanka S.S. (2001), Entrepreneurial Development chand and company Ltd, 7361, Ramnagar, New Delhi – 110055.
6. Vasant Desai (2004), Dynamics of Entrepreneurial Development and Management.
7. Agarwal R.C. Fundamentals of Entrepreneurship.

2) Reference Books:

1. Akhouri, M.M., P. Mishra S.P. and Sengupta, Ritha (1989). Trainers manual on developing entrepreneurial motivation, NIESBUD, NEW Delhi.
2. Entrepreneurship Development Institute of India (1987), Developing New Entrepreneurs, EDIT, Ahmedabad, NISIET. Library : 338-93/EDI/87/25104.

3. Betty Gordan B (1979). Entrepreneurship, playing to win. Taraporewala, Bombay.
4. Mancuso Joseph (1974). The entrepreneurs handbook (1st and 2nd). Arteck House.INC, USA
5. Singh A.K., Lakhan singh, R.Roy Burman (2006). Dimensions of Agricultural Extension. Aman publishing House, Meerut.
6. Khanka S.S. (2001), Entrepreneurial Development chand and company Ltd, 7361, Ramnagar, New Delhi – 110055.
7. Vasant Desai (2004), Dynamics of Entrepreneurial Development and Management.
8. Morgan, C.T. Klng, R.a. Robinson, N.M. (1979). Introduction to psychology-Tata M.Graw Hill Publishing Co., New Delhi.
9. Agarwal R.C. Fundamentals of Entrepreneurship
10. Hans Raj Bhatia (2003). A Text book Educational Psychology. New Delhi.

3) e-books:

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Course No. : ECON -367 **Course Title: Financial Management in Agri-Business**

Credit : (2+1=3) **Semester : VI**

Theory:

Agriculture Finance: Nature and scope, importance of agriculture finance. Agricultural finance as a part of public finance. Source of capitals: Meaning and concept of agriculture credit, classification and forms of credit. Credit as a tool of economic development. Cost of credit, interest rates of credit, 3 R's, 5 C's and 5 P's of credit. Credit creation and credit control. Credit rationing and planning.Legal aspects of credit, supervised credit.credit demand and supply, credit institution, credit policy and needed changes. Preparation of Performa of income statement, Performa of balance sheet and cash budget. Portfolio management, financial ratio analysis, Break–even analysis.Investment analysis. Capital market. Operations analysis.

Practical:

3 R's, 5 C's and 5 P's of Agriculture credit. Financial ratio analysis: Liquidity ratio, Leverage ratios, Turnover analysis, Profitability ratios, Valuation ratios with their example, Comparative analysis. Application of financial statement analysis, Break-even analysis, Investment analysis.

Teaching Schedule- Theory with weightages (%):

Lesson No.	Topics	Subtopic	Weightage (%)
1.&2.	Agricultural Finance	Meaning, Definition ,Nature and scope, Importance of agricultural finance.	4
3.	Public finance	Agricultural finance as a part of public finance.	3
4.	Source of capitals	Different sources of capitals.	3
5.	Agricultural credit	Meaning and concept of agricultural credit.	3
6.	Credit classification	Classification based on different criteria.	3
7.	Credit &Economic development	Credit as a tool of economic development.	3
8.	Cost of credit	Cost of credit and interest rates of credit.	3
9.	3 R's of credit	Discussion on Return from investment, Repaying capacity and Risk bearing ability.	3
10.	5 C's of credit	Discussion on 5 C's of credit.	3
11.	5 P's of credit	Discussion on 5 P's of credit.	3
12.	Credit rationing and planning.	Credit control, Objectives and Methods.	3
13.	Legal aspects of credit	Explanation of different legal aspects of credit.	3
14 & 15.	Supervised credit	Meaning, Objectives, Difficulties, Solution and Methods of supervised credit.	3
16.	Credit demand and supply	Credit demand and supply and various factors affecting on it.	3
17 &18	Credit institutions	Discussion on different credit institutions. Credit policy and needed changes.	3
19.	Preparation of proforma of income statement	Preparation of proforma of income statement with hypothecated examples.	3
20.	Proforma of balance sheet.	Preparation of proforma of balance sheet with hypothecated examples.	3
21.	Proforma of cash budget	Preparation of proforma of cash budget with hypothecated examples.	3
22 & 23.	Portfolio management	Aims and objectives of portfolio management, concept and factors affecting on Liquidity, Solvency and profitability. Theories of Portfolio management	3
24 & 25.	Financial ratio analysis	Important financial ratioes like Liquidity, Leverage, Turnover, profitability and Valuation ratio analysis	4
26 &27.	Break–even analysis	Break–even point, methods to calculate BEP along	3

		with examples.	
28,29&30.	Investment analysis	Concept and examples on Time value of money, Pay back period, NPW, B-C Ratio, IRR and Profitability index.	4
31.	Capital market	Meaning, Definition, Types and Importance. Capital market	4
32.	Operations analysis	Concept of operations analysis	3

Practical Exercises:

Exercise No.	Title
1.	To study of 3 R's of credit- Estimation of returns from investment and Repaying capacity. Causes of poor repaying capacity and measures to strengthen repaying capacity. Different types of risk. Causes of poor risk bearing ability and measures to strength risk bearing ability.
2.	To study of 5 C's of credit- Discussion on 5 C's of credit i.e. character, capacity, capital, condition and commonsense.
3.	To study of 5 P's of credit- Discussion on 5 P's i.e. five principles of credit. Principle of productive purpose, personality, productivity, phases disbursement, proper utilisation, payment and protection.
4.	To study of Break–even analysis- Break–even point, methods to calculate BEP along with examples.
5.	Financial ratio analysis – Meaning, Rationale, Importance, Definition, Formula, Examples, Interpretation of each- Liquidity ratio
6.	Financial ratio analysis – Meaning, Rationale, Importance, Definition, Formula, Examples, Interpretation of each- Leverage ratio
7.	Financial ratio analysis – Meaning, Rationale, Importance, Definition, Formula, Examples, Interpretation of each- Turnover ratio
8.	Financial ratio analysis – Meaning, Rationale, Importance, Definition, Formula,Examples, Interpretation of each- Profitability ratio
9.	Financial ratio analysis – Meaning, Rationale, Importance, Definition, Formula, Examples, Interpretation of each- Valuation ratio
10.	Investment analysis- Time value of money
11.	Investment analysis- Pay back period
12.	Investment analysis- NPW
13.	Investment analysis- B-C Ratio
14.	Investment analysis- IRR
15.	Investment analysis- Profitability index.

Suggested readings:

1) Text Book:

1. Patnkar, S.V. Financial Management. Everest Publishing House Everest, Pashuram Apartment, 12, Sankalp Society, Paud Phata Road, Opp. Jog Hospital, Pune- 411 038.
2. Jain, S.C. Management in Agriculture Finance. Vora and Company. Publishers Pvt. Ltd., 3 Round Building, Kalbadevi, Mumbai – 400 002.
3. Prasana Chandra. Financial Management. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Kahlon, A. S. and Karam Singh. Managing Agricultural Finance - Theory and Practice. Allied Publisher Pvt. Lt., 165, J. N. Heredia Marg, Ballard Estate, Mumbai – 400 038.

2) Reference Books:

1. Patnkar, S.V. Financial Management. Everest Publishing House Everest, Pashuram Apartment, 12, Sankalp Society, Paud Phata Road, Opp. Jog Hospital, Pune- 411 038.
2. Jain, S.C. Management in Agriculture Finance. Vora and Company. Publishers Pvt. Ltd., 3 Round Building, Kalbadevi, Mumbai – 400 002.
3. Prasana Chandra. Financial Management. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Kahlon, A. A. and Karam Singh. Managing Agricultural Finance - Theory and Practice. Allied Publisher Pvt. Lt., 165, J. N. Heredia Marg, Ballard Estate, Mumbai – 400

3) e-books:

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Course No. : MKT- 369 **Course Title :Trading of Agricultural Commodities-II**

Credit : (1+1=2) **Semester : VI**

Theory:

Marketing of commercial crops with special reference to all marketing functions and price analysis.Commercial commodities - cotton, sugarcane, onion, grapes, banana, citrus, mango, cut flowers –roses, gerbera, gladiolus, etc.vegetables – cauliflower, cabbage, tomato, potato, onion, ladies finger, brinjal. Existing levels of processing and future potential. Export and export potential

Practical:

Practical exercises on performance of various marketing functions of selected commercial fruit and vegetable crops.The estimation of marketing cost, market margins and producer's share in these commodities.Visits to various commodity markets, processing units and their detail studies.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1.	Marketing functions	Marketing of commercial crops and special reference to all marketing functions and their price analysis.	5
2.	Commercial commodity Cotton	Area under cotton in India, Production or yield of cotton in India, Maharashtra and other states. Productivity, Packaging and grading, Export and Export Potential of cotton, Pricing of cotton.	7
3.	Sugarcane	Area under sugarcane in India, Production or Yield of sugarcane in India, Maharashtra and other states. Productivity, Sugarcane Pricing Policy, Minimum Support Price, export and export potential of sugarcane.	7
4.	Onion	Area under Onion in India, Maharashtra and other states. Productivity, Production in India, Maharashtra and other states. Export and export potential of Onion.	7
5.	Grapes	Area under grapes in India, Maharashtra and other states. Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of grapes	7
6	Banana	Area under banana in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of banana	7
7	Citrus	Area under Citrus in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of citrus	7
8	Mango	Area under Mango in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Mango	7
9	Roses	Area under Roses in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Roses	7
10	Gerbera and Gladiolus	Area under Gerbera and Gladiolus in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Gerbera and Gladiolus	7
11.	Cauliflower and Cabbage	Area under Cauliflower and Cabbage in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Cauliflower and Cabbage	7
12.	Tomato	Area under tomato in India, Maharashtra and other states .	7

		Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of tomato	
13.	Potato	Area under Potato in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Potato	7
14.	Onion	Area under Onion in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Onion	7
15	Okra	Area under ladies finger in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of ladies finger	7
16	Brinjal	Area under Brinjal in India, Maharashtra and other states . Productivity, Production in India, Maharashtra and other states, Packaging and grading, Export and export potential of Brinjal	7

Practical Exercises:

Exercise No.	Title
1.	Determination of Marketing Cost
2.	Estimation of Marketing Margins
3.	Estimation of Price Spread
4.	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Cotton, Sugarcane.
5	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Onion.
6	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Grapes.
7	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Banana,
8	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Citrus.
9	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Mango,
10	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee Roses, Gladiolus, Gerbera,
11	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Vegetables like Cauliflower, Cabbage,
12	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Vegetables like, Tomato,
13	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Vegetables like Potato, Onion,

14	Study of Marketing Cost, Price, Margin, Price Spread and Producers Share in consumers rupee of Ladies Finger, Brinjal
15	Study of Export and Import Potential of fruits.
16	Study of Export and Import Potential of Vegetables.

Suggested readings:

1) Text Book:

1. Acharya, S.S. and N.L. Agrawal. Agricultural Marketing in India Oxford and IBH Publishing Co. Ltd., 66, Janpath, New Delhi. 110 001.

2) Reference Books:

1. Mamoria, C.B. and R.L. Joshi. Principles and Practices of Marketing in India. Kitab Mahal, 15, Thorn Hill Road, Allahabad.
2. Panvar, J.S. Beyond Consumer Marketing. Response Books Sage Publications, New Delhi.
3. From Internet Domestic Market Research.

3) e-books:

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Course No. : MKT -3610 **Course Title :Commodity Markets**

Credit : (1+1=2) **Semester : VI**

Theory:

Hedging and Future trading Risk - Meaning and importance, Types of risk, Minimization of risk. **Speculation-** Meaning, economic Benefits, **Hedging-** Meaning, Benefits of hedging, Difference between hedging and future trading, **Future trading -**Meaning, commodities for future trading, service rendered by forward market, Danger of forward market, Forward Market commission, Progress in India. **Introduction to Commodities Market-** Emergence of Commodity Market, Dynamics of global Commodity Markets, Indian commodity markets – Current status and future prospects. **Strengthening Commodity Markets in India-** Role of Government, Role of Commodity Exchanges, Other Institutions, Training and development of Dealers, Role of Information in Commodity Markets

Practical: Case studies on various commodities in commodity market.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topics	Subtopic	Weightage (%)
1 2 3	**Hedging and future trading risk**	Risk meaning and importance, types of risk, minimization of risk. Trading practices and rules of trading, role of futures markets in price determination, Organization of futures markets, major players in futures markets role of sebi as controlling authority.	8
4	**Speculation**	Meaning and economic benefit role of speculators, role of arbitrageurs, options trading, futures markets and price volatility.	8
5,6	**Hedging**	Meaning, benefits of hedging, , role of hedgers, advantages of hedging to different stakeholders, difference between hedging and future trading	12
6, 7, 8, 9	**Future trading**	Meaning, commodities for future trading, service rendered by forward market, danger of forward market, forward market commission, progress in india.	24
10,11,12, 13,14,15, 16	**Introduction to commodities market**	Emergence of commodity market, dynamics of global commodity markets, indian commodity markets – current status and future prospects .	24

Practical Exercises:

Exercise No	Title
1	Traditional Indian commodity spot (or cash) markets (village markets, weekly markets, APMC),
2	Spot prices, forward prices, futures prices,
3	Historical development of futures markets in world.
4	Historical development of futures marketsIndia.
5	Case study of chilly commodity .
6	Case study of Sugar commodity
7	Case study of Castor commodity
8	Case study of Turmeric commodity
9	Case study of maize commodity
10	Case study of soybeancommodity .
11	Case study of potato commodity
12	Case study of cotton commodity
13	Case study of Gaurgum commodity
14	Case study of Wheat commodity

15	Case study of Chana commodity
16	How farmers can take advantage of futures and options in protecting themselves from price fluctuations.

Suggested readings:

1) Text Book:

1. Purcell wd. 1991. Agriculture futures & options: principles & strategies. Macmillan publications
2. by Chatnani Commodity markets – operations, instruments & applications, tmgh

Indian commodity derivatives by Indian institute of banking & finance, Macmilla

2) Reference Books:

1. John wiley &sons Kaufman pj.1986. The concise handbook of future markets.
2. Wasendorf rr&mccafferty 1993. All about commodities from the inside out. Mcgraw – hill
3. by micha Commodity options : treading & hedging volatility in the world's most lucrative market, carley garner & paul britain, pearson agriculture commodity markets : a guide to future trading
4. Usda and fao published guides for farmers.
5. Purcell WD. 1991. Agriculture Futures & Options: Principles & strategies. Macmillan Publications
6. by Chatnani Commodity Markets – Operations, Instruments & Applications, TMGH
7. , Macmillan Indian Commodity Derivatives by Indian Institute of Banking & Finance

3) e-books:

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Course No. : ABM-3611 **Course Title : Managerial Accounting**

Credit : (1+1=2) **Semester : VI**

Theory:

Managerial Accounting : Book-keeping-Meaning, Definition, Classification of Accounts & Rules, Journalising the Transactions, Ledger Accounts, Trial Balance

Cash Book: Two Column Cash Book, Three Column Cash Book, Petty Cash Book

Final Account s of Sole Trader: Trading Account, Profit & Loss Account and Balance-Sheet

Farm Accounting: Introduction, Objectives of Farm Accounting, Features of Farm Accounting, Form of Crop Account, Form of Live-Stock Account

Basics of Costing & Auditing

Costing : Origin of Costing, Meaning & Definition, Objectives, Advantages & Limitations of Costing, Difference between Financial Accounting & Cost Accounting

Auditing: Meaning & Definition, Nature, Objectives, Advantages of Auditing

Elements of Cost: Material, Labour and Other Expenses, Classification of Costs, Cost Unit, Cost Centre

Practicals:

1. Journal - Preparation of Journal Entries

2. Ledger – Preparation of Ledger Accounts

3. Trail Balance - Preparation of Trail Balance

4. Cash Book – Two Column Cash Book

5. Cash Book – Three Column Cash Book

6. Cash Book – Petty Column Cash Book

7. Final Accounts of Sole Trader – Preparation of Trading Account

8. Final Accounts of Sole Trader – Preparation of Profit & Loss Account

9. Final Accounts of Sole Trader – Preparation of Balance-Sheet

10. Cost Sheet – Preparation of Cost Sheet

11. Farm Accounting - Preparation of Crop, Live-stock and Dairy Account

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Subtopic	Weightage (%)
1, 2	Business Transaction, Book keeping & Accountancy	1. Meaning of Transaction, Types of Business Transactions 2. Meaning of Book keeping, Objects of Book keeping, and Importance & Utility of Book keeping. 3. Definition of Accountancy. 4. Basic Accounting Terminologies	10
3	Principles of Book Keeping & Accountancy System	1. Single Entry System 2. Double Entry System 3. Accounting Concepts 4. Principles of Accounting 5. Principles & Advantage of Double Entry 6. Classification of Accounts	10
6	Subsidiary Books	1. Meaning, Advantage & List of Subsidiary Books 2. Use of Subsidiary Book	8
7	Cash Book & Petty Cash Book	1. Objects of Cash Book 2. Kinds of Cash Book 3. Petty Cash Book	7
8, 9	Final Accounts	1. Proforma Trading Account 2. Proforma Profit & Loss Account	10

		3. Proforma Balance Sheet	
11	Cost Accounting	1. Definition and objects of Cost Accounting 2. Cost Accounting & Financial Accounting 3. Concept of Cost Centre 4. Concept of Cost 5. Special types of Cost	10
12	Elements of Cost	1. Material Cost 2. Labour Cost 3. Expenses 4. Prime and Overhead Cost 5. Cost Sheet: Definition & Proforma	10
13	Management Accounting	1. Definition, Objects of Management Accounting 2. Scope of Management Accounting 3. Disadvantage of Management Accounting 4. Financial Accounting & Management Accounting 5. Cost Accounting & Management Accounting	10
14, 15	Farm Accounting	1. Benefits of Farm Records 2. Limitations in the Maintenance of Farm Records 3. Records Maintained on an Average Farm 4. Records Maintained on the Corporate Farm and the State Farms 5. Records Maintained on Commercial Dairy Farm	10
16	Auditing	1. Meaning & Definition 2. Nature and Objectives of Auditing 3. Advantage of Auditing	5

Practical Exercise:

Exercise No.	Title
1, 2	Journal – Preparation of Journal Entries
3, 4	Ledger – Preparation of Ledger Accounts
5, 6	Trail Balance – Preparation of Trail Balance
7, 8	Cash Book – Two and Three Column Cash Book
9	Cash Book – Petty Column Cash Book
10	Final Account of Sole Trader – Preparation of Trading Account
11	Final Account of Sole Trader – Preparation of Profit & Loss Account
12	Final Account of Sole Trader – Preparation of Balance Sheet
13, 14	Preparation of Cost Sheet
15, 16	Preparation of Crop, Live – Stock and Dairy Account

Suggested Readings:

1) Text Books:

1. M. G. Patkar Book Keeping & Accountancy;, Phadke Prakashan, Kolhapur.

2. S. Subba Reddy, P. Raghu Ram, T. V. Neelakanta Sastry & I. Agricultural Economics, Bhavani Devi, Oxford & IBH Publishing Company Pvt. Ltd, New Delhi.
3. S. M. Inamdar Cost & Management Accounting, , Everest Publishing House, Pune

2) Reference Books:

1. S. S. Johl & T. R. Kapur Fundamental of Farm Business Management, , Kalyani Publishers New Delhi.
2. Dr. J. P. Bhosale Corporate Accounting:, Chaitanya Prakashan, Nashik.
3. : Dr. J. P. Bhosale Cost& Works Accounting, Chaitanya Prakashan, Nashik.
4. Dr. J. P. Bhosale,Auditing: Atharva Prakashan, Pune.
5. R.L.Gupta & M. Radhaswamy Advanced Accountancy: By (Sultan Chand & Sons, New Delhi).

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Course No. : ABM-3612 **Course Title: Market Survey and Price Analysis**

Credit : (0+2=2) **Semester : VI**

Practical:

Marketing research processes. Sources of Data.Conducting Interviews for market survey.Constructing Schedule/Questionnaire.Mechanics of Analysis and Interpretation of Data.Diagrammatic Representation of Research Results.Writing a Report on Market Survey **Market information system and marketing research.**List of agencies and publications for market information.Appendices used for Market Information Importance of Prices in Agriculture Trends and fluctuation of prices in agriculture. Price Policy in India.Price determination in Agricultural Product.Different Prices in Agriculture.Procedure for determining MSP.Trends in MSP over decade. Input factor prices in Agriculture. Study of Arrivals and Prices of Major farm products. Trends in Production

Practical Exercises:

Exercise No	Title
1	Marketing research processes
2	Sources of Data
3	Conducting Interview for market survey
4	Constructing Schedule/Questionnaire
5	Mechanics of Analysis and Interpretation of Data
6	Diagrammatic Representation of Research Results
7	Writing a Report on Market Survey

8	Market information system and marketing research
9	List of agencies and publications for market information
10	Appendices used for Market Information
11	Importance of Prices in Agriculture
12	Trends and fluctuation of prices in agriculture
13	Price Policy in India.
14	Price determination in Agricultural Product
15	Different Prices in Agriculture
16	Procedure for determining MSP
17	Trends in MSP over decade
18	Input factor prices in Agriculture
19	Study of Arrivals and Prices of Major farm products
20	Trends in Production

Suggested readings:

1) Text Book:

1. Acharya, S.S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH Publishing Company Pvt. Ltd. 66, Janpath, New Delhi – 110 001.
2. Ramaswamy, V. S. and S. Namakumari. Marketing Management, Planning, Implementation and Control. MacMillan Co. 866, Third Avenue, New York – 10022.
3. C.R. Kothari &GauravGarg Research Methodology Methods &Techniques.
4. Dr.RavindranathV.Badi,NarayansaV.Badi Rural Marketing
5. C.B. Mamoriya& R. K. Suri Marketing Management
6. Subba Reddy ,P.Raghuram Agriculture Economics
7. Indian Journal of Agricultural Economics
8. Indian Journal of Agricultural Economics and Statistics (Hind Publication)
9. Agriculture Economics and research review New Delhi
10. Ministry of agriculture government of India, APMC, Marketing board.

2) Reference Books:

1. Acharya, S.S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH Publishing Company Pvt. Ltd. 66, Janpath, New Delhi – 110 001.
2. Ramaswamy, V. S. and S. Namakumari. Marketing Management, Planning, Implementation and Control. MacMillan Co. 866, Third Avenue, New York – 10022.

3) e-books:

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Course No. : ABM-3613 **Course Title :Supply Chain Management**

Credit : (1+1=2) **Semester : VI**

Theory:

Overview of Supply Chain Management: Nature and Concept,Value Chain, Functions and contributions Framework for supply chain solution**,** Supply chain relationships**,** Cold Chain Management. **Overview of Logistics:** Nature and concept,Logistical mission and strategic issues,Logistical competitive advantage, Strategic logistics planning process, Components of logistics management, Functions of logistics management, Integrated logistics system. **Demand Forecasting-** Nature and components, Impact of forecasts on logistics and supply chain management, Effective forecasting process, Forecasting techniques, Selecting the appropriate forecasting technique, Operating principles of demand forecasting. **Inventory-** Concept and types, Functions of inventory in logistics and supply chain management, The role of cycle inventory in a supply chain, Economies of scale to exploit fixed costs, quantity discounts, The role of safety inventory in a supply chain, Determining appropriate level of safety inventory, Impact of supply uncertainty on safety inventory, Elements of inventory costs, J-I-T system. **Marketing Logistics System-** Concept of marketing logistics system, Planning physical distribution. **Purchasing and Sourcing Management-** Nature, scope and importance, Purchasing process trends for improved productivity, Contemporary sourcing and supplier management. **Transportation and Insurance In Supply Chain-** The role of transportation in supply chain, Modes of transportation and their performance characteristics – Road transport and rail transport, Transport insurance. **Warehousing and Material Handling System-** Need and role of warehousing, Warehousing functions, Types of warehouses, Warehouse layout and design, Warehouse management system. **Coordination in a Supply Chain-** Lack of supply chain coordination and Bullwhip effect, The effect of lack of coordination on performance, Obstacles to coordination in a supply chain, Managerial levers to achieve coordination, Building strategic partnership and trust within a supply chain. **Information Technology for Supply Chain Management-** IT applications in SCM, Advanced planning and scheduling (APS), Data warehouse, Data mining, Warehouse and data warehouse aspects, warehousing decisions, Use of data mining tools in SCM, Role of knowledge worker in SCM.

Practical:

Visit to cold different cold storages and prepare the technical report. Visit to logistics depot related to agriculture and allied products.To study different commodity exchanges to find out demand forecasting.To study different logistics and supply chain units for the purpose of studying inventory management system. To verify JIT system in that unit.Study of various purchasing and sourcing processes.To study the different transport and insurance.To study the warehouse layout and design.To study different types of software's in SCM.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightages (%)
1.	Overview of Supply Chain Management	Nature and concept, Value Chain, Functions and contributions, Framework for supply chain solution, Supply chain relationships, Cold Chain Management	10
2.	Overview of Logistic	Nature and concept, Logistical mission and strategic issues, Logistical competitive advantage, Strategic logistic planning process, Components of logistics management, Functions of logistics management, Integrated logistics system	10
3.	Demand Forecasting	Nature and components, Impact of forecasts on logistics and supply chain management, Effective forecasting process, Forecasting techniquesSelecting the appropriate forecasting technique, Operating principals of demand forecasting	10
4.	Inventory	Concept and types, Functions of inventory in logistics and supply chain management, The role of cycle inventory in a supply chain, Economics of scale to exploit fixed costs, quantity discounts	10
5.	Inventory	The role of safety inventory in a supply chain, Determining appropriate level of safety inventory, Impact of supply uncertainly on safety inventory, Elements of inventory costs, J-I-T system	5
6.	Marketing Logistics System	Concept of marketing logistics system, Planning physical distribution	2.5
7.	Purchasing and Sourcing Management	Nature, scope and importance, Purchasing process trends for improved productivity, Contemporary sourcing and supplier management	2.5
8.	Transportation and Insurance In supply chain	The role of transportation in supply chain, Modes of transportation and their performance, characteristics – Road transport and rail transport, Transport insurance	10

Practical Exercises:

Exercise No.	Title
1	Visit to cold different cold storage and prepare the technical report
2.	Visit to logistics depot related to agriculture and allied products.
3.	To study different commodity exchanges to find out demand forecasting.
4.	To study different logistics and supply chain units for the purpose of studying inventory management system. To verify JIT system in that unit.
5.	Study of various purchasing and sourcing processes.
6.	To study the different transport and insurance.
7.	To study the warehouse layout and design.
8.	To study the warehouse layout and design.

Suggested readings:

1) Text Book:

1. Dr. R. Balakrishnan Supply Chain Management for Indian Agriculture
2. Logistics and Supply chain Integration – Ian Sadler – Sage – 2007

2) Reference Books:

1. Managing Customer and Supplier Relationships – APICS module 3
2. Philip B Sachary Managing and Global Supply Chain –, Larsen - Viva Books – 2000
3. Joel D.Wisner, G.K. Leong, KeahPrinciples of Supply Chain Management – A Balanced Approach — Choon Tan – Cengage Learning – 2008
4. – K. Shridhara Bhat Supply Chain management– Himalaya Publishing – 2010
5. Sunil Sharma Supply Chain Management — Oxford University Press – 2010
6. - Ian Sadler Logistics and Supply chain Integration– Sage – 2007

3) e-books:

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Course No. : ELE-ABM-3617 **Course Title :Value Chain in Agriculture**

Credit : (1+2=3) **Semester : VI**

Theory:

Meaning of value and value chain.Concept of value chain.Components of value chain-Grading, Processing, Storage, Transportation, Packaging and Delivery.Value chain from farm gate to consumer's plate.Processing- Meaning and functions. Processing of important commodities like food grains, oilseeds, commercial and horticultural crops. Economics of processing.Storage-

Meaning and functions.Different storage structures.Storage methods for food grains, oilseeds, commercial and horticultural crops.Economics of storage.

Transportation- Meaning and functions.Modes of transport, transportation of food grains, oilseeds, commercial and horticultural crops.Economics of transportation.Packaging- Meaning and functions. Materials used for packaging of food grains, oilseeds, commercialand horticultural crops. Economics of packaging.Special requisites for marketing of livestock and its products- Processing, Storage, Transportation and Packaging.Economics of marketing of livestock and its products.Special requisites for marketing of fish- Processing, Storage, Transportation and Packaging.Economics of marketing of fish.Special requisites for marketing of cocoons- Processing, Storage, Transportation and Packaging.Economics of marketing of cocoons.

Practical:

Economics of value addition at different stages for different products, visits to processing units, logistics, godowns, ware houses, etc.

Teaching Schedule- Theory with weightages (%):

Lecture No.	Topic	Weightage (%)
1	Meaning of value and concept of value chain.	4
2.	Components of value chain – Grading, Processing, Storage, Transportation, Packaging and Delivery	8
3	Value chain from farm gate to consumer's plate	4
4	Processing meaning and functions. Processing of important commodity like food grains, Oilseeds, Commercial and Horticultural crops.	8
5	Economic of processing, cost of processing	4
6	Storage meaning and functions	2
7	Different storage structure, storage methods for food grains, Oilseeds, Commercial and horticultural crops	10
8	Economics of storage	2
9	Transportation, meaning and functions	4
10	Modes of transport, transportation of food grains, Oilseeds, commercial and horticultural crops	8
11	Economics of transportation packaging meaning and functions	4
12	Materials used to packaging of food grains, oilseeds, commercial horticultural crops. Economics of packaging	12
13	Special requisites for marketing of livestock's and its products, processing, storage, transportation, and packaging. Economics of marketing of livestock and its products	12

14	Special requisites for marketing of fish-processing, storage, transportation and packaging. Economics of marketing of fish	8
15	Special requisites for marketing of cocoons – processing, storage, transportation, and packaging	08
16	Economics of marketing of Cocoons	2

Practical Exercises:

Exercise No.	Title
1-4	Economics of processing of different cereals- Fixed cost, variable cost, cost of processing, cost of packaging, transportation, cost of transportation, cost of storage BCR.
5-10	Economics of processing of different pulses- Fixed cost, variable cost, cost of processing, cost of packaging, transportation, cost of transportation, cost of storage BCR.
11-14	Economics of processing of different oilseeds- Fixed cost, variable cost, cost of processing, cost of packaging, transportation, cost of transportation, cost of storage BCR.
15-20	Economics of processing of different fruits- Fixed cost, variable cost, cost of processing, cost of packaging, transportation, cost of transportation, cost of storage BCR.
21-27	Economics of processing of different milks and milks products- Fixed cost, variable cost, cost of processing, cost of packaging, transportation, cost of transportation, cost of storage BCR.
28	Visit to cold storage structure
29	Visit to Godowns
30	Visit to warehouses
31	Visit to processing units
32	Logistics management in food grains

Suggested readings:

1) Text Book:

1. S.S. Acharya, N.L. Agrawal Agricultural marketing in India..
2. H.Evan Drummond, John. W. Goodwin Agricultural economics IInd edition,.
3. S.C. Gaur and D. Singh.A Handbook of Agri-business,
4. Mukesh Pandey, Dipali Tiwari Rural and agricultural marketing, Opportunities challenges and business strategy,.

Neelam Khetarpaul, Darshan PuniaFood packaging,.

2) Reference Books:

3) e-books:

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Course No. : ELE-ECON-368 **Course Title : Recent advances in Banking**

Credit : (1+2=3) **Semester : VI**

Theory:

Definition of Banking, meaning, Evolution of Banking Institutions, History of banking system in India, list of public and private sector banks in India, Indian Banks operation aboard, functions of a bank, difference between organized and unorganized banking sector.

Central banking- Functions of a Central bank, Monopoly of Note Issue, Monetary policy, Qualitative instruments of monetary policy and recent trends in Central banking. Reserve Bank of India- Genesis, Nature and functions of RBI, Role of RBI, Departments of RBI, difference between central bank and other banks.

Commercial banks- functions of commercial banks and the services rendered by them, General structure and methods of commercial banking, Mechanism of Credit Creation, The Clearing House System, Systems of banking-Group v/s Chain banking, Unit v/s Branch banking, Mixed v/s Investment banking, Universal banking, Merchant banking, Virtual banking, Green banking.

Cooperative bank- Structure of Cooperative banking sector, Urban Cooperative banks, Rural Cooperatives banks, Banker and Customer, Relationship between Banker and Customer- General Features of the Relationship

National Bank for Agriculture and Rural Development (NABARD)- Functions, resources of NABARD, Kissan Credit Card Scheme, Role of NABARD in rural credit.

Precautions to be taken while opening a bank account, Different types of accounts- Hindu Undivided Family, Married Women, Pardanashin Lady, Illiterate Person, Blind Person, Insolvent Person, Insane Person, Intoxicated, Executors and Administrators, Liquidators, Trust, Societies and Clubs, Minors, Agents, Joint Accounts, Partnership Firms, Joint Stock Companies.

Cheques-Requisites of a cheques, Dating of cheques, Crossing of cheques, Endorsements, Marking of cheques, Holder and Holder in Due Course, Liability of the drawer for dishonor of cheques.

Promissory notes- definition, kinds and legal decisions. Customers pass book-Entries in the pass book, effect of errors favorable to the banker and those favorable to the customers, closing an account. Customer service in banks- customer service guidelines, banking ombudsman scheme, customer service nomination facility and improvement of customer services.

KYC norms and Anti-money laundering- policy on Know Your Customer (KYC) standards/ " Anti-money Laundering(AML) measures.

Payment and settlement system- New Age Clearing- Payment and settlement systems in Banks, Electronic fund transfer (EFT), Electronic Clearing Service (ECS), MICR clearing, Core banking solution (CBS), National gateways- Real time gross settlement, RTGS operations, International gateways- Society for Worldwide Interbank Financial Telecommunications (SWIFT).

Changing profile of Indian banking- from Security orientation to purpose orientation, the challenges ahead.

Technology in banks-Technology, E- banking, Internet banking, Tele banking, M banking, Risks associated with internet banking. Banking products- Introduction, Deposit products, Remittance products, IT products and loan products.

Bank marketing- Introduction, Bank- A marketing organization, Marketing the banking products in India, Characteristics of Bank Marketing, Impact of Economic Reforms and the IT revolution, Emerging issues in Indian Banking. Banking sector- Corporate banking, Retail banking, International banking, Rural banking, Regional Rural Banks.

Foreign exchange-Meaning and Significance, Rate of Exchange, Exchange Controls- aims of exchange control, devaluation of rupee , Methods of Exchange Controls- intervention and restrictions.

Loans and advances- Principles of Bank Lending, Methods of Granting Advances, Secured Advances. Priority sector lending- Background, Small scale industries-RBI guidelines, Sub targets for all scheduled commercial banks. Non Performing Assets-Definition, Impact of NPAS, consequence of NPAS, identification of NPAS. Latest in banking- Autonomy package for banks, Tax matters, 12 hour banking, Dematerialization, Mutual fund, Insurance business by Banks

Practical:

Practical exposure visit to commercial bank, lead bank and visits to different cooperative banks like PACS, DCC Banks. Solving problems related to banking sector.

Practical:

1. Study of Banking sector- Corporate banking, Retail banking, International banking, Rural banking, Regional Rural Banks.
2. Study of Different types of accounts- Hindu Undivided Family, Married Women, Pardanashin Lady, Illiterate Person, Blind Person, Insolvent Person, Insane Person,

Intoxicated, Executors and Administrators, Liquidators, Trust, Societies and Clubs, Minors, Agents, Joint Accounts, Partnership Firms, Joint Stock Companies.

3. Study of Requisites of a cheques, Dating of cheques, Crossing of cheques, Endorsements, Marking of cheques, Holder and Holder in Due Course, Liability of the drawer for dishonor of cheques.
4. Study of Customers pass book-Entries in the pass book, effect of errors favorable to the banker and those favorable to the customers, closing an account.
5. Study of Customer service in banks- customer service guidelines, banking ombudsman scheme, customer service nomination facility and improvement of customer services.
6. Study of KYC document for opening accounts & loan purpose.
7. Study of changing profile of Indian banking- from Security orientation to purpose orientation, the challenges ahead.
8. Study of Technology in banks-Technology, E- banking, Internet banking, Tele banking, M banking, Risks associated with internet banking.
9. Study of Banking products- Introduction, Agricultural products, Deposit products, Remittance products, IT products and loan products.
10. Study of Various Agricultural loan proposal in Indian Banking sector.
11. Study of Loans and advances- Principles of Bank Lending, Methods of Granting Advances, and Secured Advances.
12. Study of Priority sector lending- Background, Small scale industries-RBI guidelines, Sub-targets for all scheduled commercial banks.
13. Study of Non Performing Assets-Definition, Impact of NPAS, consequence of NPAS, identification of NPAS.
14. Practical exposure visit to commercial bank, lead bank and visits to different cooperative banks like PACS, DCC Banks. Solving problems related to banking sector.

Course No. : ELE-ECON-369 **Course Title :Planning Formulation and Evaluation of Business Projects**

Credit : (1+2=3) **Semester : VI**

Theory:

Agriculture Project: Meaning, types and their importance in development. Economic and financial analysis of agricultural projects. Cost-benefit estimates of different types of projects, Cash-flow, Shadow price, calculation of economic prices, comparing costs and benefits such as the Net Present Worth (NPW or NPV), the Benefit Cost Ratio (BCR), Internal Rate of Returns (IRR), Cash flow, Pay Back Period (PBP). Guidelines for building up cost and return analysis, project area, characterization and components, financial and economic analysis.Project approach to agricultural leading enterprises practical steps in project formulation.Financial appraisal of a project. Application of Programme Evaluation and Review Technique (PERT,CPM), Sensitivity analysis, Social Cost Benefit Analysis (SCBA).

Practical:

Practical exercises on project preparation for securing loan.Estimation of measures of economic evaluation such as NPV, BC ratio, Internal Rate of Returns (IRR), Pay Back Period (PBP).Sensitivity analysis to judge the economic viability of a project. Complete project proposal. Exercises on CPM and PERT techniques.

Teaching Schedule- Theory with weightages (%):

Lectures No	Topic	Subtopic	Weightage (%)
1	Agricultural Projects	Project and Agril. Project -Definition, Meaning, Types of Agricultural Projects Importance of Agricultural Project In Development Criteria For selection of Agril. Project	4
2	Project cycle	Phases of Project cycle Identification,Formulation,Appraisal,Implement ation, Monitoring and Evaluation.	5
3	Economic and Financial Analysis	Objectives, Economic Analysis of Agricultural Project, Financial Analysis of Agricultural Project- Farm Planning, Farm accounting, farm budgeting, Methods of Financial Analysis	5

4	Cost-benefit estimates of different types of project	Cost estimates- Investment cost & Operating cost, Farm Level Input Cost, Benefit Types – Direct and Indirect benefit, Benefit estimation	5
5	Cash Flow	Definition, Meaning of Cash Flow Cash Inflow / cash receipt concept Cash Outflow/ expenses concept Cash balance Concept Merits of Cash Flow Statement Preparation of Cash Flow statement	8
6	Social Cost-Benefit Analysis	Social rate of discount, Income Distribution Shadow Price: Definition, Meaning 1)Shadow Price of Foreign Exchange Rate- Concept , Definition Shadow exchange rate- concept, formula Standard conversion Factor- concept , formula 2)Shadow Price of Labour- Definition, Meaning, Merits Shadow Wage Rate- Concept, formula 3)Shadow Price of Investment- definition, concept, formula	7
7	Discounted Measures of Agril. Project	Definition of discounting, concept Discounted methods- 1)Net Present Worth- Definition, meaning, Concept, formula Criteria for selection Of Agril. Project 2)Benefit-Cost ratio- Definition, Meaning, Concept, formula Criteria for selection of Agril Project 3)Internal rate of Return- - Definition, Meaning, Concept, formula, Criteria for selection of Agril Project Profitability Index- Definition, Meaning, Concept, formula Criteria for selection of Agril Project	10
8	Un-discounted Measures of Agril. Project	Concept , Un-discounted Methods, Pay Back Period- Definition ,Meaning, concept, Criteria for selection, Examples on PBP	5
9	Components Of Agril	Investment ,Gestation Period, Cash Flow, Life	4

	projects	of the project, Junk Value - Definition and Meaning	
10	Characteristics of Agril. Project	Functional classification of project Technical Analysis of Project Socio-economic Analysis Parameter	4
11	Project Approach to agricultural Lending	What is project, Need for project approach, National Priorities and Targets, Policy framework for project, Characteristics Of main Project classes, Technical, financial and Socio-Economic Aspect	5
12	Practical Steps In project Formulation	Primary data source, Secondary data Source, Project Report	5
13	Financial Appraisal Of Project	Objectives, financial viability, bankability of Scheme Methods of financial Analysis	6
14	PERT Technique	Meaning, History, Characteristics of project, Steps In PERT, Benefits Of PERT, Limitation of PERT technique	5
15	CPM Technique	Meaning, History, Characteristics of project Steps In CPM Technique, Benefits Of CPM Limitation of CPM	5
16	Sensitivity analysis	Meaning, definition, Concept, Points Considering in Sensitivity analysis of project appraisal	7

Practical Exercises:

Exercise No.	Title
1	Introductory study of Agricultural Projects
2	Study of different types of Agricultural Projects
3	Study of Different criteria for selection of the Project.
4 & 5	Study of different Phases/Steps in Project Cycle : Identification, Formulation, Appraisal, Implementation, Monitoring and Evaluation
6	Study of Practical Steps in Project Preparation
7	Study of Sources of Data in Project Preparation
8	Study of the Project Report Format
9	Study of Time value of money
10 & 11	Study of Net Present Worth
12 & 13	Study of Benefit- Cost Ratio
14 & 15	Study of Internal Rate of Return
16 &17	Study of Profitability Index
18 & 19	Study of Pay-back Period
20 & 21	Study of Sensitivity Analysis

22 & 23	Study of Preparation of Cash Flow Statement
24	Study of Project Evaluation Review Technique(PERT)
25	Study of Critical Path Method
Mini Projects	
26 & 27	Preparation of loan proposal for securing loan.
28 to 32	Preparation of complete project proposal of agricultural and allied enterprise.

Suggested readings:

1) Text Book:

1. Prasana Chandra. : Project Planning Analysis, selection, Analysis, Implementation and Review
2. Barde, S. D. and K. G. Karamkar. : Agricultural Project Management for Banks
3. S. Subba Ready. : Agricultural Economics

2) Reference Books:

1. Johl, S. S and Charles V. Moore. : Essentials of Farm Financial Management
2. Kahlon, A. A. and Karam singh. : Managing Agriculture Finance- Theory and Practice

3) e-books:

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Semester –VII

Experiential Learning Modules (0+20)

Set No	Module No.	Course Title	Credits
I	ELM-ABM 4718	Production Management of vegetable crops	0+10=10
	ELM- MKT 4713	Marketing Management of vegetable crops	0+10=10
II	ELM-ABM 4719	Production Management of floriculture crops	0+10=10
	ELM- MKT 4714	Marketing Management of floriculture crops	0+10=10
III	ELM-ABM 4720	Production Management of oilseed crops	0+10=10
	ELM- MKT 4715	Marketing Management of oilseed crops	0+10=10
IV	ELM-ABM 4721	Production Management of pulse crops	0+10=10
	ELM- MKT 4716	Marketing Management of pulse crops	0+10=10
V	ELM-ABM 4722	Production Management of Dairy Enterprises	0+10=10
	ELM- MKT 4717	Marketing Management of Dairy Enterprises	0+10=10
VI	ELM-ABM 4723	Production Management of Poultry Enterprises	0+10=10
	ELM- MKT 4718	Marketing Management of Poultry Enterprises	0+10=10
		Any Two modules (From the same set)	**0+20=20**

ELM-ABM 4718:	Vegetable Crops : Tomato, Chilly, Cucumber, Beans, Brinjal etc
ELM-ABM 4719:	Flower Crops: Marigold, Aster, Gaillardia etc.
ELM-ABM 4720:	Oilseed Crops: Soybean, Groundnut etc.
ELM-ABM 4721:	Pulse crops: Moong Beans, Udid etc.

Note: 1) 20 students will select one module (Maximum 10 students per crop)

2) Each student must select any two modules (From the same set i.e. Production & Marketing).

Lesson Plan / Details Guidelines lines for ELP Modules

Production Management of Vegetable Crops

Sr. No	Particulars
1	Importance and scope of vegetable crops.
2	Present scenario of production in world, India & State
3	Production management techniques of selected vegetable crop
4	Management of different input used for selected vegetable crop
5	Estimation of cost of cultivation of selected vegetable crop and income measures like 1) Net Income 2) B:C ratio 3) Per quintal cost of production & 4) Per hectare cost of Cultivation.
6	Experience gained.
7	Summary and Conclusion

Marketing Management of Vegetable crops

Sr.No.	Particulars
1	Export scenario, procedure and documents required for the export
2	Channel-wise marketing cost of the selected vegetable crop. Price spread and market margin
3	**Study Tour** – Visit to APMC having selected crop has major arrival
4	Collection of data for arrival & prices of visitsble crops & study of working APMC
5	Market support & price support schemes for selected vegetable crop
6	Experience gained.
7	Summary and Conclusion

Production Management of Floricultural Crops

Sr. No	Particulars
1	Importance and scope of selected floricultural crop.
2	Current scenario of production in world, India & State
3	Production management techniques of selected floriculture crop
4	Management of different input used for selected floriculture crop
5	Estimation of cost of cultivation of selected floriculture crop and income measures like 1) Net Income 2) B:C ratio 3) Per quintal cost of production & 4) Per hectare cost of production
6	Experience gained.
7	Summary and Conclusion

Marketing Management of Floricultural Enterprises

Sr. No.	Particular
1	Present domestic & international market status of selected floriculture crop. Major producing regions and major consumption markets.
2	Channel-wise marketing cost of the selected floriculture crop and market margin
3	Export scenario, procedure and documents required for the export
4	Market support & price support schemes for selected floriculture crop
5	**Study Tour** – Visit to APMC having selected crop has major arrival.
6	Experience gained.
7	Summary and Conclusion

Production Management of Oilseed Crops

Sr. No	Particulars
1	Importance and scope of oilseed crop.
2	Current scenario of production in world, India & State
3	Production management techniques of selected oilseed crop
4	Management of different input used for selected oilseed crop
5	Estimation of cost of cultivation of selected oilseed crop and income measures like 1) Net Income 2) B:C ratio 3) Per quintal cost of production & 4) Per hectare cost of production
6	Experience gained.
7	Summary and Conclusion

Marketing Management of Oilseed crops

Sr.No.	Particular
1	Present domestic & international market status of selected oilseed crop. Major producing regions and major consumption markets.
2	Channel-wise marketing cost of the selected oilseed crop. Price spread and market margin
3	Working out of payback period, break-even analysis
4	Export scenario, procedure and documents required for the export
5	Market support & price support schemes for selected oilseed crop
6	**Study Tour** – Visit to APMC having selected crop has major arrival
7	Experience gained.
8	Summary and Conclusion

Production Management of Pulse Crops

Sr. No	Particulars
1	Importance and scope of pulse crops.
2	Current scenario of production in world, India & State
3	Production management techniques of selected pulse crop
4	Management of different input used for selected pulse crop
5	Estimation of cost of cultivation of selected pulse crop and income measures like 1) Net Income 2) B:C ratio 3) Per quintal cost of production & 4) Per hectare cost of production
6	Experience gained.
7	Summary and Conclusion

Marketing Management of Pulse Crops

Sr.No.	Particular
1	Present domestic & international market status of selected pulse crop. Major producing regions and major consumption markets.
2	Channel-wise marketing cost of the selected pulse crop and market margin
3	Export scenario, procedure and documents required for the export
4	Market support & price support schemes for selected pulse crop
5	**Study tour** – Visit to APMC having selected crop as major arrival.
6	Experience gained.
7	Summary and Conclusion

Production Management of Dairy Enterprises

Sr.No.	Particulars
1	Present scenario
2	Procedure and Documents required for starting unit
3	Management systems and Process in selected unit
4	Resource Use Management: Site, Land, Water, Raw Materials, Capital, Manpower, Equipments, Energy, Electricity supply, Veterinary aids.
5	Human Resource Management: Planning, Acquisition, Training, Monitoring, Payments, Rewards.
6	Raw material, Work in Process, Finished product. Inventory account and control.
7	Supply chain Management: Procurement Management, Distribution Management.
8	Quality Management
9	Cost analysis of unit: Total annual fixed cost = Land rent + Depreciation + Interest on fixed capital Total annual variable cost: Raw Material cost+ Fuel cost+ Labour cost + Transportation cost+ Packing cost+ Other (Miscellaneous expenses)
10	Summary and conclusion
11	Experience gained

Marketing Management of Dairy Enterprises

Sr.No.	Particulars
1	Marketing management: Marketing functions – Assembling, Grading, Packing, Storage, Transportation
2	Distribution management of milk, marketing channels
3	Estimation of marketing cost & margins, price spread
4	Calculation of financial ratios: B:C ratio, Turnover ratio, Profitability ratio.
5	**Study tour -** Visit to milk market, collection center, retail outlet, large scale commercial dairy farms etc.
6	Problems & suggestions
7	Summary & conclusion
8	Experience gained

Production Management of Poultry Enterprises

Sr.No.	Particulars
1	General information
2	Procedure and Documents required for starting unit
3	Management systems and Process in selected unit
4	Resource Use Management: Site, Land, Water, Raw Materials, Capital, Manpower, Equipments, Energy, Electricity supply, Veterinary aids.
5	Human Resource Management: Planning, Acquisition, Training, Monitoring, Payments, Rewards.
6	Raw material, Work in Process, Finished product. Inventory account and control.
7	Supply chain Management: Procurement Management, Distribution Management.
8	Quality Management
9	Cost analysis of unit: Total annual fixed cost = Land rent + Depreciation + Interest on fixed capital Total annual variable cost: Raw Material cost+ Fuel cost+ Labour cost + Transportation cost+ Packing cost+ Other (Miscellaneous expenses)
10	Break even analysis
11	Summary and conclusion
12	Experience gained

Marketing Management of Poultry Enterprises

Sr.No.	Particulars
1	Marketing management: Marketing functions – Assembling, Grading, Packing, Storage, Transportation
2	Distribution management of egg/birds, marketing channels
3	Estimation of marketing cost & margins, price spread
4	Calculation of financial ratios: B: C ratio, Liquidity ratios, Turnover ratio, & profitability ratio.
5	**Study Tour** -Visit to poultry market, processing unit, retail outlet, large scale commercial poultry farms etc.
6	Problems & suggestions
7	Summary & conclusion
8	Experience gained

Syllabus of ELP Modules

Production Management of Vegetable Crops

1. Importance of vegetable crops, current scenario in world, India & state
2. Production management techniques & management of different inputs.
3. Estimation of cost of cultivation and various efficiency & income measures.
4. Summary and Conclusion

Marketing Management of Vegetable Crops

1. Study of channels of marketing, major markets of vegetable crops.
2. Distribution management and critical aspects of marketing
3. Estimation of marketing cost, margins & various ratios.
4. Market support and price stabilization measures by government
5. Summary and Conclusion

Production Management of Floricultural Crops

1. Importance of floricultural crops, current scenario in world, India & state
2. Production management techniques & management of different inputs.
3. Estimation of cost of cultivation and various efficiency & income measures.
4. Summary and Conclusion

Marketing Management of Floricultural Crops

1. Study of channels of marketing, major markets of floricultural crops.
2. Distribution management and critical aspects of marketing
3. Estimation of marketing cost, margins & various ratios.
4. Market support and price stabilization measures by government
5. Summary and Conclusion

Production Management of Oilseed Crops

1. Importance of oilseed crops, current scenario in world, India & state
2. Production management techniques & management of different inputs.
3. Estimation of cost of cultivation and various efficiency & income measures.
4. Summary and Conclusion

Marketing Management of Oilseed Crops

1. Study of channels of marketing, major markets of oilseed crops.
2. Distribution management and critical aspects of marketing
3. Estimation of marketing cost, margins & various ratios.
4. Market support and price stabilization measures by government
5. Summary and Conclusion

Production Management of Pulse Crops

1. Importance of pulse crops, current scenario in world, India & state
2. Production management techniques & management of different inputs.
3. Estimation of cost of cultivation and various efficiency & income measures.
4. Summary and Conclusion

Marketing Management of Pulse Crops

1. Study of channels of marketing, major markets of Pulse crops.
2. Distribution management and critical aspects of marketing
3. Estimation of marketing cost, margins & various ratios.
4. Market support and price stabilization measures by government
5. Summary and Conclusion

Production Management of Dairy Enterprises

1. Importance and Present Scenario of dairy industry in Maharashtra, India and World.
2. Study of Critical Areas of Management in dairy unit.
3. Estimation of maintains cost & per liter Cost of Production in dairy unit
4. Analysis of Economic Viability of dairy unit.
5. Summary and Conclusion

Marketing Management of Dairy Enterprises

1. Study marketing function performed in marketing of milk
2. Distribution management and critical aspects of marketing
3. Estimation of marketing cost, margins & various ratios.
4. Summary and Conclusion

Production Management of Poultry Enterprises

1. Importance and Present Scenario of poultry industry in India and World.
2. Study of Critical Areas of Management in poultry unit.
3. Estimation of Cost of Production in poultry unit
4. Analysis of Economic Viability of poultry unit.
5. Summary and Conclusion

Marketing Management of Poultry Enterprises

1. Study marketing function performed in marketing of eggs/birds.
2. Distribution management and critical aspects of marketing
3. Estimation of marketing cost, margins & various ratios.
4. Summary and Conclusion

Study tour to measure market centers related to selected experiential learning modules

In Plant Training Programme

Sr. No.	Title	Credits
1	Attachment to Agro. Industry	0+20=20
	Total Credits	**0+20=20**

Semester: VIII
In Plant Training

Sr. No	Particulars
1	Survey of Agro Based Industries in the region
2	Selection of Agro Based Industry
3	Features and general information of selected Agro Based Industry
4	Documentations Required and Procedure for establishment of selected Agro Based Industry / Unit
5	Management System and Processes in Selected Agro based Industry / Unit.
6	Organizational Structure and processes in Selected Agro based Industry / Unit.
7	Identification of critical management areas in selected Agro Based Industry / Unit
8	Strategic Management in selected Agro Based Industry /Unit. Strategic Management Process:- Vision, Mission,Objectives, Goals, Environmental and organizationalanalysis, Strategic alternatives, Choice of Strategy, Implementation of Strategy, Evaluation and control.
9	Human Resource Planning: Forecasting Inventorying,Anticipating Planning, Job Analysis. Human Resource Acquisition: - Recruitment, Selection,Placement, Induction, Socialization. Human Resource Development: - Training, CareerManagement, Monitoring and Performance coaching, Team building. Compensation Strategy and RewardManagement Industrial Relation.
10	Resource use Management in Selected Agro based Industry / Unit Raw Materials, Capital, Manpower,Machinery and Equipment, Energy, Site.
11	Processing Management in selected Agro Based Industry/ Unit.
12	Process Flow Chart, Technical Aspects
13	Inventory Management in selected Agro Based Industry /Unit. Raw materials, Work in Process, Finished product. Inventory Account and control.
14	Total Quality Management in selected Agro BasedIndustry / Unit. Operation Management, Qualityimprovement, Quality Assurance, Quality Policy.
15	By product Management in selected Agro Based Industry/ Unit
16	Marketing management in selected Agro based industry Marketing function management: Assembling,Transportation, Packaging, Storage, Sale promotion,Distribution. Marketing Mix Strategy: Product Strategy, Pricing strategy, Distribution Strategy, CommunicationStrategy.
17	Supply chain Management in Selected Agro BasedIndustry: Procurement Management,

	DistributionManagement
18	Estimation of Cost of Production of selected agro basedindustry: Total Variable Cost: Raw Material Cost, FuelCost, Labour Cost, Transportation Cost, Packing Cost,Other (Light bill, Stationary etc), Total Fixed Cost:Land rent, Depreciation, Interest onFixed Capital, Total Cost = Total Variable Cost + Total Fixed Cost B:C Ratio, Liquidity Ratio, Turnover Ratio, ProfitabilityRatio
19	Financial Management of selected agro based industry Sources of Funds, Allocation of Funds,Financialfeasibility, Break-Even Analysis
20	SWOT Analysis of selected Agro Based Industry / Unit - Strength, Weakness, Opportunities and Threats
21	Experience gained
22	Summary and Conclusion

WEEK-1

- Registration
- Orientation

WEEK-2

- Survey of Agro Based Industries in the region(2)
- Selection of Agro Based Industry (2)
- Features and general information of selected Agro Based Industry (3)

WEEK : 3

- Documentations Required and Procedure for establishment of selected Agro Based Industry / Unit (3)
- Management System and Processes in Selected Agro based Industry /Unit.(4)
- Organizational Structure and processes in Selected Agro based Industry / Unit.(4)
- Identification of critical management areas in selected Agro Based Industry / Unit
- Processing Management in selected Agro Based Industry / Unit. (5)
- Process Flow Chart, Technical Aspects (5)

WEEK :4

- Strategic Management in selected Agro Based Industry / Unit
- Strategic Management Process:- Vision, Mission, Objectives, Goals,
- Environmental and organizational analysis, Strategic alternatives,
- Choice of Strategy, Implementation of Strategy, Evaluation and control.

WEEK :5

- Resource Use Management in Selected Agro based Industry / Unit.

- Raw Materials, Capital, Manpower, Machinery and Equipment, Energy, Site. (5)

WEEK :6

- Human Resource Planning: Forecasting Inventorying, Anticipating
- Planning, Job Analysis.
- Human Resource Acquisition: - Recruitment, Selection, Placement, Induction, Socialization.
- Human Resource Development: - Training, Career Management, Monitoring and Performance coaching, Team building.
- Compensation Strategy and Reward Management, Industrial Relation(5)

WEEK :7

- Inventory Management in selected Agro Based Industry / Unit
- Raw materials, Work in Process, Finished product.
- Inventory Account and control.

WEEK :8

- Visit to Govt. Institutes like District Industrial Centre, Wholesale Markets of Raw Material.
- Arranging Guest Lectures related to Export, Finance, Experts related to Rules & Regulation.
- Presentation on work done till date

WEEK :9

- Total Quality Management in selected Agro Based Industry / Unit
- Operation Management, Quality improvement, Quality Assurance,
- Quality Policy.

WEEK :10

- By product Management in selected Agro Based Industry / Unit

WEEK :11

- SWOT Analysis of selected Agro Based Industry / Unit
- Strength, Weakness, Opportunities and Threats

WEEK :12

- Estimation of Cost of Production of selected agro based industry
- Total Variable Cost:- Raw Material Cost, Fuel Cost, Labour Cost,

- Transportation Cost, Packing Cost, Other (Light bill, Stationary etc),
- Total Fixed Cost:- Land rent, Depreciation, Interest on Fixed Capital,
- Total Cost = Total Variable Cost + Total Fixed Cost
- B:C Ratio, Liquidity Ratio, Turnover Ratio, Profitability Ratio

WEEK :13

- Financial Management of selected agro based industry
- Sources of Funds
- Allocation of Funds
- Financial feasibility
- Break - Even Analysis

WEEK :14

- Marketing management in selected Agro based industry
- Marketing function management: Assembling, Transportation,
- Packaging, Storage, Sale promotion, Distribution.
- Marketing Mix Strategy: - Product Strategy, Pricing strategy,
- Distribution Strategy, Communication Strategy.

WEEK :15

- Supply chain Management in Selected Agro Based Industry:
- Procurement Management, Distribution Management

WEEK :16

- Experience gained (Agribusiness management)
- Summary and Conclusion (Agribusiness management)

WEEK :17

- Study Tour
- Visit to Institutes like CFTRI (Mysore),Packaging industry, Pack house Cold Storage

WEEK :18 and WEEK :19

- Preparation of Project Reports

WEEK :20

- Evaluation