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Rahuri 413722 (M.S.)

Report
on
Syllabus for

B.Sc. (Hons) Agri. Business Management

As per the guidelines of Vth Dean Committee, ICAR New Delhi

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Mahatma Phule Krishi Vidyapeeth, Rahuri

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Mahatma Phule Krishi Vidyapeeth, Rahuri

Revised Course Curriculum and Syllabus

(As per the recommendation of Vth Dean Committee-ICAR New Delhi)
Undergraduate – B.Sc. (Hons) Agri. Business Management

CONTENTS

Department wise course structure as per Vth Dean committee

I. BASIC SCIENCES AND HUMANITIES

Sl. No.	Course No.	Course Title	Credit hrs.
		Basic sciences and humanities	
1.	STAT-231	Statistical Methods	2(1+1)
2.	STAT-242	Applied Business Statistics	2(1+1)
3.	COMP-111	Computer Science and Agri-Informatics	2(1+1)
4.	EXTN-122	Communication Skills & Personality Development	2(1+1)
		Total	**8 (4+4)**

II. AGRICULTURAL AND ALLIED SUBJECTS

Sl.No.	Course No.	Course Title	Credit hrs.
1.	AGRO-111	Introduction to Agronomy and Crop Production Technology	3(2+1)
2.	AGRO-122	Sustainable Farming Systems and Precision Agriculture	2(1+1)
3.	BOT-231	Introduction to Genetics and Plant breeding	2(1+1)
4.	BOT-242	Intellectual Property Rights	1(1+0)
5.	BOT-243	Principles and Practices of Seed Science and Technology	2(1+1)
6.	BIOTECH-351	Introduction to Plant Biotechnology	2(2+0)
7.	SSAC-241	Soil and Water Management	2 (1+1)
8.	SSAC-352	Manures, Fertilizers and Soil Fertility Management	3(2+1)
9.	ENTO-121	Introduction to Entomology	2(1+1)
10.	ENTO-242	Management of Beneficial Insects	2(1+1)
11.	ENTO-353	Management of Insect Pests of Crops and Stored Grains	2(1+1)
12.	ENGG-121	Farm Machinery and Power	2(1+1)
13.	ENGG-232	Protected Cultivation and Secondary Agriculture	2(1+1)
14.	ENGG-363	Post-harvest Physiology of Market Produce	3(2+1)
15.	PATH-121	Introduction to Plant Pathology	2(1+1)
16.	PATH-232	Agricultural Microbiology	2(1+1)
17.	PATH-243	Management of Plant Diseases	2(1+1)
18.	HORT-121	Production Technology of Horticulture Crops	3(2+1)
19.	HORT-232	Post-harvest Management &Value Addition of Fruits & Vegetables	2(1+1)
20.	EXTN-111	Rural Sociology, Educational Psychology &Constitution of India	2(0+2)
21.	EXTN-233	Fundamentals of Agricultural Extension Education & Rural Development	2(1+1)
22.	EXTN-244	Communication and Diffusion of Agricultural Innovations	2(1+1)
23.	FSHN-361	Food Science and Human Nutrition	2(1+1)
24.	ASDS-111	Livestock, Poultry and Fish Production Management	2(1+1)
25.	ECON-367	Forest Resource Management	2(1+1)
26.	BM-366	Entrepreneurship Development and Business Communication	2(1+1)
27.	BM-367	Environmental Studies & Disaster Management	2(2+0)
		Total	**57 (32+25)**

III. AGRIBUSINESS MANAGEMENT

Sl.No.	Course No.	Course Title	Credit hrs.
		Economics and Policy	
1.	ECON-111	Fundamentals of Agricultural Economics	2 (2+0)
2.	ECON-122	Micro Economics and Macro Economics	3 (2+1)
3.	ECON-233	Farm Management, Production & Resource Economics	2 (1+1)
4.	ECON-244	Theory and Practice of Cooperation	2 (2+0)
5.	ECON-355	Introduction to Managerial Economics	3 (2+1)
6.	ECON-366	International Trade and Policy in Agriculture	2 (2+0)
		Business Management	
7.	BM-111	Principles of Management and Organizational Behaviour	3 (2+1)
8.	BM-122	Business Laws and Ethics	2 (2+0)
9.	BM-233	Business Research Methods	3 (2+1)
10.	BM-244	Food Business Management	2 (2+0)
11.	BM-355	Agribusiness Project Management	3 (2+1)
		Marketing	
12.	MKT-111	Grading, Standardization & Quality Management in Agri-food Products	3 (2+1)
13.	MKT-122	Introduction to Commodity Markets	3 (2+1)
14.	MKT-233	Agri-input Marketing Management	2 (1+1)
15.	MKT-244	Marketing Management	2 (2+0)
16.	MKT-355	Value chain and Retail Management in Agribusiness	3 (2+1)
17.	COMP-352	Information Communication Technology	2 (2+0)
18.	MKT-366	Agricultural Price and Policy Analysis	3 (2+1)
19.	MKT-367	Market Information and Intelligence	3 (2+1)
		Banking, Finance and Accountancy	
20.	BFA-121	Agricultural Finance and Insurance	3 (2+1)
21.	BFA-232	Financial Management	3 (2+1)
22.	BFA-243	Theory and Practice of Banking	2 (2+0)
23.	BFA-354	Introduction to Accountancy	3 (2+1)
24.	BFA-365	Managerial Accounting	3 (2+1)
		Total credits	**62 (46+16)**

IV. ELECTIVE COURSES

(Any three courses)

Sl.No.	Course No.	Course Title	Credit hrs.
1.	ELE-ECON-248	Gender Economics	3 (2+1)
2.	ELE-ECON-249	Management of Cooperatives & Producers' Organizations	3 (2+1)
3.	ELE-ECON-3510	Cooperative Legal System	3 (2+1)
4.	ELE-ECON-3511	Agro-tourism	3 (2+1)
5.	ELE-BM-248	Social Entrepreneurship	3 (2+1)
6.	ELE-BM-369	Strategic Business Management	3 (2+1)
7.	ELE-BM-3610	Corporate Social Responsibility and Managerial Ethics	3 (2+1)
8.	ELE-BM-3611	Advances in Agribusiness Management	3 (2+1)
9.	ELE-MKT-249	Rural Marketing	3 (2+1)

10.	ELE-MKT-3510	Agricultural Marketing Regulations	3 (2+1)

11.	ELE-BFA-356	Advances in Banking	3 (2+1)
12.	ELE-BFA-367	Financial Systems and Services	3 (2+1)
		Total	**09 (6+3)**

V. STUDENT 'READY' PROGRAMME

Sl.No.	Module	Course Title	Credit hrs.
1.	Module-I	Rural Awareness Works Experience (RAWE)	0+10
2.	Module-II	Agribusiness Student Project	0+10
3.	Module-III	Experiential Learning on Agribusiness / Hands on Training/Skill Development	0+10
4.	Module-IV	Internship /Industrial attachment	0+10
		Total	**0+40**

VI. NON-GRADIAL COURSES

Sl.No.	Course No.	Course Title	Credit hrs.
1.	LANG-111	Comprehension and Communication skills in English	2(0+2)
2.			
3.	NSS-231	National Service Scheme	1(0+1)
4.	PEYP-111	Physical Education & Yoga Practices	1(0+1)
5.	EDNT -361	Educational Tour	1(0+1)
		Total	**0+5**

VII. REMEDIAL COURSES (Any one of the two courses)

1. 2.	BIO-11 1 Or MATH-111	Introductory Biology or Elementary Mathematics	2 (1+1) or 2 (1+1)

ABSTRACTS of Agribusiness Management Degree Programme

Sl. No.	Particulars	Credit hrs.
I.	Basic Sciences and Humanities courses	08
II.	Agricultural and Allied Subjects courses	57
III.	Agribusiness Management courses	62
IV.	Elective courses	09
V.	Student 'READY' Programme	40
VI.	Non-Gradial Courses	1+4
VII.	Remedial Courses (Any one of the two courses)	1+1
	GRAND TOTAL	**183**

B.Sc. (Hons) Agri. Business Management

Semester wise Course Summary

Sem	Core courses	Common Courses	Remedial Courses	Non-gradial Courses	Elective Courses	RAWE & SPW	AIA	Total
I	15	02	02	3	-	-	-	22
II	22	02	-	-	-	-	-	24
III	22	-	-	1	-	-	-	23
IV	21	-	-	-	3	-	-	24
V	21	-	-	-	3	-	-	24
VI	20	2	-	1	3	-	-	26
VII	-	-	-	-	-	20	-	20
VIII	-	-	-	-	-	-	20	20
Total	**121**	**06**	**02**	**05**	**09**	**20**	**20**	**183**

Department-wise Credit Allotment

Sr. No.	Departments	Credits
1.	Basic Sciences and Humanities	8(4+4)
2.	Department of Agricultural and Allied Sciences	57(32+25)
3.	Department of l Economics and Policy	14(11+3)
4.	Department of Marketing	21(15+6)
5.	Department of Business Management	13(10+3)
6.	Banking finance and Accountancy	14(10+4)
	Total Credit	**62(46+16)**
7.	Electives	09(6+3)
8.	Student READY Programme	40(0+40)
9.	Non- Gradial Courses	05(0+5)
10.	Remedial Courses	2(1+1)
	Total	**183**

Semester-Wise Credit Allotment

Sr. No.	Semester	Credits
1.	I	**22= 11 +11**
2.	II	**24=15 +09**
3.	III	**23= 12 +11**
4.	IV	**24=17 +07**
5.	V	**23= 16 +07**
6.	VI	**26 = 17 +09**
7.	VII	**0+20**
8.	VIII	**0+20**
	Total	**183**

B.Sc. (Hons) Agri. Business Management

Semester wise Course Lay Out (Proposed)

Semester I

Sr. No.	Course No	Course Title	Credit hrs.
1.	COMP-111	Computer Science and Agri-Informatics **(Common Course)**	2(1+1)
2.	AGRO-111	Introduction to Agronomy and Crop Production Technology	3(2+1)
3.	ASDS-111	Livestock, Poultry and Fish Production Management	2 (1+1)
4.	EXTN-111	Rural Sociology, Educational Psychology &Constitution of India	2(0+2)
5.	ECON-111	Fundamentals of Agricultural Economics	2 (2+0)
6.	BM-111	Principles of Management and Organizational Behaviour	3 (2+1)
7.	MKT-111	Grading, Standardization & Quality Management in Agri-food Products	3 (2+1)
		NON-GRADIAL COURSES	
1.	LANG-111	Comprehension and Communication skills in English	2(0+2)
2	PEYP-111	Physical Education & Yoga Practices	1(0+1)
		REMEDIAL COURSES (Any one of the two courses)	
1.	BIO-11 1	Introductory Biology	2 (1+1)
		OR	
	MATH-111	Elementary Mathematics.	2 (1+1)
		Total	**22= 11 +11**

Semester II

Sr.No	Course No	Course Title	Credit hrs.
1.	AGRO-122	Sustainable Farming Systems and Precision Agriculture	2 (1+1)
2.	HORT-121	Production Technology of Horticulture Crops	3 (2+1)
3.	ENTO-121	Introduction to Entomology	2 (1+1)
4.	PATH-121	Introduction to Plant Pathology	2 (1+1)
5.	ENGG-121	Farm Machinery and Power	2 (1+1)
6.	EXTN-122	Communication Skills & Personality Development **(Comman Course)**	2 (1+1)
7.	ECON-122	Micro Economics and Macro Economics	3 (2+1)
8.	BM-122	Business Laws and Ethics	2 (2+0)
9.	MKT-122	Introduction to Commodity Markets	3 (2+1)
10.	BFA-121	Agricultural Finance and Insurance	3 (2+1)
		Total	**24=15 +09**

Semester III

Sr. No.	Course No	Course Title	Credit
1.	STAT-231	Statistical Methods	2 (1+1)
2.	BOT-231	Introduction to Genetics and Plant breeding	2 (1+1)
3.	HORT-232	Post-harvest Management &Value Addition of Fruits & Vegetables	2 (1+1)
4.	PATH-232	Agricultural Microbiology	2 (1+1)
5.	ENGG-232	Protected Cultivation and Secondary Agriculture	2 (1+1)
6.	EXTN-233	Fundamentals of Agricultural Extension Education & Rural Development	2 (1+1)
7.	ECON-233	Farm Management, Production & Resource Economics	2 (1+1)
8.	BM-233	Business Research Methods	3 (2+1)
9.	MKT-233	Agri-input Marketing Management	2 (1+1)
10.	BFA-232	Financial Management	3 (2+1)
		NON-GRADIAL COURSES	
11.	NSS-231	National Service Scheme	1 (0+1)
		Total	**23= 12 +11**

Semester IV

Sr. No.	Course No	Course Title	Credit hrs.
1.	STAT-242	Applied Business Statistics	2 (1+1)
2	BOT-242	Intellectual Property Rights	1 (1+0)
3.	BOT-243	Principles and Practices of Seed Science and Technology	2 (1+1)
4.	PATH-243	Management of Plant Diseases	2 (1+1)
5.	ENTO-242	Management of Beneficial Insects	2 (1+1)
6.	SSAC-241	Soil and Water Management	2 (1+1)
7.	EXTN-244	Communication and Diffusion of Agricultural Innovations	2 (1+1)
8.	ECON-244	Theory and Practice of Cooperation	2 (2+0)
9.	BM-244	Food Business Management	2 (2+0)
10.	MKT-244	Marketing Management	2 (2+0)
11.	BFA-243	Theory and Practice of Banking	2 (2+0)
	ELECTIVE COURSES (Select any one)		
1	ELE-ECON-248	Gender Economics	3 (2+1)
2	ELE-ECON-249	Management of Cooperatives & Producers' Organizations	3 (2+1)
3	ELE-MKT-249	Rural Marketing	3 (2+1)
4	ELE-BM-248	Social Entrepreneurship	3 (2+1)
		Total	**24=17 +7**

Semester V

Sr. No.	Course No	Course Title	Credit hrs.
1.	SSAC-352	Manures, Fertilizers and Soil Fertility Management	3 (2+1)
2.	ENTO-353	Management of Insect Pests of Crops and Stored Grains	2 (1+1)
3.	BIOTECH-351	Introduction to Plant Biotechnology	2 (2+0)
4	ECON-355	Introduction to Managerial Economics	3 (2+1)
5.	BM-355	Agribusiness Project Management	3 (2+1)
6	MKT-355	Value chain and Retail Management in Agribusiness	3 (2+1)
7.	COMP-352	Information Communication Technology	2 (2+0)
8.	BFA-354	Introduction to Accountancy	3 (2+1)
	ELECTIVE COUSES (Select any one)		
1.	ELE-ECON-3510	Cooperative Legal System	3 (2+1)
2.	ELE-ECON-3511	Agro-tourism	3 (2+1)
3.	ELE-MKT-3510	Agricultural Marketing Regulations	3 (2+1)
4.	ELE-BFA-356	Advances in Banking	3 (2+1)
		Total	**24= 17 +07**

- Study Tour :1 (0+1) During the semester Break of V & VI

Semester VI

Sr. No.	Course No	Course Title	Credit hrs.
1	ENGG-363	Post-harvest Physiology of Market Produce	3 (2+1)
2.	FSHN-361	Food Science and Human Nutrition	2 (1+1)
3.	ECON-366	International Trade and Policy in Agriculture	2 (2+0)
4.	ECON-367	Forest Resource Management	2 (1+1)
5.	MKT-366	Agricultural Price and Policy Analysis	3 (2+1)
6.	MKT-367	Market Information and Intelligence	3 (2+1)
7.	BM-366	Entrepreneurship Development and Business Communication	2 (1+1)
8.	BM-367	Environmental Studies & Disaster Management(Comman Course)	2 (2+0)
9.	BFA-365	Managerial Accounting	3 (2+1)
10.	EDNT - 361	Educational Tour	1 (0+1)
	ELECTIVE COURSES (Select any one)		
1.	ELE-BM-369	Strategic Business Management	3 (2+1)
2.	ELE-BM-3610	Corporate Social Responsibility and Managerial Ethics	3 (2+1)
3.	ELE-BM-3611	Advances in Agribusiness Management	3 (2+1)
4.	ELE-BFA-367	Financial Systems and Services	3 (2+1)
		Total	**26 = 17 +9**

SEM-VII

Sr. No.	Module No	Course Title	Credit hrs.
1.	RAWE-471	Rural Awareness Works Experience (RAWE)	0+10
2.	SPW-472	Agribusiness Student Project (SPW)	0+10
		Total	**0+20**

SEM-VIII

Sr. No.	Module No	Course Title	Credit hrs.
1.	IA-483	Internship /Industrial Attachment	0+10
2.	HOT -484	Hands on Training	0+10
		Total	**0+20**

Semester I

Sr.No.	Course No	Course Title	Credit hrs.
1.	COMP-111	Computer Science and Agri-Informatics (Comman Course)	2(1+1)
2.	AGRO-111	Introduction to Agronomy and Crop Production Technology	3(2+1)
3.	ASDS-111	Livestock, Poultry and Fish Production Management	2 (1+1)
4.	EXTN-111	Rural Sociology, Educational Psychology &Constitution of India	2(0+2)
5.	ECON-111	Fundamentals of Agricultural Economics	2 (2+0)
6.	BM-111	Principles of Management and Organizational Behaviour	3 (2+1)
7.	MKT-111	Grading, Standardization & Quality Management in Agri-food Products	3 (2+1)
		NON-GRADIAL COURSES	
1.	LANG-111	Comprehension and Communication skills in English	2(0+2)
2.	PEYP-111	Physical Education & Yoga Practices	1(0+1)
		REMEDIAL COURSES (Any one of the two courses)	
1.	BIO-11 1 MATH-111	Introductory Biology **OR** Elementary Mathematics.	2 (1+1) 2 (1+1)
		Total	**22= 11 +11**

Course	COMP -111	Credit: 2 (1+1)	Semester: I
Course title	Computer Science and Agri-Informatics (Comman Course)		

Teaching Schedule

Syllabus

Theory:

Introduction to Computers, organization and architecture of Computers, Memory Concepts, Units of Memory, Operating System, definition and UNIX, WINDOWS.

Basic Computer networks, Internet and World Wide Web (WWW), Editing and Formatting a document, Database, concepts and types, creating database. Introduction to Computer C-Programming language, concepts and standard input/output operations. Introduction to ICT and uses in agriculture. Introduction to Computer-controlled devices (automated systems) for Agri-input management, Smartphone apps in Agriculture. Introduction to Bioinformatics and Omics database NCBI, searching and accessing genome sequences and protein sequences. Introduction to GIS and its applications in Agriculture. Introduction to MIS and Decision Support System and its applications in Agriculture.

Practical:

Introduction of different operating systems such as DOS and WINDOWS. Creating Files & Folders. Introduction of programming languages. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL – Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Demonstration of HTML page design of e-Agriculture. Omics database of NCBI searching and accessing genome sequences and protein sequences, alignment of two genome sequences and alignment of two protein sequences.

Theory

Lecture No	Topic	Weightage (%)
1	Introduction to Computers, organization and architecture of Computers,	05
2	Memory Concepts, Units of Memory	04
3	Operating System, definition and UNIX, WINDOWS	06
4	Basic Computer networks, Internet and World Wide Web (WWW), Editing and Formatting a document	06
5	Database, concepts and types, creating database	05
6	Introduction to Computer C-Programming language, concepts and standard input/output operations	08
7&8	Introduction to ICT and uses in agriculture	08
9&10	. Introduction to Computer-controlled devices (automated systems) for Agri-input management,	08
11 &12	Smartphone apps in Agriculture.	10
13	Introduction to Bioinformatics and Omics database NCBI	10

Lecture No	Topic	Weightage (%)
14	searching and accessing genome sequences and protein sequences	10
15	Introduction to GIS and its applications in Agriculture	10
16	Introduction to MIS and Decision Support System and its applications in Agriculture.	10
	Total	**100**

Practical

Exercise	Title of exercise
1&2	Introduction of different operating systems such as DOS and WINDOWS.
3	Creating Files & Folders
4	Introduction of programming languages
5&6	Use of MS-WORD for creating, editing and presenting a scientific Document
7&8	MS Power-point for creating, editing and presenting a scientific Document
9&10	MS-EXCEL – Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data
11&12	MS-ACCESS: Creating Database, preparing queries and reports
13	demonstration of Agri-information system
14	Introduction to World Wide Web (WWW)
15	Demonstration of HTML page design of e-Agriculture.
16	Omics database of NCBI searching and accessing genome sequences and protein sequences, alignment of two genome sequences and alignment of two protein sequences

Suggested readings

1. Computer Fundamentals By Sinha
2.ICT in agriculture A Clear and Concise Reference (English, Paperback, By Blokdyk Gerardus)
3. C PROGRAMMING IN BASIC Paperback – by E Balagurusamy
4. Information Technology -TPS Publication by Shweta Jawale.

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Course	AGRO 111	Credit:3(2+1)	Semester: I
Course title	Introduction to Agronomy and Crop Production Technology		

Syllabus

Theory:

Agriculture**,** Agronomy and their scope, tillage and tilth, crop density and geometry, factors affecting growth and development, crops and cropping systems, crop rotation and its principles, manures and fertilizers, irrigation, water resources, crop water requirement, water use efficiency, irrigation-scheduling criteria and methods, quality of irrigation water, drainage. Weeds- importance, classification, crop weed competition, concepts of weed management- principles and methods, herbicides. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops *Viz...* Rice, maize, sorghum, pearl millet, pigeon pea, mung bean, cowpea, urd bean, groundnut, soybean and sesamum. *Rabi* crops *Viz...* Sorghum, wheat, chickpea, safflower, linseed, rapeseed and mustard, sunflower, sugarcane, cotton, tobacco and chilli.

Practical:

Identification of crops, seeds, fertilizers, herbicides and tillage implements, Use of tillage implements – reversible plough, oneway plough, harrow, leveler, seed drill, Identification of weeds in crops, Methods of herbicide and fertilizer application, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Methods of irrigation. Rice nursery preparation and transplanting, methods of sowing. Study of morphological characteristics of *Kharif* and *Rabi* crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of *Kharif* and *Rabi* season crops, yield and juice quality analysis of sugarcane and visit to research centers of related crops.

Teaching Schedule
Theory

Lecture No.	Topic	Weightage (%)
1	Agriculture, Agronomy, its definition, scope, role of Agronomist and relationship of Agronomy with other sciences.	12
2	Tillage, its definition, objects of tillage, types of tillage, tillage implements and factors affecting tillage, Effect of tillage on soil and crop growth.	
3	Tilth: its definition, characteristics and ideal tilth, Modern concepts of tillage, minimum, zero and stubble mulch tillage, importance of puddling.	
4	Crop density and geometry, factors affecting growth and crop development	10
5	Cropping systems, crop rotation and its principles.	
6	Def. of manures and fertilizers, Role of plant nutrients in crop production, Importance of manures and fertilizers and its classification.	12
7	Methods and time of application of manures, fertilizers and green manuring. Nutrient use efficiency, meaning and factors affecting nutrient use efficiency.	

8	Irrigation meaning, water resources of India, crop water requirement.	12
9	Water use efficiency. Irrigation Efficiencies and factors affecting it.	
10	Criteria for scheduling of irrigation, Methods of irrigation, advantages, disadvantages.	
11 & 12	Water Quality parameters, Drainage, Concept and importance, type of drainage, Factors affecting of drainage.	
13	Weeds, its definition, characteristics of weeds, merits and demerits of	12

	weeds, classification of weeds, meaning of crop weed competition and its period in different crops.	
14	Principles and methods of weed management viz., cultural, mechanical, chemical, biological weed control methods and integrated weed management.	
15	Classification of herbicides, its selectivity and resistance, Allelopathic effect of weed.	
16	Production technology of kharif crop rice. (Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield)	8
17	Production technology of kharif crop Maize.	4
18	Production technology of kharif crops Sorghum and Pearl millet.	4
19	Production technology of kharif crops Pigeon pea and Mung bean.	4
20	Production technology of kharif crops Cowpea and Urd bean.	
21	Production technology of kharif crop Groundnut.	4
22	Production technology of kharif crops Soybean and Sesamum.	
23	Production technology of *rabi* crops Sorghum.	
24	Production technology of *rabi* crops Wheat and Chickpea.	8
25	Production technology of *rabi* crops Safflower and Linseed.	
26	Production technology of *rabi* crops Rapeseed and Mustard.	2
27	Production technology of *rabi* crop Sunflower.	
28	Production technology Sugarcane.	8
29 & 30	Production technology crops Cotton.	
31 & 32	Production technology of Tobacco.	
	Total	100

Practical

Exercise	Title of exercise
1	Identification of crops, seeds, fertilizers and herbicides.
2	Identification of tillage implements, use of tillage implements – reversible plough, one way plough, harrow, leveler and seed drill.
3	Identification of weeds in crops.
4	Methods of herbicide and fertilizer application.
5	Numerical exercises on fertilizer requirement.
6	Numerical exercises on calculation of plant population.
7	Numerical exercises on calculation of herbicide requirement.
8	Numerical exercises on calculation of water requirement.
9	Study methods of irrigation.
10	Rice nursery preparation and transplanting, methods of sowing.
11	Study of morphological characteristics of *Kharif* crops.
12	Study of morphological characteristics of *Rabi* crops.
13	Study of top dressing and foliar feeding of nutrients.
14	Study of yield contributing characters and yield calculation of *Kharif* and *Rabi* season crops.
15	Yield and juice quality analysis of sugarcane.
16	Visit to research centers of related crops.

Suggested Readings:

1) Chhidda Singh, Modern techniques of raising field corps. Oxford and IBH Publishing Co. Ltd., Bangalore.
2) Gopal Chandra De. 1980., Fundamentals of Agronomy. Oxford and IBH Publishing Co. Ltd., Bangalore.
3) Hand book of Agriculture, ICAR Publication.
4) Palaniappan, S.P., Cropping Systems in the tropics – Principles and Practices.Willey Eastern Ltd., New Delhi.
5) Panda, S.C., 2006.Agronomy Agribios Publication, New Delhi.
6) Reddy, S.R. Principles of Agronomy Kalyani Publishers, Ludhiana, India.
7) Sankaran, S and Subbiah Mudliyar, V.T., 1991. Principles of Agronomy. The Bangalore Printing and Publishing Co. Ltd., Bangalore.
8) Vaidya, V.G., Sahasrabuddhe, K.R. and Khuspe, V.S. Crop production and field experimentation. Continental Prakashan, Vijaynagar, Pune.
9) Rao V.S. (2006), Principles of Weed Science. Oxford and IBH Publishing Co., New Delhi, India.
10) Gupta, O.P. (2008), Modern Weed Management Agribios India Publication.
11) Irrigation Water Managemnt by Dilip Kumar Muzumdar
12) Principles and Practices of Water Management by A. M. Michel
13) Irrigation and Drainage by Lenka D.

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Course	**ASDS-111**	**Credit:**	2(1+1)	**Semester- I**
Course title	**Livestock, Poultry and Fish Production Management**			

Syllabus

Theory:

Role of livestock and poultry in the national economy. Important Indian and exotic breeds of cattle, buffalo, sheep, goat and poultry. Housing principles, space requirements for different species of livestock and poultry. Feed ingredients Feed supplements and feed additives for livestock and poultry ration. Preparation of concentrate mixture. Conservation and enrichment of fodder. Reproduction in farm animals and poultry. Artificial insemination and its importance. Feeding and management of calves, heifers, pregnant and milch animals. Incubation, hatching and brooding in poultry. Management of broilers, growers, layers and backyard birds. Management of sheep and Goats. Prevention, vaccination schedule and control of important diseases of livestock and poultry. Marketing and economics of livestock and poultry. Fisheries resources of India and importance of inland fisheries Commercial cultivation, important fishes and their production.

Practical: Introduction to University Livestock Farms and Common Terminologies of Animal Sciences. Study of external body parts of livestock. Study of different breeds of Indian and Exotic Livestock. Study of Housing for Livestock. Handling and restraining of animals. Estimation of age of animals. Methods of identification of animals. Judging and culling of animals. Physiology of Lactation; Physical and Chemical properties of Milk, Clean Milk

Production. Estimation of Specific gravity of milk. Estimation of Fat of milk. Estimation of total solids and SNF of milk. Estimation of milk adulterants and Preservatives. Study of reproductive system of hen, formation of egg, egg structure and chemical composition. Study of common feeds and fodder. Conservation of Fodder and computation of ration for livestock. Common equipment used in livestock farms. Importance of Records in Livestock. Economics of Livestock Units. Visit to Fish ponds to study fish production.

Teaching Schedule
Theory

Lecture No.	Topic name	Weightage %
1	Role of livestock and poultry in the national economy.	4
2&3	Important Indian and exotic breeds of cattle, buffalo, sheep, goat and poultry.	8
4	Housing principles, space requirements for different species of livestock and poultry.	6
5	Feed ingredients Feed supplements and feed additives for livestock and poultry ration.	8
6	Preparation of concentrate mixture. Conservation and enrichment of fodder	6
7	Reproduction in farm animals and poultry.	8
8	Artificial insemination and its importance.	8
9	Feeding and management of calves, heifers, pregnant and milch animals.	8
10	Incubation, hatching and brooding in poultry.	4
11	Management of broilers, growers, layers and backyard birds.	4
12	Management of sheep and Goats.	8
13	Prevention, vaccination schedule and control of important diseases of livestock and poultry.	4
14	Marketing and economics of livestock and poultry.	8
15	Fisheries resources of India and importance of inland fisheries	8
16	Commercial cultivation, important fishes and their production.	8
	Total	**1OO**

Practical:

Exercise No.	Title of exercise
1	Visit to University Livestock Farms and Common Terminologies of Animal Sciences
2	Study of external body parts of livestock.
3	Study of different breeds of Indian and Exotic Livestock.
4	Study of Housing for Livestock.
5	Handling and restraining of animals.
6	Estimation of age of animals.
7	Methods of identification of animals.
8	Judging and culling of animals.
9	Physiology of Lactation; Physical and Chemical properties of Milk, Clean Milk Production.
10	Estimation of Specific gravity of milk. Estimation of Fat of milk. Estimation of total solids and SNF of milk.
11	Estimation of milk adulterants and Preservatives.
12	Study of reproductive system of hen, formation of egg, egg structure and chemical composition.
13	Study of common feeds and fodder. Conservation of Fodder and computation of ration for livestock.
14	Common equipment used in livestock farms
15	Importance of Records in Livestock. Economics of Livestock Units.
16	Visit to Fish ponds to study fish production.
	Total

Suggested Readings

1. Livestock and poultry Production – Harban Singh and Moore, E. N. (1968)
2. Goat, Sheep and Pig Production and Management – Jagdish Prasad, (1996), Kalyani Publishers 1/1, Rajinder Nagar, Ludhiana
3. Dairy Bovine Production – Thomas, C. K. and Sastri, N.S.R., Kalyani Publishers, 1/1, Rajender Nagar, Ludhiana.
4. Text-Book of Buffalo Production – Ranjhan, S. K. and Pathak, N. N. (1979) Vikas Publishing House Pvt. Ltd., 576, Masjid Road, Jangpura, New Delhi
5. Text Book of Animal Husbandry – G. C. Banergee (1999), 9th ed Oxford and IBH Publishers, New Delhi.

Course	EXTN-111	Credit:	2(0+2)	Semester- I
Course title	Rural Sociology, Educational Psychology &Constitution of India			

Syllabus

Practical:

Sociology and Rural sociology: Definition and scope, its significance in agriculture extension, Social Ecology, Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development. Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence.

Constitution of India: Meaning, Preamble and Characteristics of Constitution of India. Fundamental Rights and Duties. Directive Principles of State Policy. Constitutional provisions for welfare of SCs and STs, Minorities, Women and Children. Union Executive: President, Vice-President, Prime Minister, Council of Ministers – Powers and Functions. Parliament and Supreme Court of India – Powers and Functions. State Executive: Governor, Chief Minister, Council of Ministers. Legislature and Judiciary: Powers and Functions; Electoral Process; Human Rights Commission – Structure, Powers and Functions.

Practical:

Exercise No.	Title of exercise
1	Study of Sociology
2	Study of Rural Sociology
3	Study of Indian Rural Sociology
4	Study of Social Group
5	Study of Social Stratification
6	Study of Cultural Concepts
7	Study of Social Values and Attitudes
8	Study of Social Institutions
9	Study of Social control
10	Study of Leader
11	Study of Psychology and Educational Psychology
12	Study of Behavior
13	Study of Intelligence
14	Study of Personality
15	Study of Teaching – Learning Process
16	Study of Perception
17	Study of Motivation
18	Constitution of India: Meaning, Preamble and Characteristics of Constitution of India.
19	Fundamental Rights and Duties.
20	Directive Principles of State Policy.
21	Constitutional provisions for welfare of SCs and STs, Minorities,
22	Constitutional provisions for welfare of Women and Children.

23	Union Executive: President, Vice-President, Prime Minister, Council of Ministers – Powers and Functions.
24	Parliament and Supreme Court of India – Powers and Functions.
25	State Executive: Governor, Chief Minister, Council of Ministers. Legislature and Judiciary: Powers and Functions
26	Electoral Process;
27	Human Rights Commission – Structure, Powers and Functions.

Suggested Readings:

1) Ray, G.L. (2003), Extension Communication and Management, KalyaniPubulishers Fifth revised and enlarged edition.
2) Dahama, O.P.andBhatnagar, O.P. (2003). Education and Communication for development, Oxford and IBH Publishing Co. Pvt. Ltd.
3) Sandhu, A.S. (1993) Textbook on Agricultural Communication: Process and Methods Oxford and IBH Publishing Co. Pvt. Ltd.
4) Chintambar, J.B. (2008) Introductory Rural Sociology. New Age International (P. Limited)

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Course	**ECON-111**	**Credit: 2 (2+0)**	**Semester: I**
Course title	**Fundamentals of Agricultural Economics**		

Syllabus

Theory:

Agricultural Economics: Meaning, definition, characteristics of agriculture, Nature and scope of agricultural economics, Distinction between agriculture and industry, Role of agriculture in economic development, Role of government interventions in agricultural development. Planning and Agricultural Development: Meaning and objectives economic planning, benefits of planning, Agricultural development during different Five Year Plans in India, Measures of reorganization of agriculture and NITI Aayog.

Factors of production: Meaning of land and its characteristics, Labour concept, characteristics of labour and efficiency of labour, Capital concept and its characteristics, forms of capital in agriculture and process of capital formation, Organization of business firms, forms of business organizations and their characteristics. Land reforms: Land reforms and Land tenure systems, Concepts of agricultural land holdings in India. Theory of production: Meaning, definition, types of production functions, Laws of Diminishing Marginal Returns and Elasticity of production. Scale of production: Meaning, classification and economies of scale.

Theory of costs: Meaning, definitions and different types of costs and their measurement.

Revenue concept: Total revenue, average revenue and marginal revenue and profit maximization.

Teaching Schedule

Theory

Lectures No	Topics	Weightage (%)
1	Agricultural Economics: Meaning, definition, characteristics of agriculture	6
2&3	Nature and scope of agricultural economics,	8
4	Distinction between agriculture and industry	2
5	Role of agriculture in economic development	4
6	Role of government interventions in agricultural development	4
7&8	Planning and Agricultural Development: Meaning and objectives economic planning, benefits of planning,	6
9,10,11 &12	Agricultural development during different Five Year Plans in India,	8
13	Measures of reorganization of agriculture	2
14&15	NITI Aayog.	8
16	Factors of production: Meaning of land and its characteristics,	2
17	Labour concept, characteristics of labour and efficiency of labour,	2
18&19	Capital concept and its characteristics, forms of capital in agriculture and process of capital formation,	2
20&21	Organization of business firms, forms of business organizations and their characteristics.	2
22	Land reforms: Land reforms	2
23	Land tenure systems	2
24	Concepts of agricultural land holdings in India	4
25	Theory of production: Meaning, definition,	4
26	types of production functions,	4
27	Laws of Diminishing Marginal Returns	6
28&29	Elasticity of production	6
30	Scale of production: Meaning, classification and economies of scale.	4
31	Theory of costs: Meaning, definitions and different types of costs and their measurement.	6
32	Revenue concept: Total revenue, average revenue and marginal revenue and profit maximization.	6
	Total	100

Suggested readings:

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.

3.M.L. Jhingan The economics of development and planning

4. Amarjit Singh ,sadhu ,Jasbir singh Fundamentals of Agriculture Economics

5. Dewett K. K.,J. D. Verma. Elementary Economic theory, S. Chand Publication, Delhi.

6. Subba Reddy Agricultural Economics, Oxford and IBH Publication

7.Websites-niti.gov.in

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Course	BM-111	Credit: 3 (2+1)	Semester: I
Course title	Principles of Management and Organizational Behaviour		

Syllabus

Theory:

Introduction to Management-Management functions -Management levels-Managerial roles-Management skills-Role of management. Evolution of management thought.

Functions of management: Planning: Nature and importance- types of planning -Steps in planning -Decision making-meaning-types of decisions.

Organizing- meaning-nature and purpose of organizing-Principles of organizing-Organization structure -Managing Human Resources- human resource planning- recruitment- sources of recruitment -Selection- steps in the selection process- Orientation -Training -Management development programmes.

Leading- meaning -Leadership theories -Motivation-Meaning and purpose-Motivational theories-Communication-meaning-objectives-importance-types-barriers.

Controlling-meaning and nature of controlling-essential elements of controlling. Ethics and corporate social responsibility in business.

Organizational Behaviour- definition, importance, historical background of Organizational Behaviour, challenges- the organizational context-Environment –Technology-

Learning- importance of learning-Process-approaches to learning-the learning organization.

Personality-defining personality-types and traits-personality types-the big five-the development of the self-selection methods-

Perception- meaning, selectivity and organization-perceptual sets and perceptual worlds- factors influencing perception and shortcuts in judging others –

Group Dynamics - meaning, need for joining groups, stages of group development and group decision making techniques. Teams-types, difference between teams and groups. Managing conflicts. Work stress – Types and management strategies. .Organizational culture – Definition and creating a culture in organization. Organizational change

Practical:

Study of management structure and organizational pattern of selected business units. Preparation, analysis and presentation of case studies.

Teaching Schedule
Theory

Lecture	Topic	Weightage (%)
1,2 & 3	Introduction to Management-Management functions -Management levels-Managerial roles-Management skills-Role of management.	12
4	Evolution of management thought.	4
5 & 6	Functions of management: Planning: Nature and importance- types of planning -Steps in planning -Decision making-meaning-types of decisions.	8
7,8,9 & 10	Organizing- meaning-nature and purpose of organizing-Principles of organizing-Organization structure -Managing Human Resources-human resource planning- recruitment- sources of recruitment -Selection- steps in the selection process- Orientation -Training -Management development programmes.	12
11 & 12	Leading- meaning -Leadership theories -Motivation-Meaning and purpose-Motivational theories-Communication-meaning-objectives-importance-types-barriers.	8
13 & 14	Controlling-meaning and nature of controlling-essential elements of controlling. Ethics and corporate social responsibility in business.	8
15 & 16	Organizational Behaviour- definition, importance, historical background of Organizational Behaviour, challenges- the organizational context-Environment –Technology-	8
17 & 18	Learning- importance of learning-Process-approaches to learning-the learning organization.	8
19 & 20	Personality-defining personality-types and traits-personality types-the big five-the development of the self-selection methods	8
21 & 22	Perception- meaning, selectivity and organization-perceptual sets and perceptual worlds- factors influencing perception and shortcuts in judging others –	8

23	Group Dynamics - meaning, need for joining groups, stages of group development and group decision making techniques.	4
24	Teams-types, difference between teams and groups.	4
25	Managing conflicts. Work stress – Types and management strategies. .	4
26	Organizational culture – Definition and creating a culture in organization. Organizational change	4
	Total	100

B) Practical:

Exercise	**Topic**
1	Study of various business models in agri-business.
2	Case study of management structure of selected business unit-I
3	Case study of management structure of selected business unit-II.
4	Case study of organizational pattern of selected business unit-I
5	Case study of organizational pattern of selected business unit-II.
6	Preparation of case study-I.
7	Preparation of case study-II.
8	Analysis of case study-I.
9	Analysis of case study-II.
10	Presentation of case study-I.
11	Presentation of case study-II.
12	
13	
14	
15	Study of management structure and organizational pattern of selected business units. Preparation, analysis and presentation of case studies.

Suggested Readings:

1. K.Loknandhan, K.Mani, K.Mahendran Innovations in AB
2. D.K.Tripathi Principles& Practices of Management.

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Course No:	MKT -111	Credit 3 (2+1	Semester : I
Course Title	Grading, Standardization and Quality Management in Agri- food Products		

Theory: **Evolution of markets**- meaning of market, marketing,
Significance / need of Agril. Marketing, creation of utilities.
Classification of markets.
Marketing functions- Physical functions, exchange functions and facilitative functions. **Grading and standardization** meaning-Significance of grading and standardization. Types of grading- fixed grading/mandatory grading, permissive/variable grading, centralized grading/decentralized grading and Grading at producers' level. Criteria for grade standards and advantages of grading. Role of grading in Agril. Products The agricultural produce (Grading and Marketing) Act, 1937. Quality control of Agril. Products
AGMARK standards, the role of
DMI in grading of Agril. Produce, Inspection and quality control, labeling in Agril. Products.
Grading of food grains- grading of
Rice commercial classification, based on physical characteristics, cooking quality of rice, Rice grading by **AGMARK.** Special characteristics, general characteristics, safety parameters, determination of quality of rice. Impurities refractions of food grains foreign matter- organic and inorganic, admixtures, damaged and discolored grains, slightly damaged grains and immature and shriveled grains, Chalky, weevils, broken, fragments, other food grains, non-food grains, Smutty grains, whole grains. Inherent and acquired characteristics of food grains.
Wheat- quality characteristics of wheat varieties Wheat- strong wheat flour, medium and medium flour, kinds of wheat. **AGMARK** quality specifications for wheat, safety parameters and determination of quality of wheat.
FAQ standards for Rice, **Wheat, Ragi, Maize.**
Grading of Pulses AGMARK standards for Green gram (moong), Red gram (tur dal), Bengal gram, Black gram (urad dal), Rajma, Peas, Masoor (lentils), Matki (moth) Grading of **oil seeds: Groundnut**, **Sunflower. AGMARK** standards of oil seeds. Commercial classification of Groundnut- Coramandal, Bold, Red natal and Peanuts. Grading of pods and kernels of groundnut. AGMARK grade designation of quality of edible oil. Grading of commercial crops- special and general characteristics of Areca nut, copra, Tobacco and Cotton, chilli
Classification and grading of vegetables Cole, Tuber, Pod, Salad, Root and Bulb vegetables.
Grading of fruits-
Tropical fruits, Mango, Banana, Citrus, Grapes, Sapota and Pomegranate.
Temperate fruits: Apple, Pears, Plums, Apricots and Peaches.
Quality control of manufactured products
Indian standards Institution (ISI): aims and objectives of ISI, granting licenses for ISI,
Bureau of Indian Standards (BIS), management systems certification. Spot exchange grade requirements, Mark to identify vegetarian/non vegetarian food, Eco mark. Mark of FPO and ISO standards Quality control in food- food hygiene, food adulteration and food poisoning Good Agril. Practices, good manufacturing practices.
EUREPGAP Quality management in food: FSS Act 2006,
Hazard Analysis and Critical Control Point (HACCP),
Codex Alimentarius commission (CODEX)

Fair Average Quality (FAQ) General Characteristics and grade designations of processed food- Jaggery, instant food, fruits and vegetables products.

Practical: Study of laboratory equipments Sampling equipments ,scientific grading instruments and other apparatus ,Visit to vegetable , fruit , flowers, food grains, Pulses , oil seeds markets, Grading and standardization of food grains, Grading and standardization of Pulses, Grading and standardization of oil seeds, Grading and standardization of vegetables, Grading and standardization of fruits, Grading and standardization of flowers, Visit to Jaggery market and other food processing units. EUREP GAP Quality management in food: FSS Act 2006, Visit to Bureau of Indian Standards.(BIS) , Hazard Analysis and Critical Control Point (HACCP), Fair Average Quality (FAQ), Codex Alimentarius commission (CODEX) , Presentations and Group discussions & Report Writing for the above topics.

Teaching Schedule

Lecture No.	Topic	Sub Topic	Weightage (%)
1& 2	**Evolution of Markets**	Meaning of Market, Marketing,	5
3&,4	**Agril. Marketing**	Concept of marketing – Old concept, New concept and Modern concept. Significance Need of Agril. Marketing, creation of utilities.	10
5 & 6	**Classification of markets. Marketing functions**	Physical functions, exchange functions and facilitative functions. Classification of markets. Marketing functions	10
7, 8 & & 9	**Grading**	Meaning-Significance of grading and. Types of grading- fixed grading/mandatory grading, permissive/variable grading, centralized grading/decentralized grading and Grading at producers' level. and advantages of grading. Role of grading in Agril. Products The agricultural produce (Grading and Marketing) Act, 1937.	10
10 & 11	**Standardization**	meaning-Significance, standardization Criteria for standards Quality control of Agril. Products Standards, the role of DMI in grading of Agril. Produce, Inspection and quality control, labeling in	5

Lecture No.	Topic	Sub Topic	Weightage (%)
		Agril. Products	
12 &13, 14	**AGMARK Grading of food grains specifications for Rice**	.Commercial classification, based on physical characteristics, cooking quality of rice, Rice grading by **AGMARK.** Special characteristics, general characteristics, safety parameters, determination of quality of rice. Impurities refractions of food grains foreign matter- organic and inorganic, admixtures, damaged and discolored grains, slightly damaged grains and immature and shriveled grains, Chalky, weevils, broken, fragments, other food grains, non-food grains, Smutty grains, whole grains. Inherent and acquired characteristics of food grains.	5
15 & 16,17	**AGMARK specifications for wheat**	quality specifications for wheat, safety parameters and determination of quality of wheat. FAQ standards for, Wheat,& Ragi,& Maize.	5
18 & 19,	**Grading of Pulses AGMARK**	standards for Green gram (moong), Red gram (tur dal), Bengal gram, Black gram (urad dal), Rajma, Peas, Masoor (lentils), Matki (moth) Peanuts. Coramandal,	5
20 & 21	**standards of oil seeds AGMARK**	Grading of oil seeds: .standards of oil seeds. Commercial classification of Groundnut, Sunflower Groundnut- and Grading of pods and kernels of groundnut. grade designation of quality of edible oil	5
22 & 23	**Grading of commercial crops- AGMARK**	. Grading of commercial crops- special and general characteristics of Areca nut, copra, Tobacco and Cotton, chilli	10
24.	**Classification and grading of Cole vegetables**	Tuber, Pod, Salad, Root and Bulb vegetables. Grading of vegetables	
25	**Grading of Temperate fruits**	Apple, Pears, Plums, Apricots and Peaches. Quality control of manufactured products	5
26	**Grading of Tropical fruits**	Tropical fruits, Mango, Banana, Citrus, Grapes, Sapota and Pomegranate	

Lecture No.	Topic	Sub Topic	Weightage (%)
27	**Certification**	Management Systems Certification. Spot exchange grade requirements Mark to identify Vegetarian / Non Vegetarian Food, Eco mark. Mark of FPO	5
28	**BIS**	Bureau of Indian Standards (BIS)	10
29	**ISI**	Indian standards Institution (ISI)	
30	**Quality control in food**	Food Hygiene, Food Adulteration and Food Poisoning Good Agril. Practices, good: FSS Act 2006	
	HACCP	Hazard Analysis and Critical Control Point (HACCP)	
31	**FAQ**	Fair Average Quality (FAQ)	10
	CODEX	Codex Alimentarius commission (CODEX)	
	EUREP GAP	manufacturing practices. EUREPGAP Quality management in food	
32	**Quality Management**	General Characteristics and grade designations of processed food- Jaggery, instant food, fruits and vegetables products.	
		Total	**100**

Practical Exercises

Exercise	Title of exercise
1	Study of laboratory equipments Sampling equipments ,scientific grading instruments and other apparatus
2	Visit to vegetable , fruit , flowers, food grains, Pulses , oil seeds markets
3	Grading and standardization of food grains
4	Grading and standardization of Pulses
5	Grading and standardization of oil seeds
6	Grading and standardization of vegetables
7	Grading and standardization of fruits
8	Grading and standardization of flowers
9	Jaggery market and other food processing units.
10	EUREP GAP Quality management in food: FSS Act 2006
11	Visit to Bureau of Indian Standards.(BIS)
12	Hazard Analysis and Critical Control Point (HACCP
13	Fair Average Quality (FAQ)
14	Codex Alimentarius commission (CODEX)
15	Presentations and Group discussions &for the above topics
16	Report Writing for the above topics

Suggested references

1. Acharya, S.S. and Agarwal, N.L., Agricultural Marketing in India
2. Agricultural Economics, Kalyani Publications
3. Ruddra Dutt and Sundharam K.P .M., Indian Economics
4. Ramkishen Y .Rural &Agriculture Marketing

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Course :	LANG 111	**Credit:**	2(0+2)	**Semester-I**
Course title:	Comprehension & Communication Skills in English			

Syllabus

Practical

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

Teaching Schedule

Practical

Exercise	**Topic**
1&2	Education
3	Employment
4	Unemployment
5&6	Application
7&8	Planning
9	Curriculum Vitae
10&11	Interview
12&13	Reporting
14&15	General Knowledge
16&17	Stress
18	Short Story
19&20	Environment
21	Computeracy
22	A Dilemma
23	Entertainment
24&25	You and Your English
26	Usage and Abusage
27	War Minus Shooting
	Total

Suggested Readings:

1) Krishnaswamy,. N and Sriraman, T. 1995. Current English for

Colleges. Macmillan India Ltd. Madras.
2) Balasubrmanyam M. 1985. Business Communication. Vani

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

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Course :	PEYP- 111	**Credit:**	1(0+1)	**Semester-I**
Course title:	Physical Education and Yoga Practices			

Syllabus

Physical Education (Practical)

Introduction to physical education definition, objectives, scope, and importance; physical culture; Warming up - Need and requirement of first aid.Meaning and importance of Physical Fitness and Wellness; Physical fitness components -speed, strength, endurance, power, flexibility, agility, coordination and balance;Methods of Training; aerobic and anaerobic exercises; weight training, circuit training, Interval training, Fartlek training;

Skill of Volleyball, Rules & Regulation, Advance Skill of Volleyball, Specific Warming up,Skill of Football Rules & Regulations, Advance Skill of Foot ball & Specific Warming up, Skill of Kabaddi Rules & Regulations. Advance Skill of Kabaddi, Skill of Kho-Kho, Rules & Regulations. Advance Skill of Kho-Kho, & Specific Warming up,

Yoga (Practical)

Yoga- History, Meaning and importance, Role of yoga in life.Asans and indigenous way for physical fitness, and curative exercise.Introduction

to asanas and its importance, pranayama, meditation and yogic kriya.Omkar, Yogic Suksma vyayamas,

Yogasan- Asanas in Standing posture (Tadasana, Vrikshasana, Padahastasana, Ardha- Chakrasana, Trikonasana), Sitting postures (Asanas viz: Bhadrasana, Vjrasana, Ardha- Ustrasana, Ushtrasana, sasakasana and Vakrasana), Prone postures (Makarasana, Bhujangasana and Salabhasana) and Supine posture (Setubandhasana, uttanapadasana, Ardha-halasana, and Pavanamuktasana, Shavasana),

Suryanamaskar, Yognidra, Kapalbhati, Pranayam, Meditation in different mudras

Teaching Schedule (Practical)

Exercise	Topic	Weightage (%)
1	Introduction to physical education definition, objectives, scope, and importance; physical culture; Warming up - Need and requirement of first aid.	04
2	Meaning and importance of Physical Fitness and Wellness; Physical fitness components -speed, strength, endurance, power, flexibility, agility, coordination and balance; Methods of Training; aerobic and anaerobic exercises; weight training, circuit training, Interval training, Fartlek training;	06
3	Skill of Volleyball, Rules & Regulation, Advance Skill of Volleyball, Specific Warming up,	06
4	Skill of Football Rules & Regulations, Advance Skill of Foot ball & Specific Warming up	06
5	Skill of Kabaddi Rules& Regulations. Advance Skill of Kabaddi, Skill of Kho-Kho, Rules & Regulations. Advance Skill of Kho-Kho, & Specific Warming up	10
6	Skill of Basket ball Rules & Regulation, Advance skill of Basket ball & Specific warming up	06
7	Skill of Table tennis, Rules & Regulations, Advance skill of Table tennis. Sikll of Badminton, Rules & Regulations. Advance skill of Badminton, Specific Warming up.	06

8	Skill of Athletics, Long and Short Distance running, Sill of Athletics Jumping events, Throwing events	06
9	Yoga- History, Meaning and importance, Role of yoga in life	06
10	Omkar, Yogic kriya, Yogic Suksma vyayamas	06
11	Yogasana- in Standing posture (Tadasana, Vrikshasana, Padahastasana, Ardha-Chakrasana, Trikonasana),	06
12	Yogasana- in Sitting postures (Asanas viz: Bhadrasana, Vjrasana, Ardha-Ustrasana, Ushtrasana, sasakasana and Vakrasana)	07
13	Yogasana- in Prone postures (Makarasana, Bhujangasana and Salabhasana)	06
14	Yogasana- in Supine posture (Setubandhasana, Uttanapadasana, Ardha-halasana, and Pavanamuktasana, Shavasana)	06
15	Suryananskars, Yognidra	06
16	Kapalbhati,Pranayam, Meditation in different mudras,	07
	Total	**100**

Suggested Reading:

1) O.P. Aneja. Encyclopedia of Physical education, sports and exercise science (4 volumes).
2) Anil Sharma. Encyclopedia of Health and Physical Education (7 Volumes).
3) N V Chaudhery, R Jain. Encyclopedia of Yoga Health and Physical Education (7 Volumes).
4) Pintu Modak, O P Sharma, Deepak Jain. Encyclopedia of Sports and Games with latest rules and regulations (8 volumes).
5) Physical Education And Recreational Activities by Deepak Jain, Year of Pub.: 2011
6) Dimensions of Physical Education by Anil Sharma, Year of Pub.: 2011
7) Physical Fitness by Vijaya Lakshmi Year of Pub.: 2005
8) Research Process In Physical Education And Sports: An Introduction by K.G. Jadhav, Sachin B. Pagare and Sinku Kumar Singh, Year of Pub.: 2011
9) Sports Training And Biomechanics In Physical Education by Sinku Kumar Singh Year of Pub.: 2011
10) Test, Measurement and Evaluation in Physical Education by P. L. Karad Yearof Pub.: 2011
11) Foundations of Physical Education, Exercise Science, and Sport by Deborah A. Wuest,Charles A. Bucher
12) Light on Yoga by B. K. S Iyangar, Publication: Schocken, Edn. 31st : 1995,

13) The Key Muscles of Hatha Yoga by Ray Long, Publication: Bandh Yoga, Edn.; 3rd: 2006
14) Hatha Yogas Pradipika by Yogi Swatmarama, Publishcation: Bihar School of Yoga, Edn. 26th :1998
15) Yoganidra by swami saraswati, pblication, yoga publication trust, munger, edn 3rd 1976
16) Yog Darshan of Patanjali by Harikrishna Das Goyenka, Publication: Geeta Press Gorakhpur, Year: 2013
17) Patanjali Yogasutras by Swami Premeshanand, Publication: Advaita Asharm, Edn.: 2015.

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Course :	BIO 111	**Credit:**	2(1+1)	**Semester-I**
Course title:	Introductory Biology			

Syllabus

Teaching Schedule (Theory)

Lecture No.	**Topic**	**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*. A) Brassicaceae, B) Fabaceae, C) Poaceae	15

16	Role of animals in agriculture.	5
	Total	**100**

Practical

Exercise	Title of exercise
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	Internal structure of root, stem and leaf of monocot and dicot plants.
13	Description of plant belongs to family Brassicacea. viz. Mustard/ Cabbage/ Cauliflower/ Radish. (Any one)
14	Description of plant belongs to family Fabaceae. viz. Pigeon pea/ Pea/ Cowpea/ Wal. (Any one)
15	Description of plant belongs to family Poaceae. viz. Rice/ wheat/ Jowar/ Maize. (Any one)

Suggested Readings:

1) Cell Biology, Genetics, Molecular Biology and Evolution by P.S. Verma, V.K. Agrwal. **Publisher**- S. Chand and Company Ltd. Ram Nagar New Delhi.
2) Evolution of Vertebrates by Edwin H. Colbert, Publisher- A Wiley, Interscience Publication, John Wiley and Sons New York.
3) A class- book of Botany by A.C. Dutta, Publisher- Oxford University press YMCA Library Building. 1 Jai Singh Road, New Delhi 110001, India
4) Fundamentals of Genetics by B.D. Singh, Publisher- Kalyani Publishers B-I/1292, Rajinder Nagar, Ludhiana- 141008
5) A Text book of Practical Btoany-2 by Dr. Ashok M. Bendre, Dr. Ashok Kumar, Publisher- Rastogi Publications Shivaji Road, Meerut – 25002, India
6) Botany- An introduction to Plant Biology by Jamesh D. Mauseth, Publisher- Continental Prakashan 1962, Pune
7) Anatomy of seed Plants by A.C. Datta, Sigh V. Pande P.G, Publisher- Sai printopack New Delhi Rastogi, Publication Meerut

Course :	MATH 111	Credit:	2(1+1)	Semester-I
Course title:	Elementary Mathematics			

Syllabus

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 for internal 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 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.

Circle – Definition of circle, various forms of equation of circle i.e. centre-radius form, standard form, three point form, diameter form and General form.

Mensuration- Illustration of ordinates of curve and common distance between ordinates, Statement of Simpson's $1/3^{rd}$ 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 on continuity.

Differential Calculus-Definition of Derivatives, Differentiation of simple functions(Formulae's), Derivatives of Sum ,difference, product and quotient of two functions(statement only), Differentiation of function of function(statement only), simple 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 Definite Integral, Examples based on it, Area under simple well-known curves.(simple problem based on it.)

Teaching Schedule (Theory)

Lecture No	Topics	Weightage (%)
1,2	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.	11
3	Definition of determinant as a function of square matrices, evaluation of determinant of second and third order only. Properties of determinants.	06
4,5	Distance Formula, Section Formula, Section formula for internal division, Section formula for External division.(Without proofs).	11
6,7	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	Definition of circle, various forms of equation of circle i.e. centre-radius form, standard form, three point form, diameter form and General form.	11
10,11	Illustration of ordinates of curve and common distance between ordinates, Statement of Simpson's $1/3^{rd}$ Rule(Without proof), Examples based on Simpson's rule.	11
12,13	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	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.	16
17	Definition, integrals of elementary functions (Formulae) Theorems, Integration of functions by decomposition method, Examples based on it.	06

18	Definite integral **:**Definition of Definite Integral, Examples based on it, Area under simple well-known curves.(simple problem based on it.)	06

	Total	**100**

Teaching Schedule (Practical)

Exercise	**Title of exercise**
1	Exercise on matrices
2	Exercise on determinants
3	Exercise on Section Formulae
4	Exercise on distance between two points, Slopes
5	Exercise on different forms of straight lines.
6	Exercise on circles
7	Illustrations on ordinates of curve and Examples based on Simpson's rule.
8	Exercise on functional limits
9	Exercise on derivatives and differentiation
10	Exercise on Integration

Suggested Readings:

1) A Text Book of Mathematics, 11^{th} Part-I and Part II, 12^{th} Part-I and Part-II- Maharashtra State Board of secondary and Higher secondary Education-Pune.
2) Mensuration- I by Pierpoint.
3) A text book Agricultural Mathematics by Ms. A. A. Chaudhari et.al.

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Semester II

Sr. No	Course No	Course Title	Credit hrs.
1.	AGRO-122	Sustainable Farming Systems and Precision Agriculture	2 (1+1)
2.	HORT-121	Production Technology of Horticulture Crops	3 (2+1)
3.	ENTO-121	Introduction to Entomology	2 (1+1)
4.	PATH-121	Introduction to Plant Pathology	2 (1+1)
5.	ENGG-121	Farm Machinery and Power	2 (1+1)
6.	EXTN-122	Communication Skills & Personality Development (Comman Coures)	2 (1+1)
7.	ECON-122	Micro Economics and Macro Economics	3 (2+1)
8.	BM-122	Business Laws and Ethics	2 (2+0)
9.	MKT-122	Introduction to Commodity Markets	3 (2+1)
10.	BFA-121	Agricultural Finance and Insurance	3 (2+1)
		Total	**24=15 +09**

Course	AGRO 122	Credit: 2(1+1)	Semester: II
Course title	Sustainable Farming Systems and Precision Agriculture		

Syllabus

Theory

Farming System-scope, importance and concept, Types and systems of farming system and factors affecting types of farming system. Farming system components and their maintenance, Cropping system. Allied enterprises and their importance, Tools for agriculture, indicators of sustainability, adaptation and mitigation, determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on Agriculture, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, resource use efficiency and optimization techniques. Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and Weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming: Processing, labeling, economic considerations and viability. Marketing and export potential of organic products. Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture. Global Positioning System (GPS), Geographic Information System (GIS). Site Specific Nutrient Management (SSNM) for nutrient and irrigation management practices. Comparative yield, quality and farm profits under SSNM practices v/s Variable Rate Technology (VRT) practices

Practical:

Tools for determining production and efficiencies in cropping and farming system, Visit of Cropping systems/IFS models, Organic farming guidelines and alternative philosophies, NGOs and other organizations for promotion of organic agriculture; Organic nutrient resources and its fortification; Restrictions to nutrient use, enriched compost, vermi-compost, liquid organic manures, green manuring, crop residue management, bio-fertilizers/bio-inoculants and their quality analysis; Choice of crops and varieties, Pest management under organic production; ITK in organic farming, NPOP; Certification process and standards of organic farming; Processing, labeling, marketing and export of organic products, Economics of organic production system; Post harvest management; Visit to organic farms, Use of GPS for agricultural survey & Recording observations with GPS- Field and Area of Interest, Area estimation, Navigation and recording elevation points, Conversion of GPS readings, Study of Maps, Topo sheets, Cartography, Introduction to GIS software, spatial data creation and editing, Introduction to image processing software, Visual and digital interpretation of remote sensing images, Generation of spectral profiles of different objects, Supervised and unsupervised classification and acreage estimation.

Teaching Schedule
Theory

Lecture No	Topic	Weightage (%)
1	Farming System-scope, importance and concept.	6
2	Types and systems of farming system and factors affecting types of farming system.	8
3	Farming system components and their maintenance.	6
4	Cropping system and allied enterprises and their importance.	4
5	Tools for agriculture, indicators of sustainability, adaptation and mitigation, determining production and efficiencies in cropping and farming system.	6
6	Sustainable agriculture-problems and its impact on Agriculture.	4
7	Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, resource use efficiency and optimization techniques.	12
8	Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture.	12
9	Organic ecosystem and their concepts; Organic nutrient resources and its fortification.	4
10	Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and Weed management under organic mode of production.	6
11	Operational structure of NPOP; Certification process and standards of organic farming: Processing, labeling, economic considerations and viability.	4
12	Marketing and export potential of organic products.	4
13	Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture.	12
14	Global Positioning System (GPS) Geographic Information System (GIS) uses in precision farming.	4
15	Site Specific Nutrient Management (SSNM) for nutrient and irrigation management practices.	4
16	Comparative yield, quality and farm profits under SSNM practices v/s Variable Rate Technology (VRT) practices	4
	Total	**100**

Practical

Exercise	Title of exercise
1	Tools for determining production and efficiencies in cropping and farming system.
2	Visit of Cropping systems/IFS models, Organic farming guidelines and alternative philosophies, NGOs and other organizations for promotion of organic agriculture.
3	Organic nutrient resources and its fortification.

4	Restrictions to nutrient use, enriched compost, vermi-compost, liquid organic manures, green manuring, crop residue management.
5	Bio-fertilizers/bio-inoculants and their quality analysis.
6	Choice of crops and varieties, Pest management under organic production.
7	ITK in organic farming, NPOP; Certification process and standards of organic farming.
8	Processing, labeling, marketing and export of organic products.
9	Economics of organic production system.
10	Post harvest management in organic farming.
11	Visit to organic farms.
12	Use of GPS for agricultural survey & Recording observations with GPS- Field and Area of Interest, Area estimation, Navigation and recording elevation points.
13	Conversion of GPS readings, Study of Maps, Topo sheets, Cartography.
14	Introduction to GIS software, spatial data creation and editing.
15	Introduction to image processing software, Visual and digital interpretation of remote sensing images.
16	Generation of spectral profiles of different objects, Supervised and unsupervised classification and acreage estimation.

Suggested Readings:

1) Cropping systems Theory and Practice -Chatterjee B.N. and Maiti S.
2) Cropping Systems in Tropics – Principles and practices. -Palanniappan S.P.
3) Organic Farming for Sustainable Agriculture by Dahama A. K. Agrobios Publication.
4) Organic Farming: Theory and Practices by Palanippan, S.P. and Anaadurai, K.
5) Organic Farming in India, Problems and Prospects byThapa, U. and Tripathi, P.
6) Trends in Organic Farming in India by Agrobios Publication
7) Handbook of Organic Farming.
8) Recent Developments in Organic farming by Gulati and Barik.
9) GIS : Fundamentals, Applications & Implementations – Dr. K Elangovan New India publishing Agency, New Delhi.
10) Remote sensing , GIS and wet land management - ErTasneemAbbasi& Prof. S.A. Abbasi

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Course	HORT-121	Credit:3(2+1)	Semester: II
Course title	Production Technology of Horticulture Crops		

Syllabus

Theory:

Horticulture-definition and branches; Importance and scope; Classification of horticultural crops; Plant propagation - methods and propagating structures; Production technology of Mango, Banana, Mandarin, Grapes, Guava, Sapota, Papaya, Coffee, Tea, Coconut, Arecanut, Cashew nut, Pepper, Cardamom, Potato, Tomato, Chilli, Cabbage, Cauliflower, Carrot, Onion, Okra, French bean, Cucumber, Watermelon, Rose, Chrysanthemum and Jasmine with respect to origin, distribution, uses, area and production, soil and climatic requirements, commercial varieties, hybrids, planting methods, nutrition, irrigation, weed management, pruning and training, inter and mixed cropping, harvesting and yield.

Practical:

Description and identification of varieties of the Mango, Banana, Mandarin, Grapes, Guava, Sapota, Papaya, Coffee, Tea, Coconut, Areca nut, Cashew nut, Pepper, Cardamom, Potato, Tomato, Chilli, Cabbage, Cauliflower, Carrot, Onion, Okra, French bean, Cucumber, Watermelon, Rose, Chrysanthemum and Jasmine crops.

Teaching schedule

Theory

Lecture No.	Topic	Subtopic	Weightage (%)
1	Horticulture- definition and branches; Importance and scope;	Horticulture- definition and branches; Importance and scope;	5
2	Classification of horticultural crops	Classification- Climatic Adaptability, Rate of Respiration, Photoperiodic Response	5
3	Plant propagation-methods.	Definition, sexual and asexual propagation methods.	5
4	Propagation structures.	propagation structures- Greenhouse, Net house, lath house, hot frame, cold frame, mist house	5
5	Production Technology Mango	Origin, distribution, uses, area and production, Soil and Climatic Requirements ,Varieties, Planting methods, nutrition, Irrigation, weed management, training and pruning, inter and mixed cropping, Harvesting and Yield	5
6	Production Technology Banana		5
7	Production Technology Mandarin		2
8	Production Technology Grape		4
9	Production Technology Guava		2
10	Production Technology Sapota		2
11	Production Technology Papaya		2

12	Production Technology Cashew nut		5
13	Production Technology Coffee		2
14	Production Technology Tea		2
15	Production Technology Coconut		5
16	Production Technology Areca nut		3
17	Production Technology Blackpapper		2
18	Production Technology Cardamom		2
19	Production Technology Potato		5
20	Production Technology Tomato		3
21	Production Technology Cabbage		5
22	Production Technology Cauliflower		2
23	Production Technology Chilli		3
24	Production Technology Carrot		2
25	Production Technology Cucumber		3
26	Production Technology Watermelon		2
27	Production Technology French bean		2
28	Production Technology Rose		5
29	Production Technology Chrysanthemum		3
30	Production Technology Jasmin		2

Practical Exercises:

Exercise	Title of exercise
1	Description and Identification of varieties of the Mango and Banana
2	Description and Identification of varieties of the Mandarin and Grape
3	Description and Identification of varieties of the Guava and Sapota

4	Description and Identification of varieties of the Papaya and Cashew nut
5	Description and Identification of varieties of the Coffee and Tea
6	Description and Identification of varieties of the Coconut and Areca nut
7	Description and Identification of varieties of the Blackpapper and Cardamom
8	Description and Identification of varieties of the Potato and Tomato
9	Description and Identification of varieties of the Cabbage and Cauliflower
10	Description and Identification of varieties of the Chilli and Carrot
11	Description and Identification of varieties of the Onion and Okra
12	Description and Identification of varieties of the Cucumber and Watermelon
13	Description and Identification of varieties of the French bean
14	Description and Identification of varieties of the Rose
15	Description and Identification of varieties of the Chrysanthemum
16	Description and Identification of varieties of the Jasmin

Suggested readings:

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, NayaUdyog, 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.
12. Bose, T. K., Som, M. C. and Kabir.Vegetable Crops. NayaProkash,
13. Calcutta Chaudhari, B. Vegetables.National Book Trust of India.
14. Bose, T. K. and L. P. Yadav.Commercial Flowers. NayaProkash, Calcutta.
15. Radha, J. H. and A. Mukhopadhay.Floriculture in India. Allied Publishing Pvt.Ltd., New Delhi.

16. Prasad, S. 2005. Commercial Floriculture. Agrobios (India), Jodhpur.
17. Singh, A. K. 2006. Flower Crops: Cultivation and Management. New IndiaPublishing Agency, NIPA.
18. Gopalkrishnan, T. R. 2007. Vegetable Crops.(Hort. Science Series Vol. 4.New India Publishing Agency, NIPA.
19. Shinde S. J, S.D. Jature& B.G.Hiwale.2008.A Text Book on Production Technology of Vegetables & Flowers. ShriRajlaxmiPrakashan. Aurangabad.
20. Chadda. K.L. Handbook of Horticulture. ICAR.
21. Nalage N.A. Navigator for Horticulture. Universal Prakashan, Pune.
22. H. T. Hartmann, D. E. Kester, F. T. Davies Jr., R. L. Geneve. Hartmann and kester's Plant Propagation principles and practices

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Course :	ENTO -121	**Credit:**	**2(1+1)**	**Semester- II**
Course title:	**Introduction to Entomology**			

Syllabus

Theory:

History of Entomology in India. Factors for insect's abundance. Reason for dominance of Insects in Animal kingdom. Classification of phylum Arthropoda up to classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs. Metamorphosis and diapause in insects. Immature stages of insects. Structure and functions of digestive, circulatory, excretory, respiratory, nervous and reproductive systems in insects. Types of reproduction in insects. Major sensory organs.

Systematics: Taxonomy – importance of binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders.

Practical:

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/cockroach; Types of insect antennae, mouthparts, legs and wings. Types of insect larvae and pupae; Dissection of digestive system in insects; Dissection of male and female reproductive systems in insects; Study of characters of orders Orthoptera, Mantodea, Blattodea, Odonata, Isoptera, Phasmotodea, Thysanoptera, Hemiptera, Neuroptera, Lepidoptera, Coleoptera, Hymenoptera, Diptera.

Teaching Schedule

Theory

Lecture	Topic	Weightage (%)
1-2	Introduction and history of entomology in India including contribution of scientists. Definitions: Insect, Entomology and Agril. Entomology. Factors for insect's abundance. Classification of phylum Arthropoda up to classes. Relationship of class Insecta with other classes of Arthropoda. Insect dominance.	**10**
3-4	Insect Integument: Structure and functions insect cuticle. Moulting: Definition and steps in moulting. Body segmentation: Structure of head, thorax and abdomen.	**10**
5-6	Insect head capsule: Important sclerites and sutures. Positions of head. Structure and modifications (with examples) of insect antennae, mouth parts, legs and wings (wing venation, wing coupling apparatus with examples). Structure of thorax and abdomen: segmentation, appendages and processes, pregenital and post genital appendages and structure of male and female genital organ.	**20**
7-8	Metamorphosis: Definition and types of metamorphosis with examples and its significance. Insect diapause: Definition and example, Aestivation, Hibernation and quiescence: Definitions Immature stages of insects : Types of larva and pupa withexamples. Major sensory organs. Sound producing organs in insects	**10**
9-12	Structure and functions of digestive, nervous, circulatory, respiratory, excretory, secretary and reproductive system in insects. Types of reproduction in insects.	**20**
13	**Systematics:** Definitions: Taxonomy, Systematics, Binomial nomenclature, Order, Family, Genus, Species, Subspecies, Biotype. Binomial nomenclature: Definition and Rules. Classification of Class Insecta up to Orders.	**10**

Lecture	Topic	Weightage (%)
14	Study of important insect orders: Important distinguishing taxonomic characters of orders. Families of agricultural importance with examples. Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae.	**20**
15	Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Aleurodidae, Pseudococcidae, Lophopidae, Lacciferidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturniidae, Bombycidae.	
16	Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae, Braconidae, Trichogrammatidae, lchneumonidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae Syrphidae.	
	Total	**100**

Practical

Exercise	Title of exercise
1.	Methods of collection and preservation of insects including immature stages
2.	External features of typical insect (e.g. Cockroach) structure of head, thorax and abdomen/General body organization of insect
3.	Structure of antennae and its modifications along with examples.
4.	Study and dissection of chewing and biting and chewing and lapping type of mouthparts.
5.	Study and dissection of piercing and sucking type of mouthparts.
6.	Study and dissection of sponging type of mouthparts.
7.	Structure of typical leg and modifications of legs.
8.	Study of insect wings: Structure, wing venation, types of wings and wing coupling apparatus along with examples.
9.	Types of larva and pupa.
10.	Study and dissection of digestive system of cockroach.
11.	Study and dissection of female reproductive system of cockroach
12.	Study and Dissection of male reproductive system of Cockroach
13.	Study of distinguishing taxonomic characters of orders and families of agricultural importance: Orthoptera , Odonata , and Mantodea, Blattodea.
14.	Study of distinguishing taxonomic characters of orders and families of

	agricultural importance: Thysanoptera, Isoptera, Phasmotodea
15.	Study of distinguishing taxonomic characters of orders and families of agricultural importance: Lepidoptera ,Hemiptera and Neuroptera.
16.	Study of distinguishing taxonomic characters of orders and families of agricultural importance:, Coleoptera ,Hymenoptera and Diptera

Suggested Readings:

1) Chapman, R. F. – The Insects : Structure and Functions
2) David, B. V. and T. Kumarswami – Elements of Economic Entomology
3) Marc J. Klowden- Physiological Systems in Insects
4) Pant N.C. and Swaraj Ghai – Insect Physiology and Anatomy
5) Nayar, K. K.; Anathkrishanan T.N. and B.V.David – General and Applied Entomology
6) Richards O.W. and R.G. Davies – Imms' General Text Book of Entomology –Vol.I & II
7) Patton R.L.- Introductory Insects Physiology
8) Wigglesworth – Principles of Insects Physiology
9) Metcalf and Flint – Destructive and Useful Insects; their habits and control.

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Course :	PATH-121	Credit:	2=1+1	Semester- II
Course title:	Introduction to Plant Pathology			

SyllabusTheory:

Introduction: Definition, Objectives and Significance of Plant Pathology. History of Plant Pathology. Classification of Plant Diseases based on etiology, parts affected, geographical distribution, crops infected, source of inoculums and symptoms. Important Plant Pathogens- Fungi, Bacteria, Fastidious vascular bacteria, virus, viroid, phytoplasma, sprioplasmas, nematodes. Phanerogamic parasites and abiotic causes. Concepts in Plant Pathology, disease triangle, disease tetrahedron (pyramid). Fungi :General characters of fungi- vegetative structures, types of thalli, modification of thallus, asexual and sexual reproduction in fungi, asexual and sexual spores and fruiting bodies, Classification of fungi with special reference to characters and important examples of Oomycetes, Ascomycetes, Basidiomycetes, Deuteromycetes and Zygomycetes. Bacteria and mollicutes: Characters of plant pathogenic bacteria, morphology of bacteria and Classification of prokaryotes. Plant viruses: Morphology and composition, replication and transmission, general symptoms. Nematodes: Characters of plant parasitic nematodes, morphology of male and female nematodes. Important symptoms. Growth and reproduction of plant pathogens: Liberation/ dispersal and survival of plant pathogens, Pathogenesis: Role of enzymes, toxins and growth regulators in plant disease development. Defense mechanism: Structural (cork layer, abscission layer, tyloses,) Biochemical (phenolics, phytoalexin and PR-proteins), Epidemiology: Elements of an epidemic, Factors affecting the development of epidemic. Principles of plant disease management: Exclusion, Eradication, Physical methods, Biological Methods, Chemical Methods, ISR/SAR and IDM approaches.

Practical:

Study of microscope. Collection and preservation of diseased specimens Study of symptoms and Diagnosis of plant diseases Morphological characters of Fungi. Preparation of Culture Media. Methods of Sterilization and Disinfection. Isolation techniques for Fungi and bacteria. Methods of Inoculation and proving Koch's postulates. Morphology and staining of Bacteria. Morphology and Transmission of Viruses. Morphology of plant parasitic nematodes and symptoms. Extraction of Nematodes from the soil. Study of phanerogamic parasites. Study of fungicides and their formulations. Calculation of spray concentration and evaluation of fungicides. Methods of pesticide application and their safe use.

Lecture No.	Topic	Weightage %
1	**Introduction**: Definition, Objectives and Significance of Plant Pathology.	5
2	**History** of Plant Pathology.	5
3	**Classification** of Plant Diseases based on etiology, parts affected, geographical distribution, crops infected, source of inoculums and symptoms.	5
4	**Important Plant Pathogens**- Fungi, Bacteria, Fastidious vascular bacteria, virus, viroid, phytoplasma, sprioplasmas, nematodes.	5
5	**Fungi** :General characters of fungi- vegetative structures, types of thalli, modification of thallus,	10

6	**Asexual and sexual reproduction** in fungi, asexual and sexual spores and fruiting bodies, Classification of fungi with special reference to characters and important examples of Oomycetes, Ascomycetes, Basidiomycetes, Deuteromycetes and Zygomycetes.	5
7	**Bacteria and mollicutes:** Characters of plant pathogenic bacteria, morphology of bacteria and Classification of prokaryotes.	5
8	Plant viruses: Morphology and composition, replication and transmission,	5
9	**General symptoms.** Nematodes: Characters of plant parasitic nematodes, morphology of male and female nematodes.	5
10	**Important symptoms.** Growth and reproduction of plant pathogens: Liberation/ dispersal and survival of plant pathogens,	5
11	**Pathogenesis:** Role of enzymes, toxins and growth regulators in plant disease development.	10
12	**Defense mechanism**: Structural (cork layer, abscission layer, tyloses,)	5
13	**Biochemical** (phenolics, phytoalexin and PR-proteins),	5
14	**Epidemiology:** Elements of an epidemic, Factors affecting the development of epidemic.	15
15,16	**Principles of plant disease management**: Exclusion, Eradication, Physical methods, Biological Methods, Chemical Methods ISR/SAR and IDM approaches. Biological Methods, Chemical Methods ISR/SAR	10
	Total	100

Practical

Exercise	Title of exercise
1	Study of microscope. Collection and preservation of diseased specimens
2	Study of symptoms and Diagnosis of plant diseases
3	Morphological characters of Fungi.
4	Preparation of Culture Media.
5	Methods of Sterilization and Disinfection.
6	Isolation techniques for Fungi and bacteria.
7	Methods of Inoculation and proving Koch's postulates.
8	Morphology and staining of Bacteria.
9	Morphology and Transmission of Viruses.
10	Morphology of plant parasitic nematodes and symptoms.
11	Extraction of Nematodes from the soil.
12	Study of phanerogamic parasites.

13	Study of fungicides and their formulations.
14	Calculation of spray concentration and evaluation of fungicides.I
15	Calculation of spray concentration and evaluation of fungicides.II
16	Methods of pesticide application and their safe use.

Suggested Readings

1) Singh RS. 2013. *Introduction to Principles of Plant Pathology.* Oxford and IBH 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) Stakman EC &Harrar JG. 1957. *Principles of Plant Pathology*. Ronald Press, USA.
6) Verma JP, Varma A & Kumar D. (Eds). 1995. *Detection of Plant Pathogens and theirManagement*. Angkor Publ., New Delhi
7) Mehrotra RS &Aggarwal A. 2003. *Plant Pathology*. 2nd Ed. Oxford & IBH,
8) Rhower GG. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management in
9) Agriculture. 2nd Ed. Vol. II. (Ed. David Pimental). CRC Press.

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Course	ENGG-121	Credit:2(1+1)	Semester: II
Course title	Farm machinery and power		

Syllabus

Theory:

Status of Farm Power in India, Sources of Farm Power , I.C. engines, working principles of I C engines, comparison of two stroke and four stroke cycle engines , Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication,fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor, Tractor t

ypes, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practical:

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow . Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different inter-cultivation equipment, Familiarization with harvesting and threshing machinery.

Teaching schedule

Lecture No.	Topic	Points to be Covered	Weightage %
1	• Status of Farm Power in India • Sources of Farm Power	• Status of Farm Power in India • Farm Power in India : Sources 1) Human Power 2) Animal Power 3) Mechanical Power 4) Electrical Power 5) Renewable Energy (Wind Power, Hydro. Power)	15%
2	• I.C. Engines, Working Principles of I. C. Engines • Comparison of two stroke & four stroke cycle engines	• I.C. Engine Types • Two Stroke and Four Stroke Engines • Working Principles • Comparison of two stroke & four stroke cycle engines • Comparison of Diesel engine and Petrol engine	

3 & 4	• Study of different components of I.C. Engine • I.C. Engine	• Different components of I. C. Engine 1) Stroke Bore Ratio 2) Piston Displacement 3) Compression ratio	10%

	Terminology	4) Displacement Volume 5) Horse Power 6) Indicated Horse Power 7) Break Horse Power 8) Thermal Efficiency 9) Mechanical efficiency 10) Solved Examples	
5 & 6	Familiarization with different systems of I.C. engines	• Different systems of I.C. Engines 1) Air Cleaning 2) Cooling Systems 3) Lubrication Systems 4) Fuel Supply Systems 5) Hydraulic control system of a tractor	10%
7 & 8	• Familiarization with Power transmission system • Tractor types, Cost analysis of tractor power and attached implement	• Power Transmission Systems 1) Clutch 2) Gear box 3) Differential and final drive of a tractor • Tractor – Introduction • Tractor types • Cost analysis of tractor power and attached implements	10%
9	Familiarization with Primary and Secondary Tillage implement	• 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 • Harrow – Disk Harrow, Drag Harrow, Blade Harrow	15%
10	• Implement for hill agriculture • Implement for intercultural operations	• Implement for hill agriculture • Implement for intercultural operations 1) Types of cultivators 2) Equipments for weed control	
11 & 12	Familiarization with sowing and planting equipment	• Sowing 1) Seeding methods 2) Seed drill 3) Seed cum Fertilizer drill 4) Seed Metering Mechanisms 5) Calibration of Seed Drill 6) Solved examples • Planters 1) Functions 2) Potato Planter 3) Sugarcane Planter	15%

		4) Manual Rice Planter 5) Self Propelled Paddy Transplanter 6) Solved examples	
13 & 14	Familiarization with Plant Protection equipment	• Sprayers - Components 1) Bucket type sprayer 2) Knapsack type sprayer 3) Compression type sprayer 4) Hand atomizer 5) Engine powered Sprayers • Dusters 1) Plungers type hand dusters 2) Rotary type 3) Knapsack type 4) Power operated dusters 5) Air Plane dusters	15%
15 & 16	Familiarization with harvesting and threshing equipment	• Harvesting equipments 1) Manual operated tools 2) Animal drawn implements 3) Power driven machines • Mowers • Reapers • Threshers • Power thresher – types • Paddy thresher • Combine harvester thresher	10%
	Total		100

Practical

Exercise	Title of exercise
1	Study of different components of Internal Combustion Engine
2	To study air cleaning and cooling systems of engine
3	Study of clutch, transmission, differential and final drive of a tractor
4	Study of lubrication and fuel supply system of engine
5	Study of brake, steering, hydraulic control system of engine
6	Study of operation of power tiller
7	Study of implements for hill agriculture
8 & 9	Study of different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow
10 & 11	Study of seed-cum-fertilizer drills, their seed metering mechanism and calibration
12	Study of planters and transplanters

13	Study of different types of sprayers and dusters
14	Study of different inter-cultivation equipments
15	Study of harvesting and threshing machinery
16	Learning of Tractor Driving

Suggested Readings:

1) Principles of Agricultural Engineering. Vol-I. T. P. Ojha and A. M. Michael. Jain Brothers, New Delhi.
2) Elements of Agricultural Engineering by JagadishwarSahay. Standard publishers distributors, New Delhi, Fifth Edition, Reprint, 2018.
3) Farm Tractor –Repair and Maintenance by S.C. Jain and C.R. Rai.

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Course	EXTN-122	Credit: 2 (1+1)	Semester: II
Course title	Communication Skills & Personality Development (Comman Coures)		

Theory:

Communication Skills: Encoding & Decoding skills; Structural and functional grammar; verbal and nonverbal communication- meaning, definitions, concepts and types. Listening- Meaning, types and guidelines for effective listening, note taking, writing skills, oral presentation skills- Meaning, types, and factors affecting effective oral presentation.; 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; Personality development, personality theories, attitude, motivation and perception- Meaning, Importance and measurement

Practical:

Equipping the skills of 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, Visit to village to experience the skills of group discussion and public speaking.

Lecture No.	TOPIC	SUB-TOPIC	WEITAGE (%)
1	Communication Skills	Definition of Communication ,Importance, Elements of Communication, Principles, Process, Types of Business communication, Barriers of communication, Models of communication, Feedback, Communication effectiveness, Interpersonal Communication	10
2	Types of Communication	Verbal and Non verbal communication	5
3	Body Language	Non-Verbal Communication, Types of Body Language ,Functions of Body Language, Role of Body Language,	5
4	Structural and Functional Grammar	Tenses ,Parts of speech, Sentence Structure	5
5	Listening Skills	Definition, Importance, Meaning, components, Characteristics of good listener, Stages of Listening Process, Barriers to Listening ,Factors Affecting on Listening Skill types and guidelines for effective listening	10
6	Note Taking	Definition, The Pre requisite of Note Taking, Why to Take Lecture Notes, Clues to important points in lectures, Methods of Note Taking, Tips for student for note taking	5
7	Writing Skills	Characteristics of Good Writing ,Effective	10

		Writing Skills Letter writing, Business letters, Application letters, Covering letters, Job Application and Resume writing	
8	Oral presentation skills	Meaning, Importance ,types, and factors affecting effective oral presentation, Tips, Steps in delivering oral presentation, Visual Aids	5
9	Field diary	Definition, importance, Field Diary **for Research Process documentation,** Diary content should be organized into two categories.,Components of a standard Field Diary	5
10	lab record	Definition ,Meaning, Importance, General Guidelines for Keeping Lab-records and Notebooks	5
11	Indexing, Footnote And Bibliographic Procedures	**Indexing**-Definition, Importance , A Good indexing System Advantages and disadvantages, Types Of indexing Systems **Footnote**-Meaning and importance, Procedure **BibliographicProcedures:**Definition,meaning,importance, Types of BibliographiesBibliographic Procedures	5
12	Reading Skill	Speed reading Concept,need.Type,Methods	5
13	Precise writing, summarizing, abstracting	Procedure for Precise writing, summarizing, abstracting	**5**
14	Individual and group presentations, Impromptu presentation, public speaking;	Concepts of Individual and group presentations, Impromptu presentation, public speaking	**5**
15	Group discussion. Organizing seminars and conferences	Definition, importance, meaning ,importance ,types ,tips, rules	**5**
16	Personality, Motivation, Attitude, Perception	**Personality:** Definition. importance, traits, determinants, Personality development, personality theories, **Motivation**-def, types, theories, how to motivate subordinate **Attitude and Perception**- Meaning, Importance and measurement	**10**
		TOTAL	**100**

PRACTICAL

Exercise	Title of exercise
1	Listening Skills
2	Note Taking
3	Writing Skills
4	Oral Presentation Skill
5	Field Diary
6	Laboratory Record
7	Indexing Procedure
8	Footnote Procedure
9	Bibliographic Procedure
10	Reading and Comprehension of General articles
11 & 12	Precise Writing, Summarizing, Abstracting
13 &14	Organizing Group Discussion
15	Individual and Group Presentation
16	Visit to Village

SUGGESTED READINGS

1. Bovee. 2008. Business Communication Today. 7 th Ed. Pearson Edu.
2. Brown, L. 2006. Communication Facts and Ideas in Business. Prentice Hall.
3. Lesikar. 2004. Basic Business Communication. McGraw Hill.
4. Ramchandran, K. K, Lakshmi, K. K and Karthik, K. K. 2007. Business Communication. MacMillan Hill.
5. Adair, J. 2003. Effective communication. Pan MacMillan.
6. Ludlow, R and Panton, F. 1998. The Essence of Effective Communications. Prentice Hall of India.
7. Berlo, D.K. (1960). The Process ofCommunication: An Introduction to theory and Practice. Holt,Rinehart and Winston, Inc., New York, USA.
8. Mathur, K.B. (1994). Communication for Development and social change. Allied Publishers Ltd.,New Delhi.
9. Ray, G.L. (1991). Extension, Communication andManagement. Naya Prakash, 206,

Bidhan Sarani,

Calcutta - 6.

10. Roloft, Michael F. (1981). Interpersonal Communication. Sage Publication.

11. Samanta, R.K.(1990). Development Communication for Agriculture. B. R. Publishing Corporation,Delhi-7.

12. Sandhu, A.S. (1993). Text Book on Agricultural Communication Process and Methods. Oxford and IBH Publishing

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Course	ECON-122	Credit:3(2+1)	Semester: II
Course title	Micro Economics and Macro Economics		

Syllabus

Theory:

Economics: Definition, scope, importance and subject matter of economics. Basic concepts: Goods-free and economic goods, producer and consumer goods, single-use and durable use goods and services, wants-types and characteristics, demand, utility-types, value and price, wealth and welfare, capital and income; Micro Economics: Meaning and definitions of micro economics, nature and scope of micro-economics.Theory of Consumer Behavior: Concept and Law of Diminishing Marginal Utility (LDMU). Law of Equi-marginal utility and Consumer's surplus. Indifference curve analysis.Demand concept: Demand function, Law of demand, Elasticity of demand and its measurement. Supply concept: Supply function, Law of supply, Elasticity of supply. Concept of Market Equilibrium.Market structure: Meaning, types and characteristics of market structure.Theory of Firms: Concept and Market Equilibrium under different types of markets.Macro Economics: Meaning and definitions, nature and significance of macro-economics and micro-macro-economic paradoxes.National income: Meaning and importance, circular flow, concepts of national income accounting and methods of measurement of national income, difficulties in measurement. Concepts of growth and development.Theory of income determination: Classical theory-Say's Law of market, Keynesian theory of income determination-Aggregate demand, Consumption, saving and investment functions.Money: Meaning and functions of money, classification of money, money supply. Business cycles: Meaning and phases of business cycles, remedies for control business cycles. Inflation and Employment.Public finance: Meaning of budget, concept of public finance and its components-public revenue and public expenditure, difference between Fiscal and monetary policy, Tax: meaning, direct and indirect taxes, agricultural taxation, VAT and GST.

Practical:

Law of Diminishing Marginal Utility. Law of equi-marginal utility. Consumer's surplus.Consumer Equilibrium using budget line and indifference curve. Estimation of demand and supply.Derivation of market equilibrium. Elasticity of demand and supply. Price determination under perfect competition. Price determination under monopoly. Price determination under monopolistic competition.National income accounts and their preparation. Derivation of Aggregate Demand and Aggregate Supply curves. Income Determination in Two Sector Model. Income Determination in Three Sector Model.Study of business cycles.Consumption and savings function

Teaching Schedule

Theory

Lectures No	Topics	Weightage (%)
1	Economics Definition,scope,importance and subject matter of economics.	6
2&3	Basic concepts Goods-free and economic goods, producer and consumer goods, single-use and durable use goods and services value and price, wealth and welfare, capital and income	4
3	Wants types and characteristics	4
4&5	Micro Economics Meaning and definitions of micro economics, nature and scope of micro-economics	6
6	Theory of Consumer Behavior: Concept	2
7	Law of Diminishing Marginal Utility (LDMU).	6
8	Law of Equi-marginal utility	4
9	Consumer's surplus.	2
10	Indifference curve analysis.	2
11&12	Demand concept: Demand function, Law of demand, Elasticity of demand and its measurement	4
13&14	Supply concept: Supply function, Law of supply, Elasticity of supply.	4
15	Concept of Market Equilibrium.Market structure: Meaning, types and characteristics of market structure.	2
16	Theory of Firms: Concept and Market Equilibrium under different types of markets.	2
17&18	Macro Economics: Meaning and definitions, nature and significance of macro-economics and micro-macro-economic paradoxes.	6
19	National income: Meaning and importance, circular flow, concepts of national income accounting	4
20	Methods of measurement of national income, difficulties in measurement.	4
21	Concepts of growth and development.	4
22	Theory of income determination: Classical theory-Say's Law of market,	4
23	Keynesian theory of income determination-	4
24	Aggregate demand, Consumption, saving and investment functions	4
25	Money: Meaning and functions of money	4
26	classification of money, money supply.	4
27	Business cycles: Meaning and phases of business cycles, remedies for control business cycles.	4
28	Inflation	2
29	Employment.	2
30&31	Public finance: Meaning of budget, concept of public finance and its components-public revenue and public expenditure, difference between Fiscal and monetary policy,.	2
32	Tax: meaning,direct and indirect taxes, Agricultural taxation, VAT and GST	4
	Total	**100**

Practical Exercises:

Exercise	Title of exercise
1	Law of Diminishing Marginal Utility
2	Law of equi-marginal utility.
3	Consumer's surplus
4	Consumer Equilibrium using budget line and indifference curve
5	Estimation of demand and supply
6	Derivation of market equilibrium.
7	Elasticity of demand and supply
8	Price determination under perfect competition
9	Price determination under monopoly.
10	Price determination under monopolistic competition.
11	National income accounts and their preparation
12	Derivation of Aggregate Demand and Aggregate Supply curves
13	Income Determination in Two Sector Model.
14	Income Determination in Three Sector Model.
15	Study of business cycles
16	Consumption and savings function

Suggested readings:

1. Dewett K. K., M. H. Navalur. Modern Economic Theory, S. Chand Publication, New Delhi.
2. M. L. Seth. Principles of Economics, Lakshmi NarainAgarwal Educational Publishers, Agra.
3. M.L.Jhingan.MoneyBanking,InternationalTrade and Public Finance.
4. Dr. A.L Ahuja Micro economics
5. Dewett K. K.J. D. Verma. Elementary Economic theory, S. Chand Publication, New Delhi.
6. S. Subba Reddy Agricultural Economics, Oxford and IBH Publ. Co. Pvt. Ltd

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Course	BM-122	Credit:2(2+0)	Semester: II
Course title	Business Laws and Ethics		

Syllabus

Theory:

Introduction to Indian legal system: Legislative Powers of the States and the Union. Scope and importance of Business laws. Contracts – meaning, significance, types and essentials of a valid contract. The Indian Contract Act-1872. The Indian Partnership Act, 1932 - General Nature, Registration of Partnership, Partnership Deed, Types of Partners, Rights and Duties of Partners. The Companies Act, 1956 and 2013 - General Nature, types of companies, incorporation of a Company, Memorandum of Association and Articles of Association, management of a company. Provisions of important Acts enacted over time related to business environment: Industries (Regulation & Development) Act, 1951; Income tax Act, 1961, Central Excise Act, 1944, Foreign Exchange Regulation Act (FERA), 1973; Foreign Exchange Management Act (FEMA), 1999; Monopolistic and Restrictive Trade Practices (MRTP), Act, 1969; Competition Act, 2002, Food safety and standards Act, 2006, Customs Act 1962 and Goods and Service Tax 2011. FDI Policy of GoI. Business Ethics - Nature and importance of ethics and moral standards. Scope of business ethics in business functional area. Governance mechanism.

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1& 2	Introduction to Indian legal system: Legislative Powers of the States and the Union.	10
3	Scope and importance of Business laws.	5
4 & 5	Contracts – meaning, significance, types and essentials of a valid contract. The Indian Contract Act-1872.	10
6 & 7	The Indian Partnership Act, 1932 - General Nature, Registration of Partnership, Partnership Deed, Types of Partners, Rights and Duties of Partners	10
8, 9, & 10	The Companies Act, 1956 and 2013 - General Nature, types of companies, incorporation of a Company, Memorandum of Association and Articles of Association, management of a company.	15
11,12 & 13	Provisions of important Acts enacted over time related to business environment: Industries (Regulation & Development) Act, 1951;	5
14-15	Income tax Act, 1961,.	2.5
16	Central Excise Act, 1944,	2.5
17,18 & 19	Foreign Exchange Regulation Act (FERA), 1973; Foreign Exchange Management Act (FEMA), 1999;	5
20 &21	Monopolistic and Restrictive Trade Practices (MRTP), Act, 1969;	2.5
22 & 23	Competition Act, 2002,	2.5
24 & 25	Food safety and standards Act, 2006,	5
26 & 27	Customs Act 1962	
28 & 29	Goods and Service Tax 2011	10
30	FDI Policy of GoI.	5
31 & 32	Business Ethics - Nature and importance of ethics and moral standards. Scope of business ethics in business functional area. Governance mechanism	10
	Total	**100**

Suggested Readings

1. Gulshan SS &Kapoor GK 2003 Business Law including Company law 10th Edn New Age Publication.
2. Kapoor ND 2005 Business Law S Channd& Sons.
3. Tulsian PC 2006 Business Law Tata McGraw Hill.
4. Tuteja SC 2005 Business Law for Managers SChannd& Sons.
5. SmiritiShrivastav Human Values and Professional Ethics Katson Books.
6. Nagrajan RS A text book on Professional Ethics and Human Values New Age International Publishers.

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Course	**MKT-122**	**Credit:3(2+1)**	**Semester: II**
Course title	**Introduction to Commodity Markets**		

Syllabus

Theory:

History and evolution of commodity markets. Marketing of food grains – cereals and pulses, production, consumption, marketable surplus. Marketing of commercial crops: coffee, tea, rubber, tobacco, Arecanut, coconut, cotton, oilseeds, spices, jute - supply and demand. Marketing practices, market structure, marketing channels and price spread, organizations and institutions, Commodity Boards and their activities. Marketing of horticultural crops – Fruits, vegetables and flowers - demand, supply and utilization, marketing practices, NHB, NHM, APEDA. Role of commodity exchanges- difference between national and regional exchanges. Meaning and types of market participants – Hedgers, Speculators, Arbitragers. Derivatives market – meaning, functions and limitations. Types of derivatives - options, forward, futures and swaps. Factors influencing spot and futures markets. Trading strategies. Pricing of futures. Operational mechanism of commodity markets. Settlement process and delivery mechanisms. Strategies using options to hedge risks, long and short positions. Role of banks and warehousing in commodity markets - Global commodity exchanges dealing with agricultural commodities.

Practical:

Compilation of basic statistics an area, production, productivity, consumption, export and import of selected crops. Estimating growth. Graphical representation. Visit to Grain Market, Fruit, vegetable and flowers markets. Futures pay-offs calculation. Pricing of derivatives.

Teaching Schedule

Theory

Lectures No.	**Topics**	**Subtopic**	**Weightage %**
1,2 & 3	**Introduction to Commodity markets**	History and evolution of commodity markets. Marketing of food grains – cereals and pulses, production, consumption, marketable surplus.	**15**
4, 5 & 6	**Marketing of commercial crops**	coffee, tea, rubber, tobacco, Arecanut, coconut, cotton, oilseeds, spices, jute	**15**
7.8.9,10 & 11	**Hedging and future trading**	Risk meaning and importance, types of risk, minimization of risk. Trading practices and	**15**

	risk	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.	
12, 13, 14, & 15	**Speculation**	Meaning and economic benefit role of speculators, role of arbitrageurs, options trading, futures markets and price volatility.	**15**
16, 17, 18, 19 & 20	**Hedging**	Meaning, benefits of hedging, role of hedgers, advantages of heding to different stakeholders, difference between hedging and future trading	**15**
21,22,23 ,24,25 & 26	**Future trading**	Meaning, commodities for future trading, service rendered by forward market, danger of forward market, forward market commission, progress in India	**15**
27,28,29 ,30, 31 & 32	**Introduction to commodities market**	Emergence of commodity market, dynamics of global commodity markets, Indian commodity markets – current status and future prospectus.	**10**
		Total	**100**

Practical Exercises

Exercise	Title of Exercise
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 markets India
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 Gaurgam 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) Purcell wd. 1991. Agriculture futures &options : principles & strategies. Macmillan publications.

2) Chatnani Commodity markets-operations, instruments & applications, tmgh Indian commodity derivatives by Indian institute of banking & finance, Macmilla .

3) John wiley& sons Kaufman pj. 1986. The concise handbook of futures markets.
4) Wasendorfrr&mccafferty 1993. All about commodities from the inside out. Mcgraw-hill.
5) micha Commodity options : treading & hedging volatility in the world's most lucrative market, carley garner &paul Britain, pearsons agriculture commodity markets : a guide to future trading.
6) USDA and FAO published guides for farmers.
7) Purcell WD. 1991.Agriculture Futures &Option : Principles & strategies. Macmillan publications.
8) Note Book chatnani Commodity Markets – Operations, Insturments& Applications. TMGH
9) Macmillan Indian Commodity Derivatives by Indian Institute of Banking & Finance.

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Course	**BFA-121**	**Credit:3(2+1)**	**Semester: II**
Course title	**Agricultural Finance and Insurance**		

Syllabus

Theory:

Agricultural Finance – meaning, definition, nature and scope. Agricultural Credit - meaning, definition, importance and classification based on various criteria.

Credit Analysis - 3 Rs of Credit; 5 Cs of Credit; and 7 Ps of Credit; Repayment Plans. Financial Statements – meaning, types and uses. Ratio Analysis - current ratio, intermediate ratio, net capital ratio, acid-test ratio, debt-equity ratio, operating ratio, fixed ratio and gross ratio. Time Value of Money / Principle of Time Comparison – meaning and importance. Compounding and Discounting.

History of financing agriculture in India. Nationalization of banks – meaning and objectives; Village Adoption Scheme – origin and objectives; Lead Bank Scheme – origin and functions; Regional Rural Banks – origin, objectives and features; Micro-financial Institutions: Joint Liability Groups (JLGs) – meaning and features; Self Help Groups (SHGs) – meaning and features.

Scale of finance and security for loans. Banking schemes for agricultural finance - Differential Rate of Interest (DIR) Scheme – origin and features; Kisan Credit Card Scheme – origin, objectives and features. Financial inclusion – Jan DhanYojana, financial literacy and business correspondent model. NPAs in agricultural lending: applicability of the SARFESI Act in agricultural lending.

Financing Agencies: RBI – activities and functions; NABARD – genesis, objectives and functions; AFC – functions; ADB and World Bank – origin and functions; IMF, IFC and IDA. Deposit Insurance and Credit Guarantee Corporation of India (DICGC) – origin and functions.

Insurance – meaning and definition. Crop Insurance Scheme – origin, meaning, importance and advantages of crop insurance, Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS), Modified National Agricultural Insurance Scheme (MNAIS), and Weather based Crop Insurance and FasalBimaYojana and Unified Package Insurance Scheme (UPIS). Assessment of crop losses, determination of compensation, limitations in application and estimation of crop yields. Livestock insurance – origin, meaning

and importance.

Practical:

Exercises on time value of money - compounding and discounting. Estimation of credit needs for crop and livestock enterprises. Determination of scale of finance for farm enterprises. Repayment plans for short-term loans and term loans. Estimation of risk in crop and livestock enterprises. Estimation of premium amount for insurance. Visits to financial inclusion branch of commercial bank and regional rural bank; and insurance agency in public and private sectors. Visit to weather station.

Teaching Schedule
Theory

Lectures No.	Name of topic	Content	Weightage %
1	Agricultural Finance	Meaning, definition, nature and scope.	4
2	Agricultural Credit	Meaning, definition, importance	10
3		Classification based on various criteria.	
4		Credit Analysis - 3 Rs of Credit; 5 Cs of Credit; and 7 Ps of Credit	
5	Repayment Plans.	Study of different repayment Plans.	6
6	Financial Statements	Financial Statements – meaning, types and uses.	
7	Ratio Analysis	Ratio Analysis - current ratio, intermediate ratio, net capital ratio, acid-test ratio,	7
8		Debt-equity ratio, operating ratio, fixed ratio and gross ratio.	
9&10	Time Value of Money	Time Value of Money –Present value of future money and future value of present money.	7
	Principle of Time Comparison	Principle of Time Comparison – meaning and importance.	
11		Compounding and Discounting.	
12	History of financing	History of financing agriculture in India.	6
13	Nationalization of banks	Nationalization of banks – meaning and objectives;	
14	Village Adoption Scheme	Village Adoption Scheme – origin and objectives;	15
15	Lead Bank Scheme	Lead Bank Scheme – origin and functions;	
16	Regional Rural Banks	Regional Rural Banks – origin, objectives and features;	
17	Micro-financial Institutions:	Micro-financial Institutions: Joint Liability Groups (JLGs) – meaning and features;	
18	Self Help Groups (SHGs)	Self Help Groups (SHGs) – meaning and features.	

19	Scale of finance and security for loans.	Scale of finance and security for loans.	7
20	Banking schemes for agricultural finance	Banking schemes for agricultural finance Differential Rate of Interest (DIR) Scheme – origin and features;	
21	Kisan Credit Card Scheme	Kisan Credit Card Scheme – origin, objectives and features.	6
22	Financial inclusion – Jan DhanYojana	Financial inclusion – Jan DhanYojana, financial literacy and business correspondent model.	
23	NPAs in agricultural lending	NPAs in agricultural lending: applicability of the SARFESI Act in agricultural lending.	12
24	Financing Agencies: RBI & NABARD	Financing Agencies: RBI – activities and functions; NABARD – genesis, objectives and functions;	
25	AFC, ADB and World Bank, IMF, IFC and IDA.	AFC – functions; ADB and World Bank – origin and functions; IMF, IFC and IDA.	
26	Deposit Insurance and Credit Guarantee Corporation of India (DICGC)	Deposit Insurance and Credit Guarantee Corporation of India (DICGC) – origin and functions.	
27	Insurance	Insurance – meaning and definition. Crop Insurance Scheme – origin, meaning, importance and advantages of crop insurance,	10
28	Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS),	Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS),	
29	Modified National Agricultural Insurance Scheme (MNAIS)	Modified National Agricultural Insurance Scheme (MNAIS)	
30	Weather based Crop Insurance and FasalBimaYojana and Unified Package Insurance Scheme (UPIS).	Weather based Crop Insurance and FasalBimaYojana and Unified Package Insurance Scheme (UPIS).	10
31	Assessment of crop losses	Assessment of crop losses, determination of compensation, limitations in application and estimation of crop yields	

32	Livestock insurance	Livestock insurance – origin, meaning and importance.	
		Total	**100**

Practical Exercise.

Exercise	Title of Exercise
1.	Exercises on time value of money - compounding
2.	Exercises on time value of money - discounting.
3.	Estimation of credit needs for crop enterprises.
4.	Estimation of credit needs for livestock enterprises.
5.	Determination of scale of finance for farm enterprises.
6.	Repayment plans for short-term loans and term loans.
7.	Estimation of risk in crop enterprises.
8.	Estimation of risk in livestock enterprises.
9.	Estimation of premium amount for insurance.
10.	Visit to financial inclusion branch of commercial bank
11.	Visit to financial inclusion branch of regional rural bank;
12.	Visit to insurance agency in public sectors.
13.	Visit to insurance agency in private sectors.
14.	Visit to weather station.
15.	To study of Jan DhanYojana.
16.	To study of FasalBimaYojana

Suggested Readings:

1. Memoria.C.B 2003. Agricultural Problems of India, KitabMahal Allahabad.
2.Parimal Kumar Ray.1981.Agricultural Insurance: Theory and Practice and Application to Developing Countries.
3. Hand book on crop insurance. 2015. Insurance Regulatory and Development Authority of India.
4. Singh, J.P., Agricultural Finance – Theory and Practice, Ashish Publishing House,
5. Agarwal, R.N., 1996, Financial Liberalization in IndiaA study of Banking System and Stock markets
6. Bagchi, A.K., 1987, The Evolution of the State Bank of India (Part I and II)
7. Bhasin, Niti, 2007, Banking and Financial Markets in India 1947 to 2007
8. Desai, D.K., and Tambad, S.B., 1973, Farm Finance by a Commercial Bank
9. Gulati Ashok and SeemaBathla, 2002, Institutional Credit to Indian Agriculture: Defaults and Policy Options NABARD Occasional Paper23
10. Karthykeyan, T.K., 1990, Long-term Financing of Agriculture Land Development Banks in a Multi-Agency System
11. Mathur, B.L., 1989, Indian Banking- Performance, Problems and Challenges
12. Mishra, R.K., 2005, Banking Sector Reforms and Agricultural Finance
13. Murray, William, G., 1947, Agricultural Finance- Principles and Practices of Farm Credit
14. Nakkiran, S., 1980, Agricultural Financing and Rural Banking in IndiaAn evaluation
15. Pandey, U.K., 1990 An Introduction to Agricultural Finance
16. Subba Reddy, S., and Raghuram P., 2005, Agricultural Finance and Management.

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Semester III

Sr. No.	Course No	Course Title	Credit
1.	STAT-231	Statistical Methods	2 (1+1)
2.	BOT-231	Introduction to Genetics and Plant breeding	2 (1+1)
3.	HORT-232	Post-harvest Management &Value Addition of Fruits & Vegetables	2 (1+1)
4.	PATH-232	Agricultural Microbiology	2 (1+1)
5.	ENGG-232	Protected Cultivation and Secondary Agriculture	2 (1+1)
6.	EXTN-233	Fundamentals of Agricultural Extension Education & Rural Development	2 (1+1)
7.	ECON-233	Farm Management, Production & Resource Economics	2 (1+1)
8.	BM-233	Business Research Methods	3 (2+1)
9.	MKT-233	Agri-input Marketing Management	2 (1+1)
10.	BFA-232	Financial Management	3 (2+1)
		NON-GRADIAL COURSES	
11.	NSS-231	National Service Scheme	1 (0+1)
		Total	**23= 12 +11**

Course	STAT 231	Credit:2(1+1)	Semester: III
Course title	Statistical Methods		

Syllabus

Theory:

Introduction to Statistics and its application in Agriculture. Frequency distribution and cumulative frequency distribution. Graphical representation of data. Measures of Central Tendency: Arithmetic Mean, Median, Mode, GM & HM – merits, demerits and properties of each. Measures of dispersion: Range, QD, MD, Standard deviation, merits, demerits and properties of each and Relative measures of dispersion – CV. Moments, Skewness & Kurtosis. Probability: Definition, Addition and Multiplication Theorem. Theoretical distributions of probability: Binomial, Poisson and Normal Distribution and their properties. Correlation: Definition, Scatter Diagram, Karl Pearson's Coefficient of Correlation. Linear Regression. Introduction to Sampling Methods: Sampling Versus Complete Enumeration, Simple Random Sampling with and without Replacement. Introduction to test of significance: One Sample and Two Sample test for Means (Large Sample, Small Sample), Test for proportions. Chi Square test: Test of Goodness of fit, Test of independence of Attributes in 2x2 Contingency table. Introduction to ANOVA: Analysis of One Way and Two Way Classification.

Practical:

Examples on Frequency distribution and cumulative frequency distribution. Graphical representation of data: Histogram, Frequency Polygon, Frequency Curve and Ogives. Measures of Central Tendency: Arithmetic Mean, Median, Mode, GM & HM (Ungrouped Data and Grouped data) with Calculation of Quartiles, Deciles and Percentiles. Measures of dispersion: Range, QD, MD and Standard Deviation (Ungrouped Data and Grouped data). Relative Measures of Dispersion – CV (Ungrouped Data) Moments, Measures of Skewness & Kurtosis (Ungrouped Data and Grouped data). Simple Problems Based on Probability Theory. Problems on Binomial, Poisson and Normal Distribution. Correlation and Regression Analysis. Selection of Random Sample Using Simple Random Sampling. Application of One Sample t-Test. Application of Two Sample t-Test, One Sample Z-Test, Two Sample Z-Test, test for proportions. Chi Square test: Test of Goodness of fit, Test of independence of Attributes (For 2x2 contingency Table. Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification.

Teaching Schedule:

Theory

Lecture No.	Topic	Weightage (%)
1	**Introduction**: Definitions of Statistics and its applications in Agriculture, limitations, types of **d**ata, classifications and frequency distribution	05
2	**Graphical presentation:** Histogram, frequency curve, frequency polygon, cumulative frequency curve (ogive curve)	04
3	**Measures of central tendency**: Arithmetic mean, median, mode, GM, HM, weighted average, quartile, decilies, percentiles, Characteristics of ideal measure, merits and demerits of various measures (grouped and ungrouped data)	06

4	**Measures of Dispersion:** Range, mean deviation, quartile deviation, standard deviation and variance and respective relative measures (grouped and ungrouped Data).	06
5	Concept of measures of Skewness and Kurtosis.	05
6	**Sampling:** Definitions of population, sample, parameter, statistic, need of sampling, sampling versus complete enumeration and introduction to simple random, stratified and multistage sampling methods. Simple random sampling with and without replacement. Use of random number tables for selection of simple random sample.	08
7&8	**Probability:** Random experiment, events (simple, compound, equally likely, complementary, independent) Definitions of probability (mathematical, statistical, axiomatic), addition and multiplication theorem (without proof). Simple problems based on probability.	08
9&10	**Probability distributions:** Random variable, discrete and continuous random variable, probability mass and density function, definition and properties of Binomial, Poisson and Normal distributions.	08
11 &12	**Test of Significance:** Null and alternate hypothesis, types of errors, degrees of freedom, level of significance, critical region, steps in testing of hypothesis, one sample, two sample and paired 't' test. F test for equality of variance	10
13	Large sample tests for one sample mean, two sample means 'Z' tests.	05
14	Chi-square test of goodness of fit, Chi-square test of independence of attributes in 2□□2 contingency table	05
15	**Correlation:** Definition of correlation, types, scatter diagram. Karl Pearson's coefficient of correlation and its test of significance. Spearman's rank correlation coefficient.	10
16	**Regression**: Linear regression equations, definition & properties of regression coefficient, constant, fitting of regression lines, its test of significance, comparison of regression and correlation coefficients.	10
17	**Analysis of Variance:** Introduction to analysis of variance, Assumptions of ANOVA, analysis of one way classification and two way classification.	10
	Total	**100**

Practical

Exercise	Title of exercise
1	**Graphical presentation:** Histogram, frequency curve, frequency polygon, cumulative frequency curve (ogive curve)
2	**Measures of central tendency**: Computations of arithmetic mean, mode, median, GM and HM, quartiles, deciles& percentiles(Ungrouped data).
3	Computations of arithmetic mean, mode, median, quartiles, deciles& percentiles (grouped data).
4	**Measures of Dispersion:** Computations of range, mean deviation, quartile deviation, standard deviation and variance and respective relative measures (ungrouped Data).
5	Computations of range, mean deviation, quartile deviation, standard deviation and variance and respective relative measures (grouped data).
6	Selection of random sample using simple random sampling.
7	**Correlation:** Computations of Karl Pearsons coefficient of correlation with its test of significance
8	Spearman's rank correlation
9&10	**Regression**: Fitting of simple linear regression equation with test of significance of regression coefficient.
11	**Test of Significance:** Problems on One sample, two Sample and paired t-test.
12	F test for equality of variance
13 &14	Chi-Square test of Goodness of Fit. Chi-square test of independence of Attributes for 2 X 2 contingency table.
15&16	**Analysis of Variance:** Analysis of Variance one way and two way classification.

Suggested Readings:

1) Statistical methods for Agricultural workers by Panse V.G. Sukhatme P.V.
2) Mathematical statistics by Gupta and Kapoor.
3) Statistical Methods by Snedocor and Cochran.
4) A Text book of Agriculture Statistics by R. Rangaswami
5) Statistics for Agriculture Sciences by NageshwarRao G.
6) Experimental Designs by Cochran G.W. and Cox G.W.
7) Design and Analysis of Experiment by Das M.N. and Giri N.C.
8) Statistical procedures for Agricultural Research by Gomez K.A. and Gomez A.A.
9) Applied statistics by Gupta and Kapoor

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Course	BOT -231	Credit: 2 (1+1)	Semester: III
Course title	Introduction to Genetics and Plant Breeding		

Syllabus

Theory:

History of Genetics & Plant Breeding, Study of Chromosome- Structure, functions, cell division. Mendel's laws of inheritance, Mode of inheritance- monogenic, polygenic, cytoplasmic. Modes of reproduction in plants: sexual and asexual, differences between self and cross pollinated crops. Self- incompatibility, male sterility and their significance in plant breeding. Breeding for self-pollinated (Mass, pureline, pedigree and bulk methods), cross pollinated (Ear to row, Backcross, Development of synthetics, composites and hybrids), vegetabively propagated crops viz., Clonal selection.

Practical:

Microscopy, Mendelian ratios- Monohybrid and dihybrid, and problems related to segregation and independent assortment and polygenic inheritance. Study of linkage, crossing over percentage, map distance. Study of floral biology and structure of a model flower, study of floral structure and biology of important cereals, pulses, oilseeds and commercial crops. Study of plant breeders kits, selfing and crossing techniques. Male sterility: A, B and R lines and their utility. Pollen fertility study and its importance. Layout of field experiments, principles, data recording and elementary statistics and analysis of data. Visit to different crop breeding schemes.

Teaching Schedule

Theory

Lecture No.	Name of Topic	Weightage (%)
1	History of Genetics & Plant Breeding,	5
2	Study of Chromosome- Structure, functions	7
3	Cell division	7
4	Mendel's laws of inheritance	5
5	Polygenic, cytoplasmic inheritance	6
6	Mode of inheritance- monogenic	6
7	Modes of reproduction and their significance in plant breeding	6
8	Modes of pollination	7
9	Self- incompatibility	6
10	Male sterility and their significance in plant breeding.	7
11	Breeding for self-pollinated -Mass, pureline selection,	6
12	Pedigree and bulk methods	6
13	Backcross breeding method	7
14	Development of synthetics	6

15	Development of composites and hybrids	6
16	Vegetative propagated crops viz., Clonal selection	7
	Total	**100**

Practical

Exercise	Title of exercise
1	Study of Microscopy, simple and compound microscope
2	Mendelian ratios- Monohybrid
3	Dihybrid, and problems related to segregation and independent assortment
4	Polygenic inheritance.
5	Study of linkage, crossing over percentage, map distance.
6	Study of floral biology and structure of a model flower
7	Study of floral structure and biology of important cereals,
8	Study of floral structure and biology of important pulses, oilseeds.
9	Study of floral structure and biology of important commercial crops.
10	Study of plant breeders kits
11	Selfing and crossing techniques
12	Male sterility: A, B and R lines and their utility
13	Pollen fertility study and its importance
14	Layout of field experiments
15	Principles, data recording and elementary statistics and analysis of data
16	Visit to different crop breeding schemes.

Suggested readings

1. Principle of Genetics, E. J. Gardner , M. J. Simmons, D. P. Snustad, Wiley India (P) Ltd.
2. Genetics, P. K. Gupta Restogi publication Meerut -(p)
3. Fundamentals of Genetics, B. D. Singh Kalyani Publication, New Delhi.
4. Genetics Genetics, M.W. Strickbearger, Peerson education, Inc
5. Elements of Genetics, Phundansingh, Kalyani Publication, New Delhi
6. Genetics, Sushant Elrod and William Stansfield, McGraw Hill Publishing company Limited, New Delhi
7. Plant Breeding Principles and Methods, B. D. Singh KalyaniPublication New Delhi
8. Essentials of Plant Breeding, Phundansingh, Kalyani Publication
9. Principles and Practices Plant Breeding, J. R. Sharma, McGraw Hill Publishing company Limited , New Delhi.
10. Plant Breeding Theory and Practices, V. L. Chopra , Oxford and IBH. Publishing Company , New Delhi.

Course	HORT-232	Credit: 2(1+1)	Semester: III
Course title	Post-harvest Management and Value Addition of Fruits and Vegetables		

Syllabus

Theory:

Importance of post-harvest processing of fruits and vegetables; Extent and possible causes of post-harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, Cold storage, CA, MA and Hypobaric); Value addition concept; Principles and methods of preservation; Minimal processing; Intermediate moisture foods- Jam, Jelly, Marmalade - Concepts and Standards; Fermented and non-fermented beverages; Drying/Dehydration of fruits and vegetables - Concept and methods; Canning - Concepts and Standards, Packaging of products.

Practical:

Containers for shelf life extension; Effect of temperature on shelf life and quality of produce; Chilling and freezing injury in vegetables and fruits; Extraction and preservation of pulps and juices; Preparation of Jam, Jelly, RTS, Nectar, Squash, Wine, Fruit bar, Candy, Tomato products; Quality evaluation of products- physio-chemical and sensory; Visit to processing unit/ industry.

Teaching Schedule

Theory

Lectures No	Topics	Subtopic	Weightage (%)
1	Importance of post harvest processing of fruit and vegetables	Importance of post harvest processing of fruit and vegetables	8
2	Extent and possible causes of post harvest losses	causes of post harvest losses	6
3	Pre harvest factors affecting postharvest quality	Pre harvest factors	6
4	Maturity, Ripening and changes occurring during ripening.	Maturity –Definition, types, judging maturity Ripening- Definition, changes occurring during ripening	8
5	Respiration and factors affecting respiration rate.	Respiration- Definition, Factors affecting respiration rate.	6
6	Harvesting and field handling	Harvesting-Definition, methods of harvesting Field handling	8
7	Storage	Storage- ZECC, Cold storage, CA, MA and hypobaric	8
8	Value addition concept Principles and method of preservation	Value addition concept Principles of preservation Methods of preservation	10
9	Minimal Processing Intermediate moisture foods	Minimal Processing Intermediate moisture foods	4
10	Jam	Concept and Standards	4
11	Jelly	Concept and Standards	4
12	Marmalade	Concept and Standards	4
13	Fermented and non-	Concept and Standards	6

	fermented beverages		
14	Drying/ Dehydration of fruit and vegetables	Concept and Standards	6
15	Canning	Concept and Standards	6
16	Packaging	Definition, types and principles	6
		Total	**100**

Practical Exercises:

Exercise	Title of Exercise
1	Containers for shelf life extension.
2	Effect of temperature on shelf life and quality of produce.
3	Chilling and freezing injury in vegetables and fruits.
4	Extraction and preservation of pulps and juices.
5	Preparation of Jam.
6	Preparation of Jelly.
7	Preparation of RTS.
8	Preparation of Nectar.
9	Preparation of Squash.
10	Preparation of Wine.
11	Preparation of Frit bar.
12	Preparation of candy.
13	Preparation of tomato products.
14	Quality evaluation of products-physicochemical and sensory.
15-16	Visits to processing units/Industry.

Suggested readings:

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. I and 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 Shinde and V. S. Khandare. A Text Book of Post Harvest Management &Value addition of Fruits and Vegetables Shri. Rajlakshmi Prakashan. Aurangabad.
9. K.P. Sudheer and V. Indira. Post Harvest Technology of Horticultural Crops. New India Publishing Agency
10. Sanjeev Kumar and R. P. Srivastava. Fruit & Vegetable Preservation: Principles and Practices. International Book Dis
11. G. L. Tandon , G. S. Siddappa and Girdhari Lal. Preservation of Fruits and Vegetables. Bombay Popular Prakashan.

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Course :	**PATH-232**	**Credit:**	**2**=1+1	**Semester- III**
Course title:	**Agricultural Microbiology**			

Syllabus

Theory:

Introduction to Microbiology. Diversity of microorganisms in nature: viruses, bacteria, fungi, algae and protozoa. Growth and nutrition of microorganisms. Influence of environmental factors on microbial growth. Qualitative and quantitative study of microorganisms. Microbial metabolism and genetics. Microbial interactions: neutralism, commensalism, synergism, mutualism, competition, amensalism, parasitism and predation.

Microorganisms in soil and their role in organic matter decomposition and transformations of plant nutrients. Microflora of Rhizosphere and Phyllosphere. Microbiology of water and air. Microbiology of foods. Principles of food preservation. Beneficial microorganisms in agriculture: Biofertilizers, biocontrol agents and microbial insecticides. Industrial uses of microorganisms.

Sources of microorganisms to various Foods and Agricultural products. Methods of analysis for the presence of microorganisms and their metabolites. Microbiological standards for various raw and processed products and methods to monitor them.

Practical:

Microscopy: Principles and use of microscope

Preparation of culture media and sterilization methods.

Isolation, purification and preservation of microorganisms.

Enumeration of microorganisms from natural habitats.

Stains and staining techniques: simple, negative, capsule, endospore and Gram's staining.

Influence of environmental factors on microorganisms.

Biochemical activities of microorganisms.

Isolation and examination of beneficial microorganisms from soil: N-fixers, Phosphate solubilizers and mobilizers

Edible mushrooms: Methods for production of mushroom seeds and cultivation.

Microbiological examination of water and effluents.

Microbiological examination of raw and processed foods.

Role of microorganisms in re-cycling of organic wastes.

Theory
Teaching Schedule

Lecture No.	Topic	Weightage (%)
1	Introduction to Microbiology. Diversity of microorganisms in nature: viruses, bacteria, fungi, algae and protozoa.	5
2	Growth and nutrition of microorganisms. Influence of environmental factors on microbial growth.	5
3	Qualitative and quantitative study of microorganisms. Microbial metabolism and genetics.	10
4	Microbial interactions: neutralism, commensalism, synergism, mutualism, competition, amensalism, parasitism and predation.	5
5	Microorganisms in soil and their role in organic matter decomposition and transformations of plant nutrients.	10
6	Microflora of Rhizosphere and Phyllosphere.	5
7	Microbiology of water and air. Microbiology of foods.	5
8	Principles of food preservation.	10
9	Beneficial microorganisms in agriculture: Biofertilizers, biocontrol agents and microbial insecticides.	5
10	Industrial uses of microorganisms.	10
11	Sources of microorganisms to various Foods and Agricultural products.	5
12	Methods of analysis for the presence of microorganisms and their metabolites.	5
13	Methods of analysis for the presence of microorganisms and their metabolites.	5
14	Microbiological standards for various raw and processed products and methods to monitor them.	5
15	Microbiological standards for various raw processed products and methods to monitor them.	5
16	Microbiological standards for various raw processed products and methods to monitor them.	5
	Total	**100**

Practical

Exercise	Title of Exercise
1	Microscopy: Principles and use of microscope
2	Preparation of culture media and sterilization methods.
3	Isolation, purification and preservation of microorganisms.
4	Enumeration of microorganisms from natural habitats.
5	Stains and staining techniques: simple, negative, capsule, endospore and Gram's staining.
6	Stains and staining techniques: simple, negative, capsule, endospore and Gram's staining.
7	Study of fungicides, bactericides, nematicides and their formulations.
8	Influence of environmental factors on microorganisms.

9	Biochemical activities of microorganisms.
10	Biochemical activities of microorganisms.
11	Isolation and examination of beneficial microorganisms from soil: N-fixers, Phosphate solubilizers and mobilizers
12	Edible mushrooms: Methods for production of mushroom seeds and cultivation.
13	Microbiological examination of water and effluents.
14	Microbiological examination of raw and processed foods
15	Role of microorganisms in re-cycling of organic wastes.
16	Role of microorganisms in re-cycling of organic wastes.

Suggested readings

1. M T Madigan, and J M Martinko, 2014. *Biology of Microorganisms* 14thEdn.
2. Pearson.M J Pelczer, 1998. *Microbiology* 5thEdn. Tata McGrow Hill Education Pvt. Ltd.
3. Strainer, R, 1987. *General Microbiology*. Palgrave Macmillan.EdwardAlchano, 2002. *Introduction to Microbiology*.Jones and Bartlett hearing.
4. R P Singh, 2007. *General Microbiology*. Kalyani Publishers.
5. J Heritage, E G V Evans, R A Killington, 2008. *Introductory Microbiology*. Cambridge University press P. date.
6. Pelczar, jr.M.J.E.C.S.Chan and Krieg, N.R. 1996. *Microbiology*. McGraw Hill Publishers,
   Newyork.
7. Prescott, L.M. Harley, J.P. and Klein, D.A (5ed) 2002. *Microbiology*. McGraw Hill Publishers, Newyork.
8. Jamaluddin, M. Malvidya, N. and Sharma, A. 2006. *General Microbiology*. Scientific Publishers, Washington.

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Course	**ENGG-232**	**Credit: 2(1+1)**	**Semester: III**
Course title	**Protected Cultivation and Secondary Agriculture**		

Syllabus

Theory:

Green house technology: Introduction, Types of Green Houses; Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air greenhouse heating systems, green house drying. Cost estimation and economic analysis.

Important Engineering properties such as physical, thermal and aero &hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, re-circulatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

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

Teaching schedule

Theory

Lecture No.	Topic / Topics	Points to be Covered	Weightage (%)
1	Green house technology: Introduction	Green house technology:Introduction, History of green house, Advantages of greenhouse, Greenhouse effect	
2	Types of Green Houses	Types of Green Houses: Types of greenhouse based on Shape, Utility, Construction and covering material	10
3	Plant response to Greenhouse environment	Plant response to Greenhouse environment: Light control, Factors affecting Temperature, Relative Humidity, Ventilation and Carbon di-oxide	
	Planning and design of greenhouses	Planning and design of greenhouses: Site selection and orientation, structural design and covering / glazing materials, properties of glazing material, Layout of greenhouse, Types of loads considered for design	10
4	Materials of construction for traditional and low cost green houses. Green house equipments	Materials of construction for traditional and low cost green house: Wood, G.I., aluminum, steel, R.C.C. and Glass Green house equipments	
5	Design criteria of green house for cooling and heating purposes. Passive solar green house, hot air greenhouse heating systems	Design criteria of green house for cooling and heating purposes: Cooling – Natural Ventilation, forced ventilation – fan & pad, high pressure & low pressure mist system Heating – Heating system, solar heating system, water & rock storage	15
6	Irrigation systems used in greenhouses. Typical applications	Irrigation systems used in greenhouses: Hand watering, Perimeter watering, Overhead sprinklers, Boom watering, Drip irrigation	
7	Cost estimation and economic analysis	Cost estimation and economic analysis: Capital requirement, Economics of production, Conditions influencing returns	10
8	Important Engineering properties such as physical, thermal and aero &hydrodynamic properties of cereals,	Important Engineering properties such as physical, thermal and aero &hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation: Physical properties- Size & Shape	

	pulses and oilseed, their application in PHT equipment design and operation	(Roundness &Sphericity), Poro and sity, Coefficient of friction & angle of repose. Thermal properties- Definition of specific heat & thermal conductivity. Aero & hydrodynamic properties – Definition of Terminal velocity	10
9	Drying and dehydration	Drying and dehydration: Definition of drying and dehydration, Utilities / importance of drying, Grain drying theory – EMC definition, Thin layer drying & deep bed drying (only definitions)	
10 & 11	Moisture measurements	Moisture measurement: Moisture contents and its measurement, Moisture content representation, Dry basis & Wet basis moisture content. Determination Methods: Direct methods – Oven methods, Brown-Duvel fractional distillation method, Infra-red method. Indirect methods – Electrical resistance method, Di-electric method, Chemical method	15
12	Numerical on moisture content and its representation	Conversion of wet basis into dry basis & dry basis into wet basis moisture content. Numerical on moisture content determinations	
13	Various drying methods	Various drying methods: Sun drying, Mechanical drying. Mechanical drying methods – Contact drying Convection drying, Radiation drying, Super-heated steam drying, Fluidized bed drying, Desiccated drying	10
14 & 15	Commercial grain dryers	Commercial grain dryers: Deep bed dryer, Flat bed dryer, Tray dryer, Fluidized bed dryer, Recirculating dryer (LSU dryer, Baffle dryer, RPEC dryer), Solar dryer	10
16	Material handling equipments	Belt conveyor, Screw conveyor, Bucket elevator, their principle, working and selection	10
Total			**100**

Practical's

Exercise	Title of Exercise
1	Study of different types of green houses
2	Study of cooling systems used in green house
3	Determination of rate of air exchange in an active summer winter cooling System

4	Determination of drying rate of agricultural products inside green house
5	Study of irrigation systems used in green house
6	Study of instruments and equipments used in Greenhouse
7	Cost estimation of poly-house for 560 sqm.
8	Visit to commercial green house
9	Determination of moisture content of various grains by oven drying
10	Determination of moisture content of various grains by infra-red moisture meter
11	Determination of physical properties of grains (Size and Shape, density and porosity of biomaterials)
12	Study of different types of dryers
13	Study of cleaning equipments
14	Study of different types of graders and separators
15	Study of modern rice milling machineries
16	Visit to Seed processing plant / Food-grains processing industries / Post-harvest Laboratories

Suggested Readings:

1) Green House Technology and Management by K. RadhaManohar, C. Igathinathane, Second Edition (2007), B.S. Publications 4-4-309, Sultan Bazar, Hyderabad-500095.
2) Unit Operations of Agricultural Processing by K. M. Sahay and K. K. Singh, Second Revised Edition (2001), Reprint-2017, Vikas Publishing House Pvt Ltd, New Delhi-110007.
3) Post Harvest Technology of Cereals, Pulses and Oilseeds by A. Chakravarty, Third Edition (1995), Reprint 2005, Oxford & IBH Publishing Co. Pvt Ltd, 66 Janpath, New Delhi-110001
4) .A Text Book of Greenhouse and Post Harvest Technology by B. P. Sawant, J. M. Potekar, H. W. Awari (2008), Nikita Publication, Latur.
5) Green House Technology by G. N. Tiwari and R. K. Goyal (1998), Narosa Publishing House, 6 Community Centre, Panchsheel Park, New Delhi-110017.
6) Green House Operation and Management by Nelson and Paul V (1994) Prentice Hall, USA.
7) Post Harvest Technology and Quality Management of Fruits and Vegetables by P. Suresh Kumar, V. R. Sagar and M. Kanwat (2009), Agrotech Publishing Academy, Udaipur.
8) Agricultural engineering –T.P. IJHA & A. M. MICHAL (OXFORD Publication)

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Course :	EXTN-233	Credit:	2=1+1	Semester- III
Course title:	**Fundamentals of Agricultural Extension Education and Rural Development**			

Syllabus

Theory:

Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment) and post-independence era (Etawah Pilot Project, Nilokheri Experiment); various extension/ agriculture development programmes launched by ICAR/ Govt. of India

(IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP). New trends in agriculture extension: privatization of extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems.

Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Development-meaning, definition, concept & principles, Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel.

Practical:

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids. Preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories. Presentation skills exercise; micro teaching exercise. A visit to village to understand the problems being encountered by the villagers/ farmers; to study organization and functioning of DRDA and other development departments at district level. Visit to NGO and learning from their experience in rural development. Understanding PRA techniques and their application in village development planning; exposure to mass media.

Teaching Schedule

Theory

Lectures No.	Topics	Subtopic	Weightage (%)
1	Education	Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education;	**10**
2	Extension Programme Planning :	Meaning, process, principles and steps in programme development	**8**
3	Extension system In India :	Extension efforts in pre-independence era : Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment Post-independence era : Etawah Pilot Project, Nilokheri Experiment Present extension System : Department of Agriculture : Structure, Function	**6**
4	Various extensioin/agriculture development programmes launched by ICAR/Government of India	Introduction, Objectives and Salient Achievements Intensive Agriculture District Programme (IADP) Intensive Agricultural Area Programme (IAAP) High Yielding Varieties Programme (HYVP) Institution –Village Linkage Programme (IVLP) Operational Research Project (ORP) National Agricultural Technology Project (NATP) National Agricultural Innovation Project (NAIP) Rashtriya Krishi Vikas Yojana (RKVY)	**10**
5	New trends in agricultural extension :	Meaning, Objectives, Sailent features Privatization in extension, ICT in Extension education – Cyber extension/ e-extension, Market-led extension, Farmer-led extension	**5**
6	Rural Development :	Concept, meaning, definition, objectives and genesis	**5**
7	Community Development :	Meaning, definition, concept, principles and philosophy	**3**
8	Democratic Decentralization (Panchayati Raj)	Meaning, Constitution and functions	**2**

9	Extension administration and management :	Meaning and concept, principles, functions and differences	**3**
10	Evaluation in Extension	Meaning, definition, types of evaluation, monitoring and evaluation	**2**
11	Transfer of technology programmes :	Lab to Land programme (LLP), National Demonstration (ND), Front Line Demonstration (FLD), Krishi Vigyan Kendras (KVK), Technology Assessment and Refinement Programme (TARP) of ICAR	**5**
12	Capacity building of extension personal and farmers :	Meaning, Training and Education, Types of training, Training institutes in India, Concept of Human Resource Development	**5**
13	Extension Teaching Methods and Audio-Visual Aids :	Meaning, definition, importance, classification, media mix strategies; Factors affecting selection and use of methods and aids	**10**
14	Communication	Meaning and definition ; elements, selected models and barriers to communication	**10**
15	Agriculture Journalism	Meaning, definition, news writing	**3**
16	Diffusion and adoption of innovation :	Concept and meaning, Attributes of innovation, Innovation decision Process, adopter categories.	**3**

Practicals

Exercise	Title of exercise
1	Study of university extension system
2	Organizing group discussion- exercise;
3	Handling and use of digital camera
4	Handling and use of LCD projector
5	Handling and use of Public Address System
6	Preparation of extension literature-leaflet, folder
7	Preparation of effective power point presentations
8	Writing of news story
9	Writing success story
10	Study of structure and functioning of DRDA
11	Study of structure and functioning of Department of Agriculture
12	Visit to NGO and learning from their experience in rural development
13	Visit to village to understand PRA techniques and their application development planning;
14	Visit to community radio/television studio for understanding the process of production;
15	Writing for print/electronic media,
16	Developing script for radio/television.

Suggested Readings:

1. Addison, H.M., 1973, Agricultural Extension: A Reference Manual,

Food and Agricultural Organization of the United Nations, Rome,Adivi Reddy, A., 2001, Extension Education, Sree Laxmi Press, Bapatla, (AP)
2. Dahama, O.P . and Bhatnagar, O.P ., 2005, Education and Communication for Development, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Jalihal, K.A., and Veerabhadraiah V ., 2007, Fundamentals of Extension Education and Management in Extension, Concept Publ. Co.
4. Ray, G .L., 1999, Extension Communication and Management, Noya Prakash, Calcutta

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Course	**ECON-233**	**Credit:2(1+1)**	**Semester: III**
Course title	Farm Management, Production & Resource Economics		

Syllabus

Theory:

Farm Management: Meaning, definition, nature, scope and decision making process. Land holding: Land holding ownership, Types and systems of farming, factors determining types and size of farms. Farm Management Principles: Factor-Product, Factor-Factor and Product-Product Relationships and Law of equi-marginal returns. Farm Management Costs: Seven types of costs and their interrelationships, importance of cost in managing farm business. Farm Records: Types and importance of farm records and accounts in managing a farm; Farm planning and budgeting: Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming; Risk and uncertainty: Risks and uncertainty in agriculture production and their management strategies. Crop/livestock/machinery insurance: Weather Based Crop Insurance (WBCIS) and Pradhan Mantri Fasal Bhima Yojana (PMFBY), their features. Resource economics: Meaning, natural resource economics and agricultural economics, management of common property resources.

Practical:

Factor-Product Relationship. Factor-Factor Relationship. Product-Product Relationship. Estimation of cost and returns using CACP cost concepts. Farm Budgeting. Book Keeping. Farm Inventory Analysis. Farm Financial Measures. Preparation of optimum farm plan using partial and complete budgeting. Preparation of profit and loss accounts and balance sheet.

Teaching Schedule

Theory

Lecture No.	**Topic**	**Weightage (%)**
1	Farm Management: Meaning, definition, nature, scope and decision making process.	5
2	Land holding: Land holding ownership,	5
3 & 4	Types and systems of farming, factors determining types and size of farms.	10
5 & 6	Farm Management Principles: Factor-Product, Factor-Factor and Product-Product Relationships and Law of equi-marginal returns.	15
7 & 8	Farm Management Costs: Seven types of costs and their interrelationships, importance of cost in managing farm business.	15
9	Farm Records: Types and importance of farm records and accounts in managing a farm	10

10 & 11 &12	Farm planning and budgeting: Meaning and importance of farm planning and budgeting, partial and complete budgeting.	10
13 & 14	Steps in farm planning and budgeting-linear programming;	10
15	Risk and uncertainty: Risks and uncertainty in agriculture production and their management strategies. Crop/livestock/machinery insurance: Weather Based Crop Insurance (WBCIS) and Pradhan Mantri Fasal Bhima Yojana (PMFBY), their features.	10
16	Resource economics: Meaning, natural resource economics and agricultural economics, management of common property resources.	10
	Total	**100**

Practical

Exercise	**Topic**
1	Factor-Product Relationship.
2	Factor-Factor Relationship.
3	Product-Product Relationship.
4	Estimation of cost and returns using CACP cost concepts. -1,Seasonal crop
5	Estimation of cost and returns using CACP cost concepts-2, Annual crop
6	Estimation of cost and returns using CACP cost concepts-3, Perennial crop
7	Farm Budgeting. Book Keeping-1
8	Farm Budgeting. Book Keeping-2
9	Farm Inventory Analysis
10	Farm Financial Measures. 1
11	Farm Financial Measures-2
12	Preparation of optimum farm plan using partial and complete budgeting. -1
13	Preparation of optimum farm plan using partial and complete budgeting-2
14	Preparation of profit and loss accounts and balance sheet-1
15	Preparation of profit and loss accounts and balance sheet-2
16	Semester End Practical Exam

Suggested Readings:

1) Economics of Agricultural Production and Resource Use: Heady, Earl O, Prentice Hall of India, Private Limited, New Delhi, 1964

2) Introduction to Agricultural Economic Analysis: BISHOP, C.E., & TOUSSAINT, W.D., NEWYORK, John Wiley and Sons, Inc., London, 1958

3) Fundamentals of Farm Business Management: S.S. Johl, J.R. Kapur, Kalyani Publishers, New Delhi

4) Agricultural Economics: Subba Reddy S., Raghuram P., Neelakanta Sastry T.V., Bhavani Devi I., Oxford and IBH Publishing Company, Private Limited, New Delhi, 2006

5) Farm Management Economics: Heady Earl O and Herald R. Jenson, Prentice Hall, New Delhi, 1954

6) Elements of Farm Management Economics: I.J. Singh, Affiliated East-West press, Private Limited, New Delhi

7) Introduction to Farm Management: Sankhayan, P.L., Tata – Mc Graw – Hill Publishing Company Limited, New Delhi, 1983

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Course	**BM-233**	**Credit: 3 (2+1)**	**Semester: III**
Course title	**Business Research Methods**		

Syllabus

Theory:

Business Research – Meaning, types, importance and characteristics of good research. Ethics in business research. Research proposal - purpose, types and its Importance. Research process – Problem identification. Developing an Approach to the problem. Research design - definition, classification and types. Sampling design - meaning, steps in sampling design and process. Types of sampling: Probability and Non-probability sampling. Determining sample size. Meaning and types of Sampling error. Data sources – primary and secondary data types. Data Collection Methods: Observations, survey and interview. Focus group discussion and panel data. Measurement and scaling techniques – basic scales of measurement, scaling techniques. Attitude measurement – Likert scale. Data editing, coding, classification, tabulation. Data Analysis – qualitative and quantitative methods. – Use of parametric and nonparametric tests: T -test, Z-test, F-test, Chi- square test and ANOVA and its applications – Correlation, simple and multiple regression techniques. Steps in report writing.

Practical:

Preparing business research proposal – Problem identification and research questions formulation of research design, sampling framework and hypothesis. Data mining - Collection of primary and secondary data – Sources. Preparation of interview schedule and questionnaire for primary data collection - Administration of mailed questionnaire and on-line survey. Conducting field level enquiry and data collection. Organizing other methods of data collection - Focus group discussion/panel data collection / observation / case study. Application of scaling techniques in business research. Data editing - coding and tabulation - Application of statistical tools (Descriptive statistics) in business research. Understanding cause and effect and functional relationships among the variables.

Teaching Schedule

Theory

Lecture No	**Topic**	**Weightage (%)**
1 -3	Business Research – Meaning, types, importance and characteristics of good research.	8
4	Ethics in business research.	4
5-6	Research proposal - purpose, types and its Importance.	8
7-9	Research process – Problem identification. Developing an Approach to the problem.	8
10-12	Research design - definition, classification and types.	8

13- 16	Sampling design - meaning, steps in sampling design and process. Types of sampling: Probability and Non-probability sampling. Determining sample size. Meaning and types of Sampling error	16
17	Data sources – primary and secondary data types.	4
18	Data Collection Methods: Observations, survey and interview.	4
19	Focus group discussion and panel data	4
20-22	Measurement and scaling techniques – basic scales of measurement, scaling technique.s	8
23-25	Attitude measurement – Likert scale. Data editing, coding, classification, tabulation	8
26 -31	Data Analysis – qualitative and quantitative methods. – Use of parametric and nonparametric tests: T -test, Z-test, F-test, Chi- square test and ANOVA and its applications – Correlation, simple and multiple regression techniques.	16
32	Steps in report writing.	4
	Total	100

Practical

Exercise	Topic
1	Study of Preparing business research proposal – Problem identification and research questions. (Study of Criteria for identifying the research problem)
2	Study of formulation of research design,
3	Study of sampling framework and hypothesis.
4	Study of Data mining - Collection of primary and secondary data – Sources
5	Study of Preparation of interview schedule and questionnaire for primary data collection. (Guideline for successful interviewing)
6	Study of Administration of mailed questionnaire and on-line survey.
7	Study of Conducting field level enquiry and data collection.
8	Study of Organizing other methods of data collection - Focus group discussion
9	Study of panel data collection.
10	Study of observation
11	A case study and its merits and demerits
12	Application of scaling techniques in business research.
13	Data editing - coding and tabulation
14	Application of statistical tools (Descriptive statistics) in business research. (Study of Mechanics of Analysis of Data)
15	Understanding cause and effect and functional relationships among the variables

Suggested Readings:

1. Goode, W.J and Hatt, P.K. Methods in Social Research. McGraw – Hill Book Company New Delhi

2. Eilkinson TS and Bhandarkar. Methodology and Techniques of Social Research, Mrs Meena Panday for Himalaya Publishing House, " Ramdoot DR. Bhalerao Marg, Girgaon Mumbai – 400 004.

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Course No:	MKT - 233	2 (1+1)	Semester : III
Course Title	Agri-input Marketing Management		

Theory:

Agricultural Marketing- Definition, scope and classification of agricultural marketing.

Agricultural input marketing – meaning and importance; Agricultural Inputs and their types – farm and non-farm, role of cooperative, public and private sectors in agri input marketing.

Seed Marketing: Importance, Types of seeds, Demand and supply of seeds; agencies involved in Seed marketing, distribution, export import of seeds; Role of NSC and State Seed Corporation. Government policy on seed marketing.

Fertilizer Marketing: Production, export-import, supply of chemical fertilizers. Demand/consumption, regional disparity in consumption, pricing policy; subsidy on fertilizers; marketing system – marketing channels, Agencies involved in fertilizer marketing- Public, Private, Co-operative sectors. Problems in distribution.

Plant Protection Chemicals: Plant Protection Chemicals- Production, export/import, consumption, marketing channels.

Electricity/Diesel Oil- distribution, pricing of electricity for agriculture use; subsidy on electricity.

Farm Machinery and Implement: Production, supply, demand, distribution channels of farm machines; Agencies involved in distribution of agro- machineries and implements. Meaning and importance of Land reforms and tenancy in agriculture, ceiling, elasticity, pricing.

Labor markets - productivity, heterogeneity, wage differentials – skill differentials.

Credit: importance, types and sources. IT applications in agri- input marketing.

Practical:

Input Market Analysis, Primary and Secondary Survey of input use, Exercise on Market Segmentation, Case Study on Product Management, Channel Management in Agri input, Case Study on Brand Management, Designing Communication and Promotion Measures – Seed, Designing Communication and Promotion Measures – Fertilizer, Designing Communication and Promotion Measures – Plant Protection Chemicals, Designing Communication and Promotion Measures Agricultural Machinery and Implements, Market Research – Seed, Fertilizers, Plant Protection Chemicals, Farm Machinery and Implements, Formulation of Marketing Strategy, Report Presentations.

Teaching Schedule

Lectures No	Main Topic	Sub Topics	Weithage (%)
1	**Agricultural Marketing-**	Definition, scope and classification of agricultural marketing	05
2&3	**Agricultural input**	– Meaning and Importance; Agricultural Inputs and their types – farm and non-farm, role of cooperative,	10

	marketing.	public and private sectors in agri input marketing	
4 & 5	**Seed Marketing**:.	Importance, Types of seeds, Demand and supply of seeds; Agencies Involved in Seed marketing, Distribution, Export Import of seeds; Role of NSC NSP SFCI and State Seed Corporation(SSC). Government policy on seed marketing. Government Public, Private companies involves&, Co-operative sectors. Problems & sugtion in distribution	15
6 & 7	**Fertilizer Marketing**:	, Defination Importance, Types, classification of , Supply of Chemical fertilizers. Demand/ consumption, pricing policy; subsidy on fertilizers; Legal Aspects of Fertilizer Marketing marketing system – marketing channels, Agencies involved in fertilizer marketing- Public, Private companies involves&, Co-operative sectors. Problems & suggtion in distribution	15
8 & 9	**Plant Protection Chemicals**:	Plant Protection Chemicals- Production, export/import, consumption, marketing channels Type of. Plant Protection Chemicals Different companies involves in Plant Protection Chemicals	15
10 & 11	**Electricity/Diesel Oil Engine.**	Distribution, pricing of electricity for agriculture use; subsidy on electricity Different companies involves in Electricity/Diesel Oil-.	10
12&13	**Farm Machinery and Implement**:	Supply, Demand, Distribution Channels of Farm Machines; Agencies involved in Distribution of Agro- Machineries and Implements. Different companies involves in farm machinery & Implements (Drip Sprinkler &other irrigation companies	10
14&15	**Labor markets**	Type of Labour Skill labour, Unskilled labour, Family labours & Animal Labors Work productivity, Type of wage differentials	10
16	**Credit**	Defination Importance, Types, classification of credit . Sources of Credit in agri- input marketing	10
		Total	**100**

Practical Exercises

Exercises	Title of Exercise
1	Input Market Analysis
2	Primary and Secondary Survey of input use
3	Exercise on Market Segmentation
4	Case Study on Product Management
5	Channel Management in Agri input,
6	Case Study on Brand Management
7	Designing Communication and Promotion Measures Seed
8	Designing Communication and Promotion Measures Fertilizer
9	Designing Communication and Promotion Measures Plant Protection Chemicals,
10	Designing Communication and Promotion Measures Agricultural Machinery and Implements,
11	Market Research – Seed
12	Market Research – Fertilizers
13	Market Research – Plant Protection Chemicals
14	Market Research – Farm Machinery and Implements
15	Formulation of Marketing Strategy
16	Report Presentations.

Suggested references:

1. Agricultural Marketing in India Acharya, S.S. and Agarwal, N.L.
2. Agricultural Economics, Kalyani Publications .
3. Ruddra Dutt and Sundharam K.P .M., Indian Economics.

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Course	BFA-232	Credit: 3 (2+1)	Semester: III
Course title	Financial Management		

Syllabus

Theory:

Introduction to financial management. Objective of financial management. The time value of money. Process of compounding and discounting. Capital Budgeting: Long term investment decisions. Nature of investment decisions. Forms of investment decisions. Capital budgeting process - Estimation of project cash flows, Evaluation of proposals. Evaluation techniques-Discounting and non-discounting techniques. Risk analysis in capital budgeting. Sources of Long Term finance. Cost of Capital. Capital structure: importance, factors influencing capital structure and features of an optimal capital structure. Leverage: leverage in financial context, measures of leverage. Estimation of Working Capital Requirements: Concept, factors affecting the working capital requirement - operating cycle approach. Criteria for evaluation of working capital management. Inventory Management: nature, role, purpose, inventory management techniques. Receivables Management: purpose and cost of maintaining receivables. Credit policy. Cash management: liquidity– profitability trade off, need and objectives, cash budget.

Dividend decisions of a firm.

Practical:

Appraisal of project proposals using capital budgeting techniques. Computation of costs of borrowed capital, preferred stock, equity capital and retained earnings. Calculation of Operating Leverage, Financial Leverage and Combined Leverage. Valuation of stocks and debentures. Estimation of operating cycle.

Teaching Schedule

Theory

Lecture No.	Topic	Points to be Covered	Weightage %
1	Financial management.	Introduction to financial management.	7
2		Objective of financial management.	
3	Capital Budgeting:	Long term investment decisions.	20
4		Nature of investment decisions.	
5		Forms of investment decisions.	
6 -7		Estimation of project cash flows,	
8		Evaluation of proposals.	
9		Evaluation technique -Discounting and non-discounting techniques	
10		Risk analysis in capital budgeting.	
11	Sources of Long Term finance.	Sources of Long Term finance.	7
12 -13	Cost of Capital	Cost of Capital	
14- 15	Capital structure	Capital structure: importance	10
		Features of an optimal capital structure.	
16		factors influencing capital structure	
17- 18	Leverage	Leverage: leverage in financial context	7
		Measures of leverage.	
19- 22	Estimation of Working Capital Requirements:	Estimation of Working Capital Requirements: Concept,	14
		Factors affecting the working capital requirement.	
		working capital requirement - operating cycle approach	
		Criteria for evaluation of working capital management	
23	Inventory Management	Inventory Management: nature and role	10
24-25		Inventory Management: purpose,	
		Inventory management : techniques.	
26-27	Receivables Management	Receivables Management: purpose	7
		Cost of maintaining receivables.	

28	Credit policy.	Credit policy.	11
29-30	Cash management:	Cash management: liquidity– profitability trade off,	
		Need and objectives,	
31	Cash budget.	Cash budget.	7
32	Dividend	Dividend decisions of a firm.	
		Total	**100**

Practical

Exercise	Title of Exercise
1.	Practical exercise on calculation of Net Present Worth (NPW)
2.	Calculation of Benefit Cost Ratio (BCR)
3.	To study of Internal Rate of Return (IRR)
4.	Calculation of Profitability Index (PI)
5.	Calculation of Pay Back Period (PBP)
6.	Exercise on principles of cash flow estimation.
7.	Practical exercise on Financial Break Even Analysis.
8.	Study of different sources of long term finance.
9.	Practical on Calculation / illustrations on Operating Leverage
10.	Practical on Calculation / illustrations on Financial Leverage
11.	Practical on Calculation / illustrations on Combined Leverage.
12.	Practical on Valuation of stocks.
13.	Practical on Valuation of debentures.
14.	Exercise on estimation of operating cycle / Inventory Turnover
15.	Computation of costs of borrowed capital and preferred stock.
16.	Computation of costs of equity capital and retained earnings

Suggested Readings

1. Khan M.Y. Jain P.K. 2008. Financial Management – Text & Problems. Tata McGraw – Hill.

2. Pandey I.M. 2005. Financial Management. Vikas Publishing House.

3. Shashi K. Gupta. Sharma R.K. 2007. Financial Management – Theory and Practice. Kalyani Publishers.

4. The Institute of Chartered Financial Analysts of India. 2006. Financial Management for Managers. ICFAI University.

5. Pandey, I.M., Financial Management ,Vani Educational Books.

6. Raman, B. S., Financial Management ,United Publishers.

7. Sharma, R. K., and Sasi Guptha K., Management Accounting, Kalyani Publishers.

8. Vishwanath, S.R. Corporate Finance – Theory and Practice, Response Books.

9. James.C.Van Horne (2002), Financial Management and Policy Stanford University

10. Khan and Jain (2004), Financial Management, Tata McGraw Hill

11. Chandra P. 2000. Financial Management. Tata McGraw Hill.

12. Vyaptakesh, S. 2012. Fundamentals of Financial Management, Pearson Publishers.

13. Ravi, M.K.2015. Financial Management : Theory, Problems, Cases. Taxman Publications Prentice

Hall of India Learning(8th ed.).

14. Ramachandran N & Kakani RK. 2005. Financial Accounting for Management.

Tata McGraw Hill.

15. Van Horne JC. 1997. Financial Management and Policy. Prentice Hall.

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Course :	NSS -231	**Credit:**	1(0+1)	**Semester-III**
Course title:	National Service Scheme			

Syllabus

Teaching Schedule (Practical)

Exercise	**Topic**	**Weightages (%)**
1.	Introduction and basic components of NSS: Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS, organizational structure of NSS,	7
2.	Code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health	7
3.	NSS programmes and activities- Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey,	7
4.	Analysing guiding financial patterns of scheme, youth programme/ schemes of GOI,	7
5.	Coordination with different agencies and maintenance of diary	6
6.	Understanding youth -Definition, profile, profile, categories, issues and challenges of youth;	6
7.	Opportunities for youth who is agent of the social change	6
8.	Community mobilization-Mapping of community stakeholders, designing the message as per problems and their culture;	6
9.	Identifying methods of mobilisation involving youth-adult Partnership	6
10.	Social harmony and national integration, Indian history and culture	6
11.	Role of youth in nation building, conflict resolution and peace-Building	6
12.	Volunteerism and shramdan, Indian tradition of volunteerism, its need, importance, motivation and constraints;	6

13.	Shramdan as part of volunteerism	6

14.	Citizenship, constitution and human rights. Basic features of constitution of India, fundamental rights and duties	6
15.	Human rights, consumer awareness and rights and rights to Information	6
16.	Youth and yoga- History, philosophy, concept, its impacts, yoga as a tool for healthy lifestyle, preventive and curative method.	6
	Total	**100**

Suggested Readings:

1. National Service Scheme: A Report, by KhwajaGhulamSaiyidain. Published by Ministry of Education, Govt. of India, 1961.
2. Training and consultancy needs in national service scheme, by N. F. Kaikobad, Krishan K. Kapil. Published by Tata Institute of Social Sciences, 1971.
3. National Service Scheme: guide-lines to project-masters, by Andhra University, Dept. of Sociology & Social Work. Published by Dept. of Sociology & Social Work, Andhra University, 1971.
4. National Service Scheme in Gujarat: An Evaluation Report for the Year 1986-87, by Tata Institute of Social Sciences Training Orientation & Research Centre (NSS), India, India. Dept. of Youth Affairs and Sports.Published by The Centre, 1987.
5. National Service Scheme in Maharashtra: An Evaluation Report for the Year 1986-87, by Tata Institute of Social Sciences Training Orientation & Research Centre (NSS), India, India Dept. of Youth Affairs and Sports. Published by The Centre, 1988.

National Service Scheme in India: A Case Study of Karnataka, by M. B. Dilshad. Published by Trust Publications, 2001.

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Semester IV

Sr. No.	Course No	Course Title	Credit hrs.
1.	STAT-242	Applied Business Statistics	2 (1+1)
2	BOT-242	Intellectual Property Rights	1 (1+0)
3.	BOT-243	Principles and Practices of Seed Science and Technology	2 (1+1)
4.	PATH-243	Management of Plant Diseases	2 (1+1)
5.	ENT-242	Management of Beneficial Insects	2 (1+1)
6.	SSAC-241	Soil and Water Management	2 (1+1)
7.	EXTN-244	Communication and Diffusion of Agricultural Innovations	2 (1+1)
8.	ECON-244	Theory and Practice of Cooperation	2 (2+0)
9.	BM-244	Food Business Management	2 (2+0)
10.	MKT-244	Marketing Management	2 (2+0)
11.	BFA-243	Theory and Practice of Banking	2 (2+0)
	ELECTIVE COURSES (Select any one)		
1	ELE-ECON-248	Gender Economics	3 (2+1)
2	ELE-ECON-249	Management of Cooperatives & Producers' Organizations	3 (2+1)
3	ELE-MKT-249	Rural Marketing	3 (2+1)
4	ELE-BM-248	Social Entrepreneurship	3 (2+1)
		Total	**24=17 +7**

Course :	STAT 242	Credit:	2(1+1)	Semester-IV
Course title:	Applied Business Statistics			

Syllabus

Theory:

Introduction to Sampling Theory, Sampling versus Complete Enumeration, Methods of Sampling: Probability sampling design –Simple Random Sampling (WR & WOR), Use of Random Number Tables for selection of Simple Random Sample. Concept of Stratified Sampling, Determining sample size for Simple Random and Stratified Sampling under Equal, Proportional, Neyman's and Optimal allocations. Concept of Systematic sampling, Cluster, Multistage and Probability Proportional to Size (PPS) sampling along with their advantage & disadvantages. Non-probability sampling scheme: Judgment, convenience, quota and accident sampling scheme.

Time series analysis: Introduction, Spatial, temporal and conditional series, Objectives of time series, components of time series: Trend, Seasonal, Cyclical and Irregular components. Measurement of trend: Graphical, Semi-Average, Moving Averages and Central Moving Averages, Isolation of trend by moving averages, Ordinary Least Squares (OLS), and fitting of trend.

Index numbers: Concept &Definition, objectives of index numbers, advantages and limitations. Prerequisites of index numbers, Types of Index numbers: Price index number (retail and whole sale), Quantity index numbers, Value index numbers. Construction of Simple index numbers under simple aggregative& simple average of relatives (fixed and chain based) method. Construction of weighted index numbers under weighted aggregative method. Chain index number, conversion of chain base index number to fixed base index number, fixed base index number to chain base index number.

Statistical Quality Control: Definition of control charts, uses of control charts, chance and assignable causes, parts of control charts (central line and control limits). Control charts for variables X-bar and R charts, control charts for fraction defective (p) and control charts for number of defects per unit ©. Operating characteristic curves for control charts.

Practical:

Use of Random Number Tables for selection of Simple Random Sample (WR/WOR).Computing Mean and Variance for Simple random samples. Determining sample size for Simple Random samples. Determining sample size for Stratified Sampling under Equal, Proportional, Neyman's and Optimal allocation. Graphical presentation of various time-series components. Presenting trend line using Graphical and Semi-Average methods. Computation of Moving Average & Central Moving Average, Isolation of trend by moving averages. Fitting of trend line using Ordinary Least Squares (OLS). Construction of Price index number: Retail and Whole sale. Construction of Quantity index numbers and Value index numbers. Construction of Simple index numbers under simple aggregative & simple average of relatives (fixed and chain based) method. Construction of weighted index numbers under weighted aggregative method. Construction of Chain index number, conversion of chain base index number to fixed base index number, fixed base index number to chain base index number. Construction of X bar and R charts for variables. Construction of fraction defective (p) and number of defects per unit .Construction of Operating characteristic curves for control charts**.**

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1	**Sampling Theory**: Introduction to Sampling Theory, Sampling versus Complete Enumeration.	05
2	**Methods of Sampling: i) Probability sampling design** –Simple Random Sampling (WR & WOR), Use of Random Number Tables for selection of Simple Random Sample. Concept of Stratified Sampling, Systematic sampling, Cluster, Multistage and Probability Proportional to Size (PPS) sampling along with their advantage & disadvantages.	04
3	**Determining sample size**: For Simple Random and Stratified Sampling under Equal, Proportional, Neyman's and Optimal allocations.	06
4	**Methods of Sampling: ii) Non-probability sampling scheme:** Judgment, convenience, quota and accident sampling scheme.	06
5 & 6	**Time series analysis**: Introduction, Spatial, temporal and conditional series, Objectives of time series, components of time series: Trend, Seasonal, Cyclical and Irregular components.	05
7 & 8	**Measurement of trend:** Graphical, Semi-Average, Moving Averages and Central Moving Averages, Isolation of trend by moving averages, Ordinary Least Squares (OLS), and fitting of trend.	08
9	**Index numbers**: Concept &Definition, objectives of index numbers, advantages and limitations. Prerequisites of index numbers.	08
10	**Types of Index numbers**: Price index number (retail and whole sale), Quantity index numbers, Value index numbers.	08
11 & 12	**Construction of Index number**: Construction of Simple index numbers under simple aggregative& simple average of relatives (fixed and chain based) method. Construction of weighted index numbers under weighted aggregative method.	10
13	**Chain index number:** Conversion of chain base index number to fixed base index number, fixed base index number to chain base index number.	05
14	**Statistical Quality Control:** Definition of control charts, uses of control charts, chance and assignable causes, parts of control charts (central line and control limits).	05
15 & 16	**Control charts:** Control charts for variables X-bar and R charts, control charts for fraction defective (p) and control charts for number of defects per unit. Operating characteristic curves for control charts.	10
	Total	**100**

Practical Exercise

Exercise	Title of exescise
1	Use of Random Number Tables for selection of Simple Random Sample (WR/WOR).Computing Mean and Variance for Simple random samples.
2	Determining sample size for Simple Random samples
3	Determining sample size for Stratified Sampling under Equal, Proportional, Neyman's and Optimal allocation.
4	Graphical presentation of various time-series components Presenting trend line using Graphical and Semi-Average methods.
5&6	Computation of Moving Average & Central Moving Average, Isolation of trend by moving averages.
7	Fitting of trend line using Ordinary Least Squares (OLS)
8	Construction of Price index number: Retail and Whole sale.
9	Construction of Quantity index numbers and Value index numbers.
10	Construction of Simple index numbers under simple aggregative & simple average of relatives (fixed and chain based) method.
11	Construction of weighted index numbers under weighted aggregative method.
12	Construction of Chain index number.
13	Conversion of chain base index number to fixed base index number, fixed base index number to chain base index number.
14	Construction of X bar and R charts for variables
15	Construction of fraction defective (p) and number of defects per unit
16	Construction of Operating characteristic curves for control charts**.**

Suggested Readings:

1) Brockwell,P.J. and Davis R.A.(2003). Introduction to Time Series Analysis, Springer
2) Fuller, W.A.(1996). Introduction to Statistical Time Series , 2nd Ed. JohnWiley
3) Montgomery D.C. (1985) Introduction to Statistical Quality Control (Wiley)
4) A Text book of Agriculture Statistics by R. Rangaswami
5) Arnab R. (2017). Survey Sampling: Theory & Applications , Academic Press
6) Cochran W.G. (1984). Sampling Techniques (Wiley)

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Course :	BOT -242	Credit:	1(1+O)	Semester- IV
Course title:	Intellectual Property Rights			

Syllabus

Theory:

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Beme Convention, Budapest treaty, etc. Types of intellectual Property and legislations covering IPR in India- Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets. Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database. Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV& FR Act of India, Plant breeder's rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge- meaning and rights of TK holders. Convention of Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing

Theory
Teaching Schedule

Lecture No.	Topic	Weightage (%)
1-2	Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO	**10**
3	Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc.	**5**
4-5	Types of Intellectual Property and legislations covering IPR in India:- Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.	**15**
6-7	Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation,	**12**
8	Penalties for infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.	**4**
9-10	**UPOV-** Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV	**14**
11-12	PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001	**14**
13-14	Researcher and farmers rights, Traditional knowledge-meaning and rights of TK holders.	**12**

15-16	Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological diversity Act,2002 and its salient features, access and benefit sharing	**14**
	Total	**100**

Suggested Readings:

1) Introduction to Intellectual Property Rights by H.S. Chawla, Oxford & IBH Publishing Co. Pvt. Ltd. 113-B ShahpurJat, 2nd Floor, *Asian Games Village side* New Delhi 110 049, India
2) Encyclopedia of Intellectual Property rights Volume No. 1 to 10 by Priyanjan Trivedi (2008)
3) Plant Breeding by B.D. Singh (2006), Kalyani Publication
4) Intellectual Property Right Under Golbalization by Tawar S. Serials Publication, New Delhi.

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Course :	**BOT -243**	**Credit:**	**2(1+1)**	**Semester- IV**
Course title:	**Principles and Practices of Seed Science and Technology**			

Syllabus

Theory:

Introduction: Importance of improved seed in Indian Agriculture, definition, difference between seed & grain, characteristics of quality seed. History; Development of seed industry in India. Seed Programme: Types of seed programme, development of seed programme, basic strategy for organizing seed production, different classes of seeds, generation system of seed multiplication, seed replacement rate, agencies involved in seed programme. Principles of seed production: Factors affecting genetic purity and varietal deterioration, methods / safe guards to maintain genetic purity during seed production, study of improved production practices for higher seed yield and quality. Hybrid seed production: Requirements of hybrid seed production, methods of hybrid seed production and types of hybrids. Varietal and hybrid seed production (Foundation and Certified seed classes) in maize, rice, sorghum, bajra, sunflower, redgram, cotton, castor, chilli, tomato, brinjal and okra. Varietal seed production in wheat, soybean, chickpea, blackgram, grasses. Seed processing & packaging: Seed processing- its importance and methods Seed packaging and seed branding. Seed testing: Seed testing procedures in different crops, minimum seed standards for certification. Seed marketing: Seed demand forecasting, factor affecting seed marketing, seed supply systems, promotional activities for seed marketing, seed marketing organizational structures. International seed trade, developing seed entrepreneurship. Importance of account keeping in seed business. Cost estimation and pricing of seed.

Practical:

Identification of seeds of field and horticultural crops, study of seed structure in monocot and dicot seeds. Study of floral biology of important self, cross and often cross pollinated agriculture and horticulture crops. Types of isolation, determination of isolation distance, requirements, study of isolation requirements in different crops for foundation and certified

seeds. Study of hand emasculation, hand pollination and detasseling techniques. Study of distinguishing morphological characters in A, B& R lines of released hybrids. Study of synchronization techniques for hybrid seed production, planting ratio. Supplementary pollination techniques, border rows for hybrids seed production. Study of seed cleaning and grading technique, seed packing and seed treatment techniques. Practicing seed testing in different crop seeds. Working out cost of seed production, seed pricing. Visit to seed production plots of public and private sector companies. Visit to seed production organisation to understand account keeping and working of seed prices in seed business.

Theory
Teaching Schedule

Lecture No	Topic	Weightage %
1	Seed and seed technology : introduction, definition and importance	5
2	Seed Programme: Types of seed programme, development of seed programme, basic strategy for organizing seed production	5
3	Deterioration causes of crop varieties and their control & Maintenance of genetic purity during seed production	15
4	Seed quality : definition. Characters of good quality seed	5
5	Different classes of seed.	5
6	Foundation and certified seed production of important cereals **(Wheat, Sorghum, Maize, Rice &Bajara)**	5
7	Foundation and certified seed production of important pulses **(Pigeon Pea, Green Gram, Black Gram & Chick Pea)**	5
8	Foundation and certified seed production of important oil seeds **(Soybean, Sunflower, Castor and Cotton)**	5
9	Foundation and certified seed production of important fodder crops **(Fodder Sorghum, Lucern, Berseem,)**	5
10	Foundation and certified seed production of important vegetable crops **(Tomato, Brinjal, Chilli & Okra)**	5
11-12	Seed processing & packaging: Seed processing- its importance and methods Seed packaging and seed branding	10
13	Seed testing: Seed testing procedures in different crops, minimum seed standards for certification.	5
14-15	Seed marketing: Seed demand forecasting, factor affecting seed marketing, seed supply systems, promotional activities for seed marketing, seed marketing organizational structures.	15
16	International seed trade, developing seed entrepreneurship. Importance of account keeping in seed business. Cost estimation and pricing of seed.	5
	Total	**100**

Practical Exercise

Exercise	Title of Exercise
1	Identification of seeds of field and horticultural crops
2	Study of seed structure in monocot and dicot seeds.
3	Study of floral biology of important self pollinated agriculture and horticulture crops.
4	Study of floral biology of important cross pollinated agriculture and horticulture crops.
5	Study of floral biology of important often cross pollinated agriculture and horticulture crops.
6	Types of isolation, determination of isolation distance, requirements, study of isolation requirements in different crops for foundation and certified seeds.
7	Study of emasculation and hybridization techniques.
8	Study of distinguishing morphological characters in A, B& R lines of released hybrids
9	Study of synchronization techniques for hybrid seed production, planting ratio. Supplementary pollination techniques, border rows for hybrids seed production.
10	Study of seed cleaning and grading technique, seed packing and seed treatment techniques
11	Seed testing – seed sampling
12	Seed testing - physical purity test and moisture test
13	Seed testing – seed germination test
14	Economics of seed production
15	Visit to seed production plots of public and private sector companies
16	Visit to seed production organization.

Suggested Readings

1. Seed Technology by R. L. Agrawal Oxford and IBH. Publishing Company, New Delhi.
2. Seed Science and Technology by Subir Sen N Ghosh Kalyani Publication New Delhi
3. Principles of Seed Technology by Phundan Singh Kalyani Publication New Delhi.
4. Seed Science and Technology by N. C. Singhal Kalyani Publication New Delhi.
5. Seed Technology by DhirenderKhare and Mohan Bhale Scientific Publishers, JodhaPur
6. Vegetable Seed Production by Nempal Singh, D.K. Singh, Y.K. Singh and Virendirekumar International Book Distribution Company, Lucknow.

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Course :	PATH-243	Credit:	2=1+1	Semester- IV
Course title:	Management of Plant Diseases			

Syllabus

Theory:

Economic significance of post-harvest diseases and seed borne diseases. Historical development in seed pathology and post-harvest diseases. Objectives of seed pathology and post-harvest diseases. Study of important Post-Harvest Diseases (transport, storage & market) of vegetables, fruits, oilseeds etc. Important postharvest diseases. Storage/ Field fungi responsible for production of toxins and their effects on consumption. Mycotoxins and Aflatoxin.

Identification and detection of plant pathogens carried through seeds, vegetatively propagating material. Seed processing, treatment and storage. Seed transmission, Seed contamination, accompanying pathogens, false seed transmission. Processing, seed treatment, seed packaging, packaging materials. Functional requirement of packing materials. Epidemiology, Factors affecting disease development, Assessment of disease severity and crop losses. Principles of plant disease management viz., Avoidance, Exclusion, Eradication, Protection, Immunization-HPR and Biological control. Pesticides. Classification of fungicides. Mode of application. Management of post-harvest diseases. Biotechnological approaches of diseases management. IPR and related issues. IDM concepts and importance. IDM module for important post-harvest diseases.

Practical:

Study of post-harvest disease symptoms caused by fungi, bacteria, virus, nematodes etc., Methods of diagnosis of various post-harvest diseases. Methods of estimation of disease severity and losses; Seed health testing techniques. Methods of detection and identification of seed borne pathogens; Isolation of biocontrol agents; Testing the efficacy of biocontrol agents by dual culture technique. Mass multiplication and methods of application of bio agents; Study of fungicides, bactericides, nematicides and their formulations. Study of pesticide compatibility and their safe-use. Study of plant protection equipments. Bioassay of fungicides; Seed treatment techniques for the control of seed borne diseases; Biocontrol of post-harvest diseases. Study of seed packaging & storage techniques. Visit to vegetable and fruit markets, bio-pesticide/ Pesticide firms. Visit to processing warehouse and testing laboratories.

Theory

Teaching Schedule

Lecture No.	Topic	Weightage %
1	**Economic significance** of post-harvest diseases and seed borne diseases.	5
2	**Historical development** in seed pathology and post-harvest diseases.	5
3	**Objectives** of seed pathology and post-harvest diseases.	5
4	Study of important **Post-Harvest Diseases** (transport, storage & market) of vegetables, fruits, oilseeds etc.	5
5	**Important post-harvest diseases.** Storage/ Field fungi responsible for production of toxins and their effects on consumption. Mycotoxins and Aflatoxin.	10

6	**Identification and detection of plant pathogens** carried through seeds, vegetatively propagating material. Seed processing, treatment and storage.	5
7	Seed transmission, Seed contamination, accompanying pathogens, false seed transmission.	5
8	Processing, seed treatment, seed packaging, packaging materials.	10
9	Functional requirement of packing materials.	5
10	Epidemiology, Factors affecting disease development, Assessment of disease severity and crop losses.	5
11	Principles of plant disease management viz., Avoidance, Exclusion, Eradication, Protection, Immunization-HPR and Biological control. Pesticides.	10
12	Classification of fungicides.	5
13	Mode of application.	5
14	Management of post-harvest diseases.	10
15	**Biotechnological approaches** of diseases management. IPR related issues. IDM concepts and importance. IDM module for important post-harvest diseases.	5
16	**IDM concepts and importance**. IDM module for important post-harvest diseases.	5
	Total	**100**

Practical Exercise

Exercise	Title of Exercise
1	Study of post-harvest disease symptoms caused by fungi, bacteria, virus, nematodes etc.,
2	Methods of diagnosis of various post-harvest diseases.
3	Methods of estimation of disease severity and losses; Seed health testing techniques.
4	Methods of detection and identification of seed borne pathogens;
5	Isolation of biocontrol agents; Testing the efficacy of biocontrol agents by dual culture technique.
6	Mass multiplication and methods of application of bio agents;
7	Study of fungicides, bactericides, nematicides and their formulations.
8, 9	Study of pesticide compatibility and their safe-use.
10	Study of plant protection equipments.
11	Bioassay of fungicides; Seed treatment techniques for the control of seed borne diseases;
12	Biocontrol of post-harvest diseases.
13, 14	Study of seed packaging & storage techniques.
15, 16	Visit to vegetable and fruit markets, bio-pesticide/ Pesticide firms, processing warehouse and testing laboratories

Suggested Readings

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.

Singh RS. 2013. *Introduction to Principles of Plant Pathology.*Oxford and IBH Pub.Co.
5) Alexopoulos, Mims and Blackwel. Introductory Mycology
6) Mehrotra RS &Aggarwal A. 2007.Plant Pathology.7th Ed. Tata McGraw Hill Publ. Co. Ltd.
7) Verma JP. 1998. *The Bacteria*. Malhotra Publ. House, New Delhi.
8) Goto M. 1990. *Fundamentals of Plant Bacteriology*. Academic Press, New York.
9) Dhingra OD & Sinclair JB. 1986. *Basic Plant Pathology Methods*. CRC Press, London, Tokyo.
10) Nene YL &Thapliyal PN. 1993. *Fungicides in Plant Disease Control.* 3rd Ed. Oxford & IBH, New Delhi.
11) Vyas SC. 1993. *Handbook of Systemic Fungicides*. Vols. I-III. Tata McGraw Hill, New Delhi.

Course :	ENTO -242	**Credit:**	2(1+1)	**Semester- IV**
Course title:	Management of Beneficial Insects			

Syllabus

Theory

Economic importance of insects. Parasitoids, predators and micro-organisms used in pest control and their mass multiplication techniques. Important species of pollinators weed killers and scavengers and their importance. Apiculture-importance, species, morphology, colony structure and bee comb. Behaviour of honey bees, bee posture and bee products. Management of bee colonies and bee poisoning. Pests and diseases of honey bees and their management. Lac culture: biology, cultivation, natural enemies and their management. Vermiculture, species & production technology. Sericulture – importance, species of silkworm, moriculture, rearing of mulberry silkworm, reeling and marketing. Pests and diseases of silkworm and their management.

Practical:

Identification of bio-control agents: Predators, parasitoids and microorganisms. Identification of important species of pollinators, weed killers and scavengers. Mass multiplication of *Trichogramma* and *Chrysoperla*. Honey bee species, castes of bees. Beekeeping appliances and their use. Bee enemies and diseases. Beekeeping products and their uses. Types of silkworm, voltinism, silkworm breeds and biology of silkworm. Mulberry cultivation, mulberry varieties, harvesting and preservation of leaves. Pests and diseases of mulberry. Silkworm rearing, silkworm egg production and silk reeling techniques. Species of lac insect and its biology. Lac host plants, lac strains, cultivation and their management. Visit to research and training institutions devoted to beekeeping and sericulture.

Teaching schedule
Theory

Lecture No.	Topic	Weightage (%)
1	**Biocontrol agents** (Natural Enemies): Introduction of bioagents, Ideal characteristics of bioagents, Successful examples of biological control	25
2-3	General classification: Important insect orders bearing predators and parasitoids used in pest control Identification of major parasitoids and predators commonly used in biological control of crop pests.	
4 5-6	Major parasitoids: *Trichogramma sp., Chelonus blackburni, Cotesia (Apanteles) sp., Bracon sp., Epiricania melanoleuca, Goniozus nephantidis, Campoletis chloridae,* Major predators: *Chrysoperla* sp., Australian lady bird beetle-*Cryptolaemus*montrouzieri Weed killers: *Zygogramma bicolorata*, *Neochetina* spp.	
	Mass multiplication and field release techniques of some important parasitoids: *T. chilonis, Chelonus blackburni, Cotesia / Bracon, Goniozus nephantidis, Epiricania melanoleuca*	25
7	Mass multiplication and field release techniques of important predators: *Chrysoperla* sp., Australian lady bird beetle, Weed predators/killers: *Zygogramma bicolorata*, *Neochetina* sp.	
8	**Apiculture**: importance, species, morphology, colony structure and bee comb.	25
9	Behaviour of honey bees, bee posture and bee products	
10	Management of bee colonies and bee poisoning.	
11	Pests and diseases of honey bees and their management.	
12	Lac culture: biology, cultivation, natural enemies and their management.	
13	Vermiculture, species & production technology.	25
14	Sericulture – importance, species of silkworm, moriculture,	
15	rearing of mulberry silkworm, reeling and marketing.	
16	Pests and diseases of silkworm and their management.	
	Total	**100**

Practical

Exercise	Title of Exercise
1 &2	Identification of bio-control agents Predators, parasitoids and microorganisms
3.	Identification of other important pollinators and scavengers.
4.	Mass multiplication of parasitoids: *Trichogramma chilonis, Corcyra cephalonica* St.
5.	Honey bee species, castes of bees
6.	Bee keeping appliances and their use
7.	Bee enemies and diseases
8.	Beekeeping products and their uses
9 & 10	Types of silkworm, voltinism and biology of mulberry silkworm
11 & 12	Mulberry cultivation, mulberry varieties and methods of harvesting of leaves and preservation of leaves
13	Pests and diseases of mulberry silkworm
14	Species of lac insect and its biology
15	Lac host plants, lac strains, cultivation and their management.
16	Visit to research and training institutions devoted to beekeeping and sericulture.

Suggested Readings:

1) Singh, S., 1975.Bee keeping in India – ICAR, New Delhi., 214p.
2) Sunita, N.D, Guled, M.B, Mulla, S.R and Jagginavar, 2003, Beekeeping, UAS Dharwad
3) Mishra, R.C. and Rajesh Gar. 2002. Prospective in Indian Apiculture. Agrobios, Jodhpur.
4) Singh, D. and Singh, D.P. 2006. A Hand Book of Beekeeping, Agrobios (India).
5) Paul DeBach and Devid Rosen 1991. Biological control by natural enemies. Cambridge University Press; 2 edition (27 June 1991)
6) Y.A. Shinde and BR Patel. Sericulture in India
7) Tribhuwan Singh. Principles and Techniques of Silkworm Seed Production, Discovery publishing House Pvt. Ltd
8) M.L. Narasaiah. Problems and Prospects of Sericulture.discovery publishing House Pvt. Ltd.
9) Ganga, G. and Sulochana Chetty, J. 1997. An Introduction to Sericulture (2nd Edn.). Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.
10) Krishnaswamy, S. (Ed). 1978. Sericulture Manual - Silkworm Rearing. FAO Agril. Services bulletin, Rome.

11) Glover, P.M. 1937. Lac Cultivation in India. Indian Lac Research Institute, Ranchi.

12) Jolly, M.S. 1987. Appropriate Sericulture Techniques. International Centre for Training and Research inTropical Sericulture, Mysore, 209.

13) K.P. Srivastava. A Text Book on Applied Entomology. Vol. I & II, Kalyani Publishers, Ludhiana

14) B.R. David and V.V. Ramamurthy. Elements of Economic Entomology, 7th Edn. Namrutha Publications, Chennai.

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Course	**SSAC-241**	**Credit: 2(1+1)**	**Semester: IV**
Course title	**Soil and Water Managemaent**		

Syllabus

Theory:

Concept of soil, meaning and definition; soil components and important, soil physical properties ; soil texture, structure density, porosity, soil water; soil air, soil temperature, soil chemical properties, organic matter, Land capacity classification and suitability. Soils of India and Karnataka, Soil quality and soil health, Distribution of waste land/degraded lands and problem soils in India. Management of salt affected soils, calcareous soils, acid soils, acid sulphate soils, eroded and compacted soils, flooded / water logged soils, physically constrained soils, polluted soils. Alternate land use strategies for management of problematic soils including bioremediation/phytoremidation. Irrigation water-quality and standards, utilization of poor quality water in agriculture.

Practical:

Soil sample collection and it's preparation for analysis. Determination of soil color, density, porosity and moisture content. Determination of soil texture by feel method. Determination of infiltration rate. Determination of aggregate stability. Determination of soil reaction (pH) and total soluble salts content (EC) in soil. Determination of organic matter in soil. Determination of lime requirement of acid soils. Determination of water soluble cations. Determination of water soluble anions. Determination of exchangeable cations (Ca, Mg, Na and K) and computation of ESP. Determination of gypsum requirement of sodic soils. Determination of quality of irrigation water (pH, EC, SAR, RSC, boron, chlorides etc.)

Teaching schedule
Theory

Lecture No.	**Topic**	**Weightage (%)**
1	Concept of soil, meaning and definition; soil components	06
2 & 3	Important soil physical properties- Soil texture and structure, density, porosity	16
4	Soil water; Soil air, Soil temperature	08
5 & 6	Soil chemical properties, Organic matter,	12
7	Land capacity classification and suitability	08

8	Soils of India and Maharashtra	04
9	Soil quality and soil health	04
10	Distributions of waste land/degraded lands and problem soils in India.	06
11 & 12	Management of salt affected soils, calcareous soils, acid soils, acid sulphate soils,	16
13 & 14	Management of eroded and compacted soils, flooded / water logged soils, physically constrained soils, polluted soils.	08
15	Alternate land use strategies for management of problematic soils including bioremediation/phytoremidation	06
16	Irrigation water-quality and standards, utilization of poor quality water in agriculture.	06
	Total	100

Practicals

Exercise No.	**Title of Exercise**
1	Collection of Soil sample and it's preparation for analysis
2	Determination of soil colour by Munsell soil colour chart in field.
3	Determination of Bulk density by Core cutter method
4	Determination of Partical density by Pycnometer method
5	Determination of moisture content in soil by gravimetric method.
6	Determination of soil texture by feel method
7	Determination of infiltration rate
8	Determination of aggregate stability
9	Determination of soil reaction (pH) and total soluble salts content (EC) in soil
10	Determination of organic matter in soil
11	Determination of lime requirement of acid soils
12	Determination of water soluble cations
13	Determination of water soluble anions
14	Determination of exchangeable cations (Ca, Mg, Na and K) and computation of ESP
15	Determination of gypsum requirement of sodic soils
16	Determination of quality of irrigation water (pH, EC, SAR, RSC, boron, chlorides etc.)

Suggested Reading:

1) ISSS. 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi- 110 012. pp. 728.
2) Das D. K. 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana. pp. 645.
3) Brady, N. C. 2016. The Nature and Properties of Soils. 15th edition Publisher: Pearson Education, ISBN: 978-0133254488
4) Daji J A; Daji J A; Kadam J R; Patil N D.1996. Textbook of Soil Science Bombay Media Promoters and publishers Pvt. Ltd.

5) Biswas, T.D.; Mukherjee, S.K.. 1995. Text Book of Soil Science 2nd sEd. Tata McGraw Hill Publisher, Delhi pp 433.
6) Somawanshi, et al. 2012. Laboratory Methods for Analysis of Soil, Irrigation Water and Plants.., Department of Soil Science and Agriculturasl Chemistry, MPKV., Rahuri. revised Ed. pp. 307.
7) Jakson, M.L. 1973. Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498.
8) Page et. al. 1982. Methods of Soil Analysis, Part 1 and 2. Chemical and Microbiological Properties . 2nd Ed. Soil Science Soc. of America Am. Soc. Agron., Madison, Wisconsin, USA.
9) Klute, A. 1986. Methods of Chemical Analysis, 2nd Ed. American Soc. Agron.,Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
10) Piper, C. S. 1966. Soil and Plant Analysis. Inters Science . Hans Publisher, Mumbai.
11) Black, C. A. 1965. Soil Chemical Analysis, Part I and part II. American Soc. Agron.,Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
12) Hesse, P. R. 1971. a Text Book of Soil Chemical Analysis. John Murray, London.
13) Richards, L. A. 1968. Diagnosis and Improvement sof Saline Alkali Soils. Oxford and IBH Publication Co. Calcutta.
14) Chora, S. L. and Kanwar, J. S. 1991. Analytical Agricultural Chemistry, Kalyani Publisher New Delhi.
15) Chapman, H.D., and P.F. Pratt. 1961. Methods of analysis for soils, plants and waters. Division of Agricultural Sciences, University of California,
16) Mehara , R. K. 2004. Text Book of Soil Science., ICAR, New Delhi.
17) Patil, V. D. and Mali C. V. 2007. Fundamentals of Soil Science, Aman Publication, Meerut.
18) Nirankari Lal Singh. 2000. Text Book of Soil Science. Aman Publication, Meerut.
19) Dahama , A. K. Organic farming for sustainable agriculture. 19, Agrobotanica Binaker. Pp 53-98 and 210-255.
20) Tandon H.L.S. 1994. Recycling of Waste in Agriculture. Fertilizer Development t and consultation organization.

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Course	**EXTN-244**	**Credit: 2(1+1)**	**Semester: IV**
Course title	**Communication and Diffusion of Agricultural Innovations**		
Syllabus			
Theory: Communication: meaning and definition; Principles and Functions of Communication. Models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption. Extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies. Diffusion and Adoption			

of Innovations – Meaning, Definition, Models and adoption Process, Innovation – Decision Process – Elements, Adopter categories and their characteristics, Factors influencing adoption process; Capacity building of Extension Personnel and Farmers - Meaning, Definition, Types of training, Training of farmers, farm women and Rural youth – FTC and KVK.

Practical:

Simulated exercises on communication; Identifying the Problems, Fixing the Priorities and selecting the most important problem for preparation of a project. Developing a project based on identified problem in a selected village. Organization of Group discussion and Method demonstration. Visit to KVK / FTC. Planning and Writing of scripts for Radio and Television. Audio Visual aids – Meaning, Importance and Classification. Visit to community radio and television studio for understanding the process of programme production. Planning & Preparation of visual aids - Charts, Posters, Over Head Projector (OHP) Transparencies, Power Point Slides. Planning and Preparation of Agricultural Information materials – Leaflet, Folder, Pamphlet, News Stories, Success Stories. Field diary and lab record; indexing, footnote and bibliographic procedures. Handling of Public Address Equipment (PAE) System, Still camera, Video Camera and Liquid Crystal Display (LCD) Projector. Development of schedules, Questionnaires and field visits for Data Collection.

Theory
Teaching Schedule

Lecture No	Topic	Subtopic	Weightage (%)
1 & 2	Communication Skills	Definition of Communication**,** Importance Principles Process, Types of Business communication, Feedback Communication effectiveness**,** Interpersonal Communication, Functions of communication**,** Communication fidelity**,** Forms/types of communication Communication effectiveness	10
3	Models of Communication	Models with their elements, Verbal model Structural model , Explanatory model	10
4	Barriers to communication	Semantic Barriers, Organizational Barriers Psychological or Emotional Barriers	08
5 & 6,7	Agriculture journalism	Definition, Importance , Meaning, Nature, Scope , Characteristics of Agricultural Journalism; Agricultural Movement in India, Role and Significance of Media in Agrigarian Society, Status of Agricultural Journalism in India, Effect of media mix for rural people, modern communication media electronic video, Tele-video conference, Agricultural Media Reporting; Interviews; Articles; Agriculture Movements in India, agricultural programs on TV Channels	12
	Diffusion and Adoption	Definition and Meaning of diffusion, Diffusion Process, Elements, Diffusion Effect, Meaning of	12

8 & 9		adoption , Process of Adoption, Differences between Diffusion and adoption, Stages in adoption process Factors influencing rate of adoption	
10,11 & 12	Innovation	Definition and Meaning of Innovation, Innovation decision process, Model of Innovation Decision, Process, Consequences of innovation decision Adopter Categories	10
13	Extension teaching methods	Meaning, Definition, Classification, Factors affecting sell and use of teaching methods, Role, Modern Communication technology	10
14	ICT Applications in TOT	Applications in TOT (New and Social Media), media mix strategies.	10
15	Capacity building of Extension Personnel and Farmers	Meaning, Definition	8
16	Training	Meaning, Definition, Types of training, Training of farmers, farm women and Rural youth – FTC and KVK.	10
		Total	**100**

Practical Exercise

Exercise	Title of Exercise
1	Study of soft skill of communication
2	Fixing the Priorities and selecting the most important problem for preparation of a project
3	Organization of Group discussion
4	Organization Method demonstration
5	Visit to KVK
6	Visit to FTC
7	Planning and Writing of scripts for Radio and Television
8	Study of Audio Visual aids
9	Visit to community radio and television studio
10	Planning & Preparation of visual aids
11	Planning and Preparation of Agricultural Information materials
12	Field diary
13	Lab record
14	Indexing, footnote and bibliographic procedures
15	Handling of Public Address Equipment (PAE) System
16	Questionnaires and field visits for Data Collection.

Suggested Reading

1. Leagans J. P. 1961. Characteristics of Teaching and Learning in Extension Education. In: Extension Education in Community Development. Ministry of Agriculture, New Delhi, Pp 171-194.

2. Legans, J.P. 1961, The Communication Process, Extension Education in Community Development, North Central Rural Sociology Subcommittee for the Study of Diffusion of Farm Practices 1955.
3. Ray G. L. 2005. Extension Communication and Management.Kalyani Publ. Reddy AA. 1987. Extension Education. Sree Lakshmi Press, Bapatla. Ray, G.L., 1996, Extension communication and management, NayaPrakash, Calcutta
4. Rogers E. M. and Kincaid A. 1981. Communication Networks: Towards A New Paradigm for Research. New York: The Free Press.
5. Ryan B. and Gross N. C. 1943. The Diffusion of Hybrid Corn in Two Iowa Communities. Rural Sociology
6. Schramm W. (ed.). 1964. The Process and Effects of Mass Communication. Urbana: Univ. of MIinois Press.
7. Shannon C. and Weaver W. 1949. The Mathematical Theory of Communication. Urbana: Univ. of IIIinois Press.
8. Berlo, D.K. (1960). The Process ofCommunication: An Introduction to theory and Practice. Holt,Rinehart and Winston, Inc., New York, USA.
9. Ray, G.L. (1991). Extension, Communication andManagement. Naya Prakash, 206, Bidhan Sarani,Calcutta - 6.

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Course	**ECON-244**	**Credit:2(2+0)**	**Semester: IV**
Course title	**Theory and Practice of Cooperation**		

Syllabus

Theory:

Concept of cooperation – Origin of cooperative ideology- Nature of Cooperatives-Distinctive Features of Co-operative Ownership.

Evolution of cooperation –pioneers of cooperative movement –Robert Owen- Evolution of cooperative movement- Raiffeisen movement- Evolution of cooperative principles- Rochdale principles- Reformulation of cooperative principles by ICA in 1937, 1966 & 1995 – ICA statement on Cooperative Identity.

History and development of cooperative movement in India: pre and post-independence period of developments.

Sectors of cooperative development – Agricultural and Non-Agricultural cooperatives-Primary Agricultural Credit Societies (PACS)-Farmers Service Societies (FSS)–Large Sized Agricultural Multi-Purpose Societies (LAMPS) – District Central Cooperative Banks–State Cooperative Banks–PCARDBs- Cooperative Marketing Societies –Processing Cooperatives-Dairy Cooperatives-Consumer Cooperatives–Urban Cooperative Banks–Industrial Cooperatives.

National Co-operative Federations and its role. Cooperative Education and Training-Organizational Structure- NCUI, NCCE, NCCT, VAMNICOM, RICM, ICM and the role of Universities. Role of International Co-operative Alliance (ICA) in the promotion of Co-operatives.

Cooperatives, State and political economy – current political environment and its effects on cooperatives- Future of cooperative movement in India–Impact of Cooperatives- The agenda for the future.

Teaching Schedule
Theory

Lecture	Topic	Weightage (%)
1	Co-operation- Concept of cooperation – Origin of cooperative ideology-	4
2&3	Nature of Cooperatives-Distinctive Features of Co-operative Ownership	4
4&5	Evolution of cooperation -pioneers of cooperative movement –Robert Owen-	3
6&7	Evolution of cooperative movement- Raiffeisen movement-	3
8&9	Evolution of cooperative principles- Rochdale principles-	3
10&11	Reformulation of cooperative principles by ICA in 1937, 1966 & 1995 – ICA statement on Cooperative Identity.	6
12	History and development of cooperative movement in India	6
13&14	Pre and post-independence period of developments	6
15	Sectors of cooperative development – Agricultural and Non-Agricultural cooperatives	4
16	Primary Agricultural Credit Societies (PACS)	3
17	Farmers Service Societies (FSS)	3
18	Large Sized Agricultural Multi-Purpose Societies (LAMPS)	3
19	District Central Cooperative Banks	3
20	State Cooperative Banks, PCARDBs	3
21	Cooperative Marketing Societies	6
22	Processing Cooperatives- Dairy Cooperatives	3
23&24	Consumer Cooperatives–Urban Cooperative Banks–Industrial Cooperatives	6
25	National Co-operative Federations and its role	3
26&27	Cooperative Education and Training- Organizational Structure- NCUI, NCCE, NCCT	6
28	Cooperative Education and Training- Organizational Structure- VAMNICOM, RICM, ICM and the role of universities	6
29	Role of International Co-operative Alliance (ICA) in the promotion of Co-operatives.	4
30	Cooperatives, State and political economy – current political environment and its effects on cooperatives	6
31	Future of cooperative movement in India	3
32	Impact of Cooperatives- The agenda for the future	3
	Total	100

Suggested Readings:

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.
6. Mamoria, C.B. and R.D. Saxena. Co-operation in India, Kitab mahal, 15-Thorn Hill Road , Allahabad.
7. 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.
8. 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.
9. Dr.V.D.Varkey,V.G.Vartak.Co-operative Management.Pragati Books Pvt.Ltd.119,Budhwar Peth ,Jogeshwari Mandir Lane,Pune-411002.

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Course	**BM-244**	**Credit:2(2+0)**	**Semester: IV**
Course title	**Food Business Management**		

Syllabus

Theory:

Introduction to food, food business and food business management, Types and classification of Foods, Food Business, Institutions involved in Food preparation, Marketing and Exporting. Present status of food industry in India – Current market size and future potential – Key drivers for growth. Recent advances in food processing, Quality management in food industry- Food Safety and standards (ISO and Codex). Food traceability. Food preservation methods - Food Packaging and Labelling - Improved food grain storage structures. Logistics management at different stages of marketing the food products. Food business environment and policy. IPR in Food Industry, Entrepreneurship opportunities in food business. Food Economics and Policy, Innovation in food business at domestic and international, Food Business Marketing. Successful business organizations. Food business Environment & Policy, Government, Regulations/Guidelines for food sector. Food Waste management. Food Retailing, Formats of Food Service Industry, Policies related to Food Processing and Markets, Institutions enabling food processing sector, Food Safety and Standards Authority of India.

Teaching Schedule

Theory

Lecture	**Topic**	**Weightage (%)**
1	Introduction to food, food business and food business management,	5
2	Types and classification of Foods, Food Business	5
3	Institutions involved in Food preparation,.	5
4	Marketing and Exporting	5

5-6	Present status of food industry in India – Current market size and future potential – Key drivers for growth	5
7	Recent advances in food processing	5
8	Quality management in food industry- Food Safety and standards (ISO and Codex).	5
9	Food traceability.	5
10	Food preservation methods	5
11	Food Packaging and Labelling	5
12	Improved food grain storage structures.	5
13-14	Logistics management at different stages of marketing the food products.	
15-16	Food business environment and policy	5
17	IPR in Food Industry,	4
18	Entrepreneurship opportunities in food business.	4
19	Food Economics and Policy,	4
20-21	Innovation in food business at domestic and international,	4
22-23	Food Business Marketing.	4
24-25	Successful business organizations.	4
26-27	Food business Environment & Policy, Government, Regulations/Guidelines for food sector.	4
28	Food Waste management.,	4
29-30	Food Retailing, Formats of Food Service Industry, Policies related to Food Processing and Markets	4
31-32	Institutions enabling food processing sector, Food Safety and Standards Authority of India.	4
	Total	100

Suggested Readings

1) Owen R, Fennema. 1996. Food Chemistry, 3rd Ed. Marcel Dekker, Inc., New York, USA.
2) M. Shafiur Rahman. 2007. Handbook of Food Preservation, 2nd Ed. CRC Press, Boca Raton, FL, USA.
3) James G. Brennan. 2006. Food Processing Handbook. Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany.
4) Fellows P. 2000. Food Processing Technology: Principles and Practice, 2nd Ed. CRC Press, Boca Raton, FL, USA.
5) William C. Frazier and & Dennis C. Westfoff. 1987. Food Microbiology, 4th Ed. Tata McGraw-Hill Education, New Delhi.
6) Carolyn D. Berdanier, Elaine B. Feldman and Johanna Dwyer. 2008. Handbook of Nutrition and Food, 2nd Ed. CRC Press, Boca Raton, FL, USA.
7) Sehgal, S. and Raghuvanshi, R.S. (2007) Text Book of Community Nutrition. ICAR, New Delhi.
8) Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication, Delhi.
9) Peter Zeuthen and Leif Bùgh-Sùrensen. 2003. Food Preservation Techniques. CRC Press LLC, Boca Raton, FL, USA.
10) Joshi V.K. and Ashok Pandey. 1999. Biotechnology: Food Fermentation – Microbiology, Biochemistry and Technology, Vol. II. Educational Publishers & Distributors, New Delhi**.**

11) George J. Banwart. 1989. Basic Food Microbiology, 2nd Ed. Chapman & Hall, New York, USA.
12) Kalia, M. and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
13) Swaminathan, M. (1999. Food Science, Chemistry and Experimental Foods. 2nded. The Banglore Printing and Publishing Co., Bangalore

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Course	**MKT - 244**	**Credit:2(2+0)**	**Semester: IV**
Course title	**Marketing Management**		

Syllabus

Theory:

Marketing – meaning, importance, functions. Marketing Management- definition, Difference between marketing and selling. Guiding philosophy of Marketing. Marketing planning: importance, steps, nature. Market Segmentation – meaning, bases and advantages; Market Targeting – Approaches. Positioning – meaning and strategies. Marketing environment analysis. Marketing Mix – 4 Ps and 7 Ps; Product. Product classifications and new product development and launching. Product life cycle – stages; Branding – meaning, selecting a brand, advantages and disadvantages of branding, types of brands; Packaging: meaning, importance, and functions of packaging. Pricing Methods and strategies.

Marketing channel – meaning, market intermediaries, types of channels and functions of marketing channel; channel management strategies, channels of distribution, channel management decisions, management of retailing and wholesaling.

Direct marketing – methods and advantages and disadvantages; Promotional mix: meaning, elements and objectives. Services Marketing – introduction, meaning, characteristics and Service Marketing Mix.

Teaching Schedule
Theory

Lecture No.	**Main Topic**	**Sub Topic**	**Weightage (%)**
1	Marketing	Meaning, Importance & Functions.	6
2, 3	Marketing Management	Definition, Difference between marketing and selling. Guiding philosophy of Marketing.	7
4	Marketing planning	Importance, steps, nature.	7
5, 6	Market Segmentation	Meaning, bases and advantages; Market Targeting – Strategies, Factors consider in target market selection. Approaches.	8
7, 8	Positioning	Meaning and Strategies	8
9, 10, 11	Marketing environment analysis	Internal and External Environment	8
12, 13, 14	Marketing Mix	4 Ps and 7 Ps; Product classifications and new product development and launching.	8

15, 16	Product Life Cycle	Concept, Stages & Strategies.	6
17, 18	Branding	Meaning, selecting a brand, advantages and disadvantages of branding, types of brands.	6
19, 20	Packaging	Meaning, importance, and functions of packaging.	6
21, 22	Pricing	Importance, Methods and Strategies.	6
23, 24, 25	Marketing channel	Meaning, market intermediaries, types of channels and functions of marketing channel; channel management strategies, channels of distribution, channel management decisions, management of retailing and wholesaling.	6
26, 27	Direct marketing	Methods and advantages and disadvantages	6
28, 29	Promotional mix	Meaning, elements and objectives.	6
30, 31, 32	Services Marketing	Introduction, meaning, characteristics and Service Marketing Mix.	6

Suggested Reading:

1. Kotler Philip et.al. Marketing Management. Pearson India Education Service Pvt Ltd 15th edition.
2. Ramaswamy, V. S. and S. Namakumari, Marketing Management – Planning, Implementation and Control. Macmillan co. 866, Third Avenue, New – York – 10022. 5th edition.
3. Acharya S. S. & Agarwal N. L. Agriculture Marketing in India, Oxford & IBH Publishing Co. Ltd New Delhi, 4th edition.

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Course	BFA-243	**Credit:2(2+0)**	**Semester: IV**
Course title	**Theory and Practice of Banking**		
Syllabus			

Theory:

Introduction to Financial markets. Bank - meaning, definition, functions. Types of banking- Commercial, developmental and central. Systems of banking- Unit, branch, holding company, chain. Principles of banking. Credit creation by banks. Development banking institutions. Central banking – Functions. Monetary policy: concept & objectives. Credit control- qualitative and quantitative measures. Bankers' clearing house. Banker - his functions and relationship with customer. Deposit accounts and their operations. Negotiable instruments- bills of exchange, check and bank drafts. Loans and advances and their operations. Securities and modes of charges- lien, mortgage, hypothecation, pledge etc. Investment Banking: Meaning, functions, importance, operational issues. Differentiated Banks: Payment banks, Small Finance Banks, Permitted business. Recent reforms in banking sector in India. Mergers and acquisitions in banking sector, Entry of new generation banks.

Banking Ombudsman Scheme, customer service nomination facility, KYC norms and Anti-money laundering policy on KYC.

Teaching Schedule
Theory

Lecture No.	Topic	Points to be Covered	Weightage (%)
1	Financial markets	Evolution,Origin,Growth, Concept, Relation to Agri-Business	6
2&3	Bank	Meaning, Definition & Functions	6
4,5&6	Types of banking	Commercial Bank, Developmental Bank, Central Bank	9
7,8,9&10	Systems of banking	Unit banking, Branch banking, Holding company/Group Banking, Chain banking	12
11	Principles of banking.	Principles of Bank Lending Policies Essentials of a Sound Banking System	3
12	Credit creation by banks	Concept, Process & Limitations on the power of banks to create credit.	3
13	Development banking institutions.	Organized & Un-organized Financial Institutions	3
14	Central banking – Functions	Functions of Central bank, Role of Central Bank in Economic Development	3
15	Monetary policy	Concept & Objectives	3
16	Credit control Measures	Objectives & Methods of Credit control Qualitative & Quantitative measures Difficulties of Credit control	4
17	Bankers' clearing house	Concept of Clearing house for transfer and Settlement by RBI	3
18	Banker - his functions and relationship with customer	Functions of Banker Banker Relationship with customer	3
19	Deposit accounts	Deposit accounts and their operations	3
20	Negotiable instruments	Bills of exchange, Cheque, Bank drafts	3
21	Loans and advances and their operations.	Loans and their operations Advances and their operations.	3
22	Securities and modes of charges	Lien, Mortgage, Hypothecation, Pledge	3
23	Investment Banking	Meaning, Functions, Importance, Operational issues	3
24, 25 & 26	Differentiated Banks	Payment banks Small Finance Banks Permitted business	9
27	Recent reforms in banking sector in India	Recent banking reforms	3
28 & 29	Mergers and acquisitions in	Mergers and acquisitions in banking sector, Entry of new generation banks	6

	banking sector		
30,31,32	Banking Ombudsman Scheme, customer service nomination facility, KYC norms and Anti-money laundering policy on KYC.	Banking Ombudsman Scheme Customer service nomination facility KYC norms Anti-money laundering policy on KYC	9

Suggested Readings:

1. Gorden E. and Natarajan, K.2006, Banking-Theory,Law & Practice,Himalaya Publishing House,New Delhi.
2. Paramesswaran,R. and Natarajan S,2003.Indian Banking, S.Chand & Co.
3. Maheswari S.N and Paul R.R.2003,Banking theory,Law & Practice Kalyani Publishers.
4. Shekhar, K.C.2000 Banking Theory and Practice ,Vikas Publishing House Pvt,Ltd., New Delhi.
5. IIBF.2017.Principles and Practice of Banking ,Macmillan Education.
6. 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 -110055.
7. Dewett, K.K and M.H.Navalur .Modern Economic Theory. Shyam Lal Charitable Trust , Ravindra Mansion Ramnagar, New Delhi-110055.
8. Vaish, M.C. Monetary Theory. Ratan Prakashan, Educational and University Publishers, 21 Dayanad Marg, Darya Ganj, New Delhi – 110002
9. M.L.Jhingan, Money,Banking ,International Trade and Public Finance,Vrinda Publicatiob(P) Ltd.
10. R.R.Paul,Money,Banking and International Trade,Kalyani Publishers,New Delhi-110002.

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Course	**ELE-ECON-248**	**Credit: 3 (2+1)**	**Semester: IV**
Course title	**Gender Economics**		
Syllabus			
Theory: Introduction to Gender studies: Concepts of gender and sex, Importance of women studies and its relevance to present Indian society. Demography of female population in India. Interstate variations in sex-ratio and causes of declining sex-ratio. Women and Education and GER ratio in India. Tools of Women Empowerment, addressing gender inequalities in education, health, nutrition. Women's participation in decision making. Gender and community Economic Development (CED).Factors affecting female entry in labour markets, supply and demand for female labour in developed and developing countries. Female work participation in agriculture, non-agriculture rural activities. Impact of technology and modernization on women's work participation. Effects of globalization and liberalization on women. Gender issues in development, female labour in agriculture, sector-impact of change in female labour employment.			

Practical:
Preparation of case studies based on field survey of women in agriculture. Preparation of case studies based on field survey on women participation in social, economic and political activities. Survey on role of women in decision making in family. Survey on role of women in decision making democratic institutions like co-operatives and local self-governments.
Exercises on estimation of gender empowerment ratio across different states of India. Exercises on time series analysis of sex ratio across different states of India. Estimation of female literacy ratio across different states of India. Estimation of female work participation across different states of India. Group Discussion – Gender division of labour in family and Gender power relations. Field work-Problems of women in organized & authorized sector.

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1, 2, 3 & 4	Introduction to Gender studies: Concepts of gender and sex, Importance of women studies and its relevance to present Indian society. Demography of female population in India. Interstate variations in sex-ratio and causes of declining sex-ratio.	20
5 & 6	Women and Education and GER ratio in India.	5
7, 8 & 9	Tools of Women Empowerment, addressing gender inequalities in education, health, nutrition.	15
10	Women's participation in decision making.	5
11	Gender and community Economic Development (CED).	5
12 & 13	Factors affecting female entry in labour markets, supply and demand for female labour in developed and developing countries.	10
14 & 15	Female work participation in agriculture, non-agriculture rural activities.	10
16 & 17	Impact of technology and modernization on women's work participation.	10
18 & 19	Effects of globalization and liberalization on women.	5
20	Gender issues in development	5
21 & 22	female labour in agriculture, sector-impact of change in female labour employment	10
	Total	**100**

B) Practical:

Exercise	Title of Exercise
1	Preparation of case studies based on field survey of women in agriculture.
2	Preparation of case studies based on field survey on women participation in social, economic and political activities-I
3	Preparation of case studies based on field survey on women participation in social, economic and political activities-II
4	Preparation of case studies based on field survey on women participation in social, economic and political activities-III
5	Survey on role of women in decision making in family.
6	Survey on role of women in decision making democratic institutions like co-operatives and local self-governments.
7	Exercises on estimation of gender empowerment ratio across different states of India.
8	Exercises on time series analysis of sex ratio across different states of India.
9	Estimation of female literacy ratio across different states of India
10	Estimation of female work participation across different states of India
11	Group Discussion – Gender division of labour in family and Gender power relations-I
12	Group Discussion–Gender division of labour in family and Gender power relations-II
13	Field work-Problems of women in organized & authorized sector-I
14	Field work-Problems of women in organized & authorized sector-II

Suggested Readings:

1. Dutta, Nandita and' Sumitra Jha. 2014: Women and Rural Development. Pacific Books International, Delhi.
2. Dutta, Nandita and, Sumitra Jha (2014): Women and Agricultural Development- Pacific Book, New Delhi.
3. Sen, Amartya. 1990. More than 100 Million Women are missing. Review of Books, New York. vol.37, No.20.
4. UNRISD. 2004. Gender Equality: Striving for Justice in an Unequal World- UNRISD, France.
5. ILO. 2002. Women and Men in the Informal Economy: A Statistical Picture- ILO.
6. Joyce Jacobsen. 2007. The Economics of Gender, Blackwell Publishers.

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Course	ELE-ECON-249	Credit: 3 (2+1)	Semester: IV
Course title	Management of Cooperatives & Producers' Organizations		

Theory:

Management of cooperative enterprises: Concept, Meaning, definition, unique features– Issues in cooperative management – Cooperative governance- Human resource development in cooperatives- Professionalization of cooperatives.

Co-operative management structure: Role and responsibilities of General Body, Board of Directors, President and Chief Executive Officer. Decision making in cooperatives- Performance evaluation parameters for co-operatives.

Capital and cooperatives – Meaning-Purpose of Equity-Equity Management and cooperatives -The Importance of Financial Planning -Equity Types -Equity Management Considerations .

Producer Organizations: concept, meaning, types, characteristics and scope. Process guidelines for promotion of FPOs. Steps in Registration of PCs. Management of Producer Companies: Membership, Powers of General Body, powers of Executive Committee, Funds, accounts and audit, appropriation of net profit. Role of central and state governments in supporting FPOs, Role of NABARD in promoting Producer Organizations.

Practical:

Case studies on evaluation of the performance of co-operative organisations. Case studies on democratic decisions and ethical dilemma. Assessing capital requirements of a Producer Company, Assessment of financial viability of the business of Producer Companies, Assessing institutional performance of Producer Company.

Teaching Schedule

Theory

Lecture No	Topic	Weightage %
1&2	Management of cooperative enterprises: Concept, Meaning, definition	10
3 to 5	Management of cooperative enterprises unique features Issues in cooperative management Cooperative governance	10
6 to 8	Human resource development in cooperatives- Professionalization of cooperatives Co-operative management structure	10
9 to 13	Role and responsibilities of General Body Board of Directors, President and Chief Executive Officer Decision making in cooperatives- Performance evaluation parameters for co-operatives.	10
14 to 19	Capital and cooperatives – Meaning- Purpose of Equity- Equity Management and cooperatives The Importance of Financial Planning Equity Types Equity Management Considerations	20
20 to 23	Producer Organizations: concept, Producer Organizations: meaning, types, Producer Organizations characteristics Producer Organizations scope	10

24 to 30	Process guidelines for promotion of FPOs. Steps in Registration of PCs. Management of Producer Companies: Membership, Powers of General Body powers of Executive Committee Funds accounts and audit, appropriation of net profit.	20
31 to 32	Role of central and state governments in supporting FPOs Role of NABARD in promoting Producer Organizations.	10
	Total	**100**

B) Practical:

Exercise	Topic
1	Case study on evaluation of the performance of co-operative organization-I
2	Case study on evaluation of the performance of co-operative organization-II.
3	Case study on democratic decisions and ethical dilemma-I
4	Case study on democratic decisions and ethical dilemma-II.
5	Assessing capital requirements of a Producer Company-I
6	Assessing capital requirements of a Producer Company-II.
7	Assessment of financial viability of the business of Producer Company-I
8	Assessment of financial viability of the business of Producer Company-II.
9	Assessment of financial viability of the business of Producer Company-III
10	Assessment of financial viability of the business of Producer Company-IV.
11	Assessing institutional performance of Producer Company-I
12	Assessing institutional performance of Producer Company-II.

Suggested Readings

1. GOI.2013. Policy & Process Guidelines for Farmer Producer Organisations, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, New Delhi.
2. NABARD. 2015. Farmer Producer Organisations, Farm Sector Policy Department & Farm Sector Development Department, NABARD, Mumbai.
3. ASA. 2016. Resource book on Formation & Functioning of Farmer Producer Companies. Action for Social Advancement, Madhya Pradesh.
4. Sukhpal Singh and Tarunvir Singh. 2014.Producer Companies in India : Organisation & Performance. Allied Publishers, New Delhi.
5. GOI.2013. The Companies Act,1956. Part IX A, Producer Companies.
6. Indian Management, AIMA, Newdelhi.
7. International Food and Agribusiness Management Review,Wageningen Academic Publishers.

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Course No:	ELE MKT - 249	3 (2+1	Semester : IV
Course Title	Rural Marketing		

Syllabus

Theory:

Nature and Scope of Rural Marketing, Definition and Scope of Rural Marketing. Rural Market in India – Size and Scope. Problems of Rural Market. Constraints in Rural Marketing and Strategies to Overcome Constraints. Rural Consumer vs. Urban Consumers – A Comparison, Characteristics of Rural Consumers. Rural Market Environment: (a) Demographics – Population, Occupation Pattern, Literacy Level; (b) Economic Factors – Income Generation, Expenditure Pattern, Rural Demand and Consumption Pattern, Rural Market Index, Land Use Pattern; (c) Rural Infrastructure – Rural godowns/ warehousing, Electrification, Roads.
Consumer behaviour: meaning and importance, Rural Consumer Behaviour: Meaning, Factors Affecting Rural Consumer Behaviour – Social Factors, Cultural Factors, Technological Factors, Lifestyle, Personality. Rural marketing strategies: Relevance of Marketing Mix for Rural Market/Consumers. Product Strategies- Rural Product Categories – FMCGs, Consumer Durables, Agriculture Goods and Services; Importance of Branding, Packaging and Labeling.
Nature of Competition in Rural Markets, the Problem of Fake Brands. Rural market segmentation – occupational segmentation. Sociological segmentation, Thomson rural Market Index, MICA rural marketing ratings and Lin Quest Data. Pricing Strategies and Objectives, pricing policies - innovative pricing methods for rural markets. Promotional Strategies.
Segmentation, Targeting and Positioning for Rural Markets. Distribution Strategies for Rural Consumers: Channels of Distribution- HAATS, Mandis, Public Distribution System, Co- operative Society, Distribution Models of FMCG, Model for Rural Markets. (Case Study Based). Communication Strategy: Challenges in Rural Communication, Developing Effective Communication, Determining Communication Objectives, Designing the Message, Selecting the Communication Channels. Creating Advertisements for Rural Audiences. Rural Media – Mass media, Non-conventional Media, Personalized Media. Innovative Distribution Channels like ITC E-choupal, Godrej Adhar, HUL Shakti. Rural Retail Markets: Understanding the rural retail environment, Emergence of modern retail markets in rural areas. Principles of Innovation for Rural Market, Need for Innovation in Rural Market, Role of Government &NGOs in Rural Marketing.

Practical:

Studying rural marketing environment,Rural Consumer vs. Urban Consumers
Process of Research in Rural Markets,Sources and Methods of Data Collection,Data Collection Approaches in Rural Markets.
Corporate Sector in rural marketing,Rural Specific Promotion
Segmentation, Targeting and Positioning for Rural Markets
Rural Communication, Media and Methods.
Pricing Strategies and, pricing policies
Branding, Packaging and Labeling.in Rural Markets
Field visits / case studies: Understanding the Rural Market A Practical Approach Case Studies.

Theory
Teaching Schedule

Lectures No	Topic	Sub Topic	Weightage %
1 &2	**Nature and Scope of Rural Marketing**	Definition and Scope of Rural Marketing. Rural Market in India – Size and Scope. Problems of Rural Market. Constraints in Rural Marketing and Strategies to Overcome Constraints	5
3& 4	**Rural Consumer vs. Urban Consumer**	Consumers – A Comparison, Characteristics of Rural Consumers	5
5&6	**Rural Market Environment**: **(a) Demographics** – (**b) Economic Factors** –	Population, Occupation Pattern, Literacy Level Income Generation, Expenditure Pattern, Rural Demand and Consumption Pattern, Rural Market Index, Land Use Pattern	5
9&10	**c) Rural Infrastructure** –	Rural godowns/ warehousing, Electrification, Roads Social Factors, Cultural Factors, Technological Factors, Lifestyle, Personality.	5
12&13	**Rural marketing strategies**:	Marketing Mix for Rural Planning stage implementation stage Feedback stage	10
14&15	**Market/Consumers**.	Product Strategies- Rural Product Categories – FMCGs, Consumer	5
16&17	**Durables, Agriculture**	Goods and Services; Importance of Branding, Packaging and Labeling. Grading standardition	10
18&19	**Nature of Competition**	Rural Markets, the Problem of Fake Brands.	5
20&21 22 23	**Rural market segmentation** –	occupational segmentation. Sociological segmentation, Thomson rural Market Index, MICA rural marketing ratings and Lin Quest Data. Segmentation, Targeting and Positioning for Rural Markets Distribution Strategies for Rural Consumers	10
24 & 25	**Pricing Strategies**	Objectives, pricing policies - innovative pricing methods for rural markets**.**	10
26&27	**Promotional Strategies**..	Objectives, types of Promotional Advantage &disadvantage of Promotional	5
28	**Channels of Distribution**-	HAATS, Mandis, Public Distribution System, Co-operative Society, Distribution Models of FMCG, Model for Rural Markets.	5

29&30	**Communication Strategy**:	Challenges in Rural Communication, Developing Effective Communication, Communication Objectives, Designing the Message, Selecting the Communication Channels. Creating Advertisements for Rural Audiences. Rural Media – Mass media, Non-conventional Media, Personalized Media. Innovative	10
31	**Distribution Channels**	ITC E-choupal, Godrej Adhar, HUL Shakti.	5
32	**Rural Retail Markets**:	Understanding the rural retail environment, Emergence of modern retail markets in rural areas	5

Practical's

Exercise	Title of Exercise
1	Studying rural marketing environment,
2	Rural Consumer vs. Urban Consumers
3	Process of Research in Rural Markets,
4	Sources and Methods of Data Collection,
5	Data Collection Approaches in Rural Markets.
6	Corporate Sector in rural marketing,
7	Rural Specific Promotion
8	Segmentation, Targeting and Positioning for Rural Markets
9	Rural Communication, Media and Methods.
10	Pricing Strategies and, pricing policies
11	Branding, Packaging and Labeling .in Rural Markets
12	Understanding the Rural Market ITC E-choupal, Godrej Adhar,
13	Field visits / case studies Branding Pricing
14	Field visits / case studies Labeling Pricing
15	Field visits / case studies Packaging Pricing
16	A Practical Approach Case Studies & Report writing

Suggested references

1. Acharya, S.S. and Agarwal, N.L., Agricultural Marketing in India
2. Agricultural Economics, Kalyani Publications
3. Ruddra Dutt and Sundharam K.P .M., Indian Economics
4. Ramkishen Y .Rural &Agriculture Marketing.

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Course	**ELE-BM-248**	**Credit: 3 (2+1)**	**Semester: IV**
Course title	**Social Entrepreneurship**		

Theory:

Social Entrepreneurship: concept, meaning. Historical perspective of social entrepreneurship. Factors impacting transformation into social entrepreneurship. The characteristics of social

entrepreneurs. Differences between business and social enterprise. Forms of social enterprises - Profit and non-profit Proprietorships, partnership and company; Non-Governmental organisation – Society, Trust and Company. Third Sector Organizations (TSOs) and social enterprises. Similarities and differences with other forms of enterprises. Organisation of social enterprise. Financing of social enterprise. Legal compliance and management of resistance. Management: strategy, finance, HRM and marketing. Governance. Governance challenges - accountability, transparency and democracy. Measurement of social outcomes & impact, social accounting, social return on investment. Innovations in social enterprises. Successful social enterprises in India.

Practical:

Case studies on organisation, financing and impact measurement of social enterprises.

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1to 3	Social Entrepreneurship: concept Social Entrepreneurship: meaning Historical perspective of social entrepreneurship	10
4 to 8	Factors impacting transformation into social entrepreneurship The characteristics of social entrepreneurs. Differences between business and social enterprise Forms of social enterprises	20
9	Profit and non-profit Proprietorships partnership and company	10
10 To 16	Non-Governmental organization Non-Governmental organization Society Non-Governmental organization Trust Non-Governmental organization Company. Third Sector Organizations (TSOs) social enterprises Financing of social enterprise	20
17 To 23	Legal compliance and management of resistance Management: strategy finance HRM and marketing Governance. Governance challenge accountability transparency and democracy	20
24&25 26&27 28&29	Measurement of social outcomes & impact social accounting social return on investment	10
30&31 32	Innovations in social enterprises Successful social enterprises in India.	10

B) Practical:

Exercise	Title of Exercise
1	Case studies on organisation, financing and impact measurement of social enterprises.
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Suggested Readings:

1. David Bornstein. 2007. How to Change the World: Social Entrepreneurs and the Power of New Ideas. Oxford University Press, New York.
2. Muhammad Yunus. 2010. Building Social Business: The New Kind of Capitalism that Serves Humanity's Most Pressing Needs. Public Affairs, New York.
3. David Bornstein and Susan Davis. 2010.Social Entrepreneurship: What Everyone Needs to Know.Oxford University Press, New York.
4. Ryszard Praszkier and Andrzej Nowak.2011. Social Entrepreneurship: Theory and Practice. Cambridge University Press, Cambridge.
5. Bob Doherty, George Foster & Chris Mason. 2009. Management for Social Enterprise. Sage Publications,USA.
6. Journal of Social Entrepreneurship, Taylor & Francis.
7. International Journal of Social Entrepreneurship & Innovation, Inderscience.

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Semester V

Sr. No.	Course No	Course Title	Credit hrs.
1.	SSAC-352	Manures, Fertilizers and Soil Fertility Management	3 (2+1)
2.	ENTO-353	Management of Insect Pests of Crops and Stored Grains	2 (1+1)
3.	BIOTECH-351	Introduction to Plant Biotechnology	2 (2+0)
4	ECON-355	Introduction to Managerial Economics	3 (2+1)
5.	BM-355	Agribusiness Project Management	3 (2+1)
6	MKT-355	Value chain and Retail Management in Agribusiness	3 (2+1)
7.	MKT-356	Information Communication Technology	2 (2+0)
8.	BFA-354	Introduction to Accountancy	3 (2+1)
	ELECTIVE COUSES (Select any one)		
1	ELE-ECON-3510	Cooperative Legal System	3 (2+1)
2	ELE-ECON-3511	Agro-tourism	3 (2+1)
3	ELE-MKT-3510	Agricultural Marketing Regulations	3(2+1)
4	ELE-BFA-356	Advances in Banking	3 (2+1)
		Total	**23= 16 +07**

Course	SSAC-352	Credit: 3(2+1)	Semester: V
Course title	Manures, Fertilizers and Soil Fertility Management		

Syllabus

Theory:

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, Nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. History of soil fertility and plant nutrition. Criteria of essentiality. Role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, Sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, and rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Practical:

Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of soil organic carbon, Estimation of alkaline hydrolysable N in soils. Estimation of soil extractable P in soils. Estimation of exchangeable K; Ca and Mg in soils. Estimation of soil extractable S in soils. Estimation of DTPA extractable Zn in soils. Estimation of N in plants. Estimation of P in plants. Estimation of K in plants. Estimation of S in plants. Analysis of Manures and fertilizers, Visit to STL/FTL.

Teaching schedule
Theory

Lecture No.	Topic	Weightage (%)
1	History of soil fertility and plant nutrition.	3
2	Soil as a source of plant nutrients, essential and beneficial nutrients and their role. Criteria of essentiality, forms of nutrients in soil.	5
3	Introduction and importance of organic manures. Sources of organic matter, recycling, composition and C:N ratio	5
4 & 5	Definition, properties and classification of bulky and concentrated organic manures, their composition and nutrient availability. Preparation of FYM, composts, different methods of composting, decomposition process and nutrient losses during handling and storage.	6
6 & 7	Vermicomposting, green manuring; types, advantages and disadvantages and nutrient availability.	5
8	Sewage and sludge, Biogas plant slurry; their composition and effect on soil and plant growth.	5
9 & 10	Integrated nutrient management; concept, components and importance	6
11 & 12	Fertilizer; Definition and their classification; N fertilizers: classification, manufacturing process and properties their fate and reaction in soils.	6
13 & 14	Phosphatic fertilizers, manufacturing process and properties, classification, their fate and reaction in soils.	5
15 & 16	Potassic fertilizers: classification, manufacturing process, properties, their fate and reaction in soils. Complex fertilizers their fate and reaction in the soil. Nano fertilizers.	5
17 & 18	Secondary &micronutrient fertilizers: Types, composition, reaction in soil and effect on crop growth. Soil amendments.	5
19	Handling and storage of fertilizers: Fertilizer control order.	3
20 & 21	Mechanism of nutrient transport to plants: Factors affecting nutrient availability to plants. Measures to overcome deficiencies and toxicities	6
22,23 & 24,	Chemistry of soil N,P, K, calcium, magnesium, sulphur and micronutrients	6
25 & 26	Soil fertility evaluation and different approaches	6
27	Soil Testing (Available nutrients) :Chemical methods and critical levels of different nutrients in soil.	6
28	Plant analysis methods : Critical levels of nutrients, DRIS approach, rapid tissue test, indicator plants. Soil test based fertilizer recommendations to crops.	6
29-30	Methods and scheduling of nutrient applications for different soils and crops grown under rain fed and irrigated conditions.	6
31-32	Factors influencing nutrients use efficiency (NUE) in respect of N, P, K, S, Fe and Zn fertilizers.	5

Practicals

Exercise	Title of Exercise
1	Principle and application of spectro-photometry / Colorimetry
2	Principle and application of flame photometry and atomic absorption spectrophotometer (AAS)
3	Determination of moisture from organic manures and its preparation for nutrient analysis.
4	Determination of organic carbon from organic manures by ignition method.
5	Estimation of available nitrogen in soil (Alkaline permanganate method)
6	Estimation of available phosphorus in soil.
7	Determination of available potassium in soil using flame photometer.
8	Determination of exchangeable Ca& Mg in soil by EDTA method.
9	Estimation of available sulphur in soil (Turbidity method).
10	Estimation of DTPA extractable micronutrients from soil using AAS.
11	Estimation of total N from plant sample by Micro Kjeldahl's method.
12	Plant analysis for P,K, secondary and micronutrients.
13	Determination of nitrate nitrogen content of potassium nitrate.
14	Determination of water soluble phosphorus in superphosphate (Pumberton method).
15	Determination of total potassium content of muriate of potash (flame photometer).
16	Determination of zinc content from micronutrient fertilizer (EDTA Method).

Suggested Reading:

1. Mariakulandi and Manickam: 1975 : Chemistry of fertilizers and manures.
2. Mariakulandi and Manickam (1975) : Chemistry of manures an fertilizers
3. Tandon H. L. S. (1994) : Recycling of crop, animal, human and industrial Wastes in Agriculture. FDCO, Delhi
4. Krishna and Murthy (1978) : Manual on compost and other organic manures .
5. Rakshit A. 2015.Manures Fertilizers and Pesticides Paperback – Import. CBS Publishing; 1ST edition, pp. 266.
6. Zhongqi Heand Hailin Zhang) . 2016 . Applied Manure and Nutrient Chemistry for
7. Sustainable Agriculture and Environment Paperback – Import. Springer. pp. 379.
8. Havlin , John L, Samuel L. Tisdale (Author), Werner L. Nelson (Author), James D.
9. Beaton (2004).Soil Fertility and Fertilizers (8th Edition) 8th Edition. Published July 23rd 2004 by Prentice Hall. pp. 528.
10. Havlin , John L. 2004. Soil Fertility and Fertilizers: An Introduction to Nutrient
11. Management Published July 23rd 2004 by Prentice Hall. pp. 528.
12. James F. Power, Rajendra Prasad. 1997 .Soil Fertility Management for Sustainable
13. Agriculture. CRC Press Tayloer and Francis Group. .Textbook -pp. 384 .ISBN 9781566702546
14. ISSS. 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi- 110 012. pp. 728.
15. Das D. K. 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana. pp. 645.
16. ICAR Handbook of manures and fertilizers (1971) publication.
17. Yawalkar K.S. Manures & fertilizer: (1992).

18. Somawanshi, et al. 2012. Laboratory Methods for Analysis of Soil, Irrigation Water and Plants.., Department of Soil Science and Agricultural Chemistry, MPKV., Rahuri. revised Ed. pp. 307.
19. 15)Jakson, M.L. 1973. Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498. Page et. al. 1982. Methods of Soil Analysis, Part 1 and 2. Chemical and Microbiological Properties . 2nd Ed. Soil Science Soc. of America Am. Soc. Agron., Madison, Wisconsin, USA.
20. Chapman, H.D., and P.F. Pratt. 1961. Methods of analysis for soils, plants and waters.
21. Division of Agricultural Sciences, University of California.
22. Brady, N. C. 2016. The Nature and Properties of Soils. 15th edition Publisher: Pearson Education, ISBN: 978-0133254488.
23. ISSS. 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi110 012. pp. 728.
24. Das, D. K. 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana. pp. 645.
25. Tisdale, S. L. and Nelson, W. L. and Beaqton, J. D. 2010. Soil Fertility and fertilizers. 7th Ed. Macmillan Publishing Company, 445 Hutchinson Avenue, Columbus.
26. Yawalkar, K. S. , Agarwal, J. P. and Bokde, S. 1967. Manures and Fertilizers. AgriHorticultural Publication.
27. Chopra, S. L. and Kanwar, S. L. and Rakshit, J. S. 2014. Analytical Agricultural Chemistry. Kalyani Publisher.
28. Hand book of fertilizers use (1980) : FAI publication.

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Course :	ENTO -353	**Credit:**	2(1+1)	**Semester- V**
Course title:	Management of Insect Pests of Crops and Stored Grain			

Syllabus

Theory

General account on nature and type of damage by different arthropods pests: Scientific name, order, family, host range, distribution, biology, nature of damage and management of insect pests of **Cereals-Rice -** Paddy stem borer, Green leaf hopper, Brown plant hopper, White backed plant hopper, Gall midge, Paddy grasshopper, Blue beetle, Caseworm, Armyworm, Gundhi bug, Hispa, Leaf folder. **Sorghum –** Shoot fly, Stem borer, Aphids, Delphacids, Grasshopper, Earhead midge, Earhead caterpillars. **Maize –** Shoot fly, Stem borer, Armyworm, Cob earworm. **Bajra –** Shoot fly, Blister beetle. **Wheat –** Stem borer, Aphids, Termites. **Pulses – Pigeon pea**, **chickpea, pea. Pigeon pea** – Pod borer, Plume moth, Pod fly, Spotted pod borer, Leaf webber, Mites. **Chickpea –** Gram pod borer, Aphids, Cutworm. **Pea** – Aphids, Blue butterfly, Pod borer. **Oilseeds -Groundnut** – Leaf miner, Hairy caterpillar, Tobacco leaf eating caterpillar, Aphids, Thrips, White grub, Pod sucking bug. **Sunflower** – Capitulum borer, Hairy caterpillar, Jassids, Thrips, Whitefly, Stem borer. **Mustard –** Aphids, Sawfly, Leaf webber. **Linseed –** Gall fly. **Soybean –** Stem fly, Girdle beetle, Leaf miner, Tobacco leaf eating

caterpillar, Whitefly, Semilooper, Gram pod borer. **Sesamum –** Til hawk moth, Gall fly, leaf eating caterpillar. **Fiber crops –Cotton –** Aphids, Jassids, Thrips, Whitefly, Mealy bugs, Spotted bollworm, American bollworm, Pink bollworm, Tobacco leaf eating caterpillar, Leaf folder, Semilooper, Red cotton bug, Dusky cotton bug, Grey weevil. **Sugarcane crops** - Early shoot borer, Internode borer, Top shoot borer, Whitefly, Pyrilla, Woolly aphids, Mealy bug, Scale insect, Termites, White grub. **Horticultural pests-** crops like citrus, mango, grapevine, pomegranate, guava banana, papaya, apple, tea, coffee, brinjal, okra, tomato, chilli, potato, turmeric, onion, **Cruciferous crops:** Cauliflower, Cabbage

Non-insect pests of above crops –Mites, Rats and Birds.**Stored grain pests** - Biology and damage of Primary and Secondary pests. Primary store grain pests- Internal feeders - Rice weevil, lesser grain borer, pulse beetle and Angoumois grain moth. External feeders - khapra beetle, Indian meal moth. Secondary store grain pests – Rust red flour beetle, Saw toothed grain beetle, Long headed beetle. Primary and Secondary store grain pests - Rice moth. Non insect pests, mites, rodents, birds and their management. Preventive and curative methods of stored grain pests. Storage structure and methods of grain storage and fundamental principles of grain store management.

Practical

Identification of different type of damage.Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce. **Field crops: Cereals-** Rice, Sorghum, Maize, Bajra, Wheat and Miner millets. **Pulses-** Pigeon pea, Chickpea, Pea.**Oilseeds:** Groundnut, Sunflower, Mustard, Linseed, Soybean, Sesamum. **Fibre:** Cotton,. **Sugar crop:** sugarcane. **Horticultural pests-** crops like citrus, mango, grapevine, pomegranate, guava,banana, papaya, custard apple, apple, tea, coffee, brinjal, okra, tomato, chilli, potato, turmeric, onion, **Cruciferous crops:** Cauliflower, Cabbage **Non insect pests** of field crops.Store grain pests. Non insect pests, mites, rodents, birds and their management. Preventive and curative methods of stored grain pests. Storage structure and methods of grain storage and fundamental principles of grain store management. Visit to nearest FCI godowns and ware houses

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
	Distribution, biology, nature of damage and management of insect pests of ….	10
	Cereals	

Lecture	Topic	Weightage (%)
1	Rice - Paddy stem borer, Green leaf hopper, Brown plant hopper, White backed plant hopper, Gall midge, Paddy grasshopper, Blue beetle, Caseworm, Armyworm, Gundhi bug, Hispa, Leaf folder	
2	Sorghum – Shoot fly, Stem borer, Aphids, Delphacids, Grasshopper, Earhead midge, Earhead caterpillars	
3	Maize – Shoot fly, Stem borer, Armyworm, Cob earworm	
	Bajra – Shoot fly, Blister beetle	
	Wheat – Stem borer, Aphids, Termites,	
	Pulses – Pigeon pea, **chickpea, pea**	10
4	Pigeon pea – Pod borer, Plume moth, Pod fly, Spotted pod borer, Leaf webber, Mites	
5	Chickpea – Gram pod borer, Aphids, Cutworm	
	Pea – Aphids, Blue butterfly, Pod borer	
	Oilseeds -	10
6	Groundnut – Leaf miner, Hairy caterpillar, Tobacco leaf eating caterpillar, Aphids, Thrips, White grub, Pod sucking bug	
7	Sunflower – Capitulum borer, Hairy caterpillar, Jassids, Thrips, Whitefly, Stem borer	
	Mustard – Aphids, Sawfly, Leaf webber	
8	Linseed – Gall fly	
	Soybean – Stem fly, Girdle beetle, Leaf miner, Tobacco leaf eating caterpillar, Whitefly, Semilooper, Gram pod borer	
	Sesamum – Til hawk moth, Gall fly, leaf eating caterpillar	
9	**Fiber crops –**	10
	Cotton – Aphids, Jassids, Thrips, Whitefly, Mealy bugs, Spotted bollworm, American bollworm, Pink bollworm, Tobacco leaf eating caterpillar, Leaf folder, Semilooper, Red cotton bug, Dusky cotton bug, Grey weevil	
	Sugarcane crops	
	Sugarcane – Early shoot borer, Internode borer, Top shoot borer, Whitefly, Pyrilla, Woolly aphids, Mealy bug, Scale insect, Termites, White grub	
10-11	**Horticultural pests**	10
	Citrus:- Lemon butterfly,White fly, Black fly, Leaf miner,Fruit sucking moth, (*Eudocima fullonica* C, *E. materna* L. *Achoea janata* L.), Citrus psylla,Citrus aphids, Mealy bug, Citrus thrips, Scale insects	
	Mango:-Mango stem borer,Mango stone weevil,Mango fruit fly, Mealy bugs, Mango hoppers, Shoot borer, Thrips,	

Lecture	Topic	Weightage (%)
	Slug caterpillar, Midge fly, Leaf gall	
12-16	**Grapevine:-**Flea beetle /Udadya beetle, Thrips, Stem Girdler, Mealy bug, Mite	
	Guava:-Fruit fly, Spiraling white fly, Bark eating caterpillar Fruit Borers- **(** *Congethes (Dichocrocis) punctiferalis, Deudorix (Virachola) isocrates, Rapala varuna,)* Green Scale, Mealy bug.	
	Banana:-Root stock weevil/Rhizome weevil, Pseudostem borer, Fruit rust thrips, Aphids, Tingid or Lace wing bug, Leaf eating caterpillar **Papaya:-**Papaya mealy bugs, White fly, Green peach aphid, Ash weevils,	10
	Sapota :-Chiku moth / Sapota Leaf Webber, Sapota seed borer, Fruit fly, Stem borer, Hairy caterpillar, Leaf folder, Bud borer.	
17-19	**Apple** :-Mites, Codling moth,	
	Pomogranate:-Anar caterpillar, Fruit sucking moth *(Eudocima fullonica, Eudocima materna, Achoea janata L.,)* Thrips, Shot hole borer, Bark eating caterpiller, Mealy bug, Whitefly, Aphids,	
	Brinjal:- Brinjal shoot & fruit borer, Jassids /leaf hopper, Aphids, White fly, Red Spider Mites, Hadda Beetle,Brinjal leaf roller, Lace wing bug, Stem borer **Okra:-**Shoot & fruit borer,Leafhoppers, Aphids, White fly, Leaf Roller, Red Spider Mite**,** *Helicoverpa,* Flea beetle, Leaf miner (*Liriomyza)*	10
	Tomato :-Fruit borer,Leaf miner- *Liriomyza* and *Tuta absoluta* Aphids, Thrips, White Fly, Mites **Chilli:-**Thrips, Fruit borer (*Helicoverpa*), Mites.	
20-21	**Tea:-** Tea Green leaf Hopper, Tea mosquito bug, Mites **Coffee:-**Coffee seed borer, Coffee berry borer	
	Cruciferous crops (Cauliflower, Cabbage,:- Diamond back moth, Aphids, Painted bug, Cabbage butterfly, Leaf eating caterpillar, Head borer	
	Non-insect pests of above crops – Crabs, Snails and Slugs, millepedes, Mites, Rats and squirrels	10
22	**Stored grain pests -** Biology and damage of Primary and Secondary pests Primary store grain pests- Internal feeders - Rice weevil, lesser grain borer, pulse beetle and Angoumois grain moth External feeders - khapra beetle, Indian meal moth Secondary store grain pests – Rust red flour beetle, Saw toothed	

Lecture	Topic	Weightage (%)
	grain beetle, Long headed beetle Primary and Secondary store grain pests - Rice moth	
23-25	Non insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management	20
	Preventive and curative methods of stored grain pests	
	Storage structure and methods of grain storage and fundamental principles of grain store management.	
	Total	**100**

b) Practical

Experiment	Topic
1.	Pests of Rice
2.	Pests of Sorghum
3.	**Pests of Maize, Bajra, Wheat**
4.	Pests of Pigeon pea ,Chickpea and Pea
5.	Pests of Groundnut ,Sunflower ,Mustard
6.	Pests of Linseed ,Soybean, Sesamum
7.	Pests of Cotton, Sugarcane
8.	Pests of citrus, Mango
9.	Pests Grapevine, Guva, Banana
10 & 11.	Pests of Papaya, Sapota, Apple ,Pomegranate
12.	Pests of Brinjal,Okra, Tomatto and chilli
13	Pests of Tea, Coffee , Cauliflower and Cabbage
14	Non insect pests of field crops
15	Store grain pests
16	Non insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management
17	Preventive and curative methods of stored grain pests
18	Storage structure and methods of grain storage and fundamental principles of grain store management.

Marks distribution for practical examination

1. Spotting -36

2. Viva-voce -04
3. Practical manual-5
4. Collection-5

Suggested Readings:

- A.S. Atwal and G.S. Dhaliwal :Agricultural Pests of South Asia and their Management
- B.V. David and V.V. Rammurthy: Elements of Economic Entomology
- Manishekharan and Sudarrajan : Pest Management in Field Crops.
- Pedigo L.P. : Entomology and Pest Management.
- VenuGopal Rao: Insect Pest Management.
- B.P. Khare : Storage Entomology.

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Course :	BIOTECH-351	**Credit:**	**2(2+0)**	**Semester-V**
Course title:	**Introduction to Plant Biotechnology**			

Syllabus

Theory:

Introduction to Recombinant DNA Technology, Introduction, history, concepts and applications of plant biotechnology, cell, DNA structure and function, gene cloning steps, common enzymes used as molecular tools, vectors, transformation and selection of recombinants, construction of genomic libraries, isolation and cloning of coding parts of eukaryotic genes-cDNA cloning. Application of Genetic Engineering in Crop Improvement. Gene transfer methods, transgenic and its importance, gene editing, biosafety measures and intellectual property rights. Introduction to Marker-Assisted Breeding in Crop Improvement Molecular markers, RAPD, RFLP, SSR, SNP etc., and their applications. Plant Tissue Culture for Crop Improvement. Concept of tissue culture, organogenesis and embryogenesis, embryo rescue and its significance, micro propagation, soma clonal variation and its use in crop improvement, synthetic seeds and their significance, somatic hybridization and cybrids and cryo-preservation. Use of tissue culture in biotechnology (transgenic and gene editing).

Teaching Schedule:

Theory

Lecture No.	Topic	Weightage (%)
1	Introduction to Recombinant DNA Technology,	4

Lecture No.	Topic	Weightage (%)
2	Introduction, history, concepts and applications of plant biotechnology,	4
3	Cell, DNA structure and function	4
4 -5	gene cloning steps, common enzymes used as molecular tools,	4
6	vectors, transformation and selection of recombinants,	4
7-8	Construction of genomic libraries,	4
9	Isolation and cloning of coding parts of eukaryotic genes-cDNA cloning.	4
10	Application of Genetic Engineering in Crop Improvement.	8
11 -12	Gene transfer methods	4
13	transgenic and its importance,	4
14	Gene editing, biosafety measures and intellectual property rights.	4
15&16	Introduction to Marker-Assisted Breeding in Crop Improvement,	4
17	Molecular markers, RAPD, RFLP, SSR, SNP etc., and their applications.	4
18	Plant Tissue Culture for Crop Improvement. Concept of tissue culture,	8
19 &20	organogenesis and embryogenesis	4
21 & 22	embryo rescue and its significance	4
23 & 24	micro propagation	8
25 & 26	soma clonal variation and its use in crop improvement	4
27& 28	synthetic seeds and their significanc$_{1}$e$_{56}$	4
29	somatic hybridization and cybrids	4
30	cryo-preservation.	4

Suggested Reading:

1) Text Book:

Reference books:

Singh, B D, 2004. *Biotechnology Expanding Horizons* 2nd Edn.Kalyani Publishers, New Delhi.

1. Gupta, P.K., 2015. *Elements of Biotechnology* 2nd Edn. Rastogi and Co., Meerut.
2. Razdan M K, 2014. *Introduction to plant Tissue Culture* 2nd Edn. Science Publishers, inc. USA.
3. Gautam V K, 2005. *Agricultural Biotechnology*. Sublime Publications
4. Thomar, R.S., Parakhia, M.V., Patel, S.V. and Golakia, B.A., 2010. *Molecular markers and Plant biotechnology*, New Publishers, New Delhi.
5. Purohit, S.S., 2004. *A Laboratory Manual of Plant Biotechnology* 2nd Edn. Agribios, India.
6. Singh, B.D. 2012. *Plant biotechnology*. Kalyani publishers, Ludhiana
7. Bilgrami, K.S. and Pandey, A.K.1992. *Introduction to biotechnology*. CBS Pub. New Delhi
8. Gupta, P.K. 1994. *Elements of biotechnology*. Rastogi Pub. Meerut.
9. Ch1ahal, G.S. and Gosal, S.S.2003. *Principles and procedures of plant approaches breeding Biotechnological and conventional*. Narosa Publishing House, New Delhi.

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Course	ECON-355	Credit: 3 (2+1)	Semester: V
Course title	Introduction to Managerial Economics		

Theory:

Managerial Economics: Definition, scope and significance of managerial economics, Basic economic concepts and principles – firm, industry and economy. Demand estimation: Demand forecasting – meaning, importance and techniques. Production analysis: Cobb-Douglas and CES production functions. Modern Firms: Changing objectives of modern firms & their cost curves, Leaning curve, Meaning, uses and types of cost control, revenue concepts and break-even analysis. Monopoly: Monopoly types, characteristics and degrees of price discrimination under monopoly. Monopolistic Competition: Types, characteristics and pricing and output determination, Pricing strategies of modern firms. Macro-economic equilibrium: Money concept, functions, demand for and supply of money. Inflation: Meaning and types of inflation, price indices, causes, effects and control of business cycles using monetary and fiscal policies.

Practical:

Computation of different types of demand function. Computation of elasticity of demand -price, income, cross and promotional. Computation of total, average and marginal revenue under different market conditions. Demand estimation through regression analysis. Demand forecasting using non-quantitative and quantitative techniques - trend method, regression method, leading indicator method, simultaneous equations method. Analysis of important demand forecasting methods. Computation of average product, marginal product and elasticity of output with respect to one variable input. Analysis of optimal factor combination using C-D production function. Computation of elasticity of substitution using C-D & CES production functions. Calculation of

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optimal output combination of multi-product firms. Derivation of cost functions from production functions and break-even analysis. Determination of market price, market price & normal price. Price determination in perfect competition. Computation of break-even point, learning curve and economies of scope. Calculation of equilibrium price and output under conditions of monopoly and oligopoly. Calculation of market concentration under oligopoly. Price and output determination. Computation of macro-economic equilibrium models.

Teaching Schedule

Theory

Lecture	Topic	Weightage (%)
1, 2	Managerial Economics: Definition, scope and significance of managerial economics,	10
3, 4 & 5	Basic economic concepts and principles – firm, industry and economy.	10

6, 7	Demand estimation: Demand forecasting – meaning, importance and techniques.	10
8, 9 & 10	Production analysis: Cobb-Douglas and CES production functions.	10
11 & 12	Modern Firms: Changing objectives of modern firms & their cost curves, Leaning curve	10
13, 14 & 15	Meaning, uses and types of cost control, revenue concepts and break-even analysis.	10
16, 17	Monopoly: Monopoly types, characteristics and degrees of price discrimination under monopoly.	5
18 & 19	Monopolistic Competition: Types, characteristics and pricing and output determination,	5
20	Pricing strategies of modern firms.	5
21 & 22	Macro-economic equilibrium: Money concept, functions, demand for and supply of money.	10
23 & 24	Inflation: Meaning and types of inflation	5
25, 26 27	price indices, causes, effects and control of business cycles using monetary and fiscal policies	10
	Total	100

B) Practical:

Exercise	Topic
1	Computation of different types of demand function.
2	Computation of elasticity of demand -price, income, cross and promotional.
3	Computation of total, average and marginal revenue under different market conditions.
4	
5	Demand estimation through regression analysis. Demand forecasting using non-quantitative and quantitative techniques - trend method, regression method, leading indicator method, simultaneous equations method.
6	
7	
8	Analysis of important demand forecasting methods
9	. Computation of average product, marginal product and elasticity of output with respect to one variable input.
10	Analysis of optimal factor combination using C-D production function. Computation of elasticity of substitution using C-D & CES production functions.
11	Calculation of optimal output combination of multi-product firms.
12	Derivation of cost functions from production functions and break-even analysis. Determination of market price, market price & normal price. Price determination in perfect competition.
13	Computation of break-even point, le[1]a[5]r[9]ning curve and economies of scope.
14	Calculation of equilibrium price and output under conditions of monopoly and oligopoly.
15	. Calculation of market concentration under oligopoly. Price and output

Suggested readings:

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

Course	**BM-355**	**Credit: 3 (2+1)**	**Semester: V**
Course title	**Agribusiness Project Management**		

Syllabus

Theory:

Meaning and definition of project, general features of projects, importance and objectives of project analysis. Categories of projects based on various criteria.

Project cycle, stages of project cycle – conception, formulation, appraisal, implementation, monitoring and evaluation. Criteria for appraising projects – ex-ante and ex-post evaluation. Differences between economic and financial analysis in project evaluation. Costs and benefits of agribusiness projects, comparing costs and benefits of agribusiness projects. Externalities – meaning and definition, positive externalities, negative externalities and internalization of externalities, divergence between social costs and benefits of a project.

Undiscounted measures of project worth – Accounting Rate of Return (ARR), ranking by inspection, payback period, proceeds per rupee of outlay and average annual proceeds per rupee of outlay.

Time value of money - compounding and discounting, choice of discount rate. Discounted cash flow measures of project appraisal – Net Present Worth (NPW), Benefit-Cost Ratio (BCR) and Internal Rate of Return (IRR).

Risk and uncertainty. Sensitivity analysis, general kinds of sensitivity analyses, social cost benefit analysis, and rationale for social cost benefit analysis.

Project management – meaning, importance and triple constraint. Project management structures

- functional organization, project organization and matrix organization - meaning, advantages and disadvantages. Project Rating Index (PRI), Work Breakdown Structure (WBS) and Responsibility Assignment Matrix (RAM / RACI). Network analysis – CPM and PERT.

Project financing - sources of financing a project. Business incubators - definition, types and their benefits.
Project control - monitoring time performance (Gnatt Charts, Control Charts), performance index and per cent complete index. Project audit and project closure.

Practical:
Generation of agribusiness project ideas, project proposals in agribusiness sector (private and public), exercises on feasibility studies and formulation of detailed project proposals. Investment analysis - undiscounted measures and discounted measures of project worth. Review of case studies pertaining to management of agribusiness projects.

Theory

Lectures No	Topics	Weightage (%)
1	Meaning and definition of project, general features of projects	4
2	Importance and objectives of project analysis	4
3	Categories of projects based on various criteria	4
4	Project cycle, stages of project cycle – conception, formulation, appraisal, implementation, monitoring and evaluation	4
5	Criteria for appraising projects – ex-ante and ex-post evaluation.	4
6	Differences between economic and financial analysis in project evaluation..	2
7	Costs and benefits of agribusiness projects, comparing costs and benefits of agribusiness projects.	2
8	Externalities – meaning and definition, positive externalities, negative externalities and internalization of externalities, divergence between social costs and benefits of a project	4
9	Time value of money - compounding and discounting, choice of discount rate	2
10	Undiscounted measures of project worth – Accounting Rate of Return (ARR),	4
11	ranking by inspection,	2
12	payback period,	2
13	proceeds per rupee of outlay and average annual proceeds per rupee of outlay	2
14	Discounted cash flow measures of project appraisal – Net Present Worth (NPW),	4
15	Benefit-Cost Ratio (BCR)	4
16	Internal Rate of Return (IRR)	4
17	Risk and uncertainty.	4
18	Sensitivity analysis, general kinds of sensitivity analyses,	2

19	social cost benefit analysis, and rationale for social cost benefit analysis	2
20	Project management – meaning, importance and triple constraint	4
21	Project management structures - functional organization	4
22	Project organization and matrix organization - meaning, advantages and disadvantages..	4
23	Project Rating Index (PRI),	2
24	Work Breakdown Structure (WBS)	4
25	Responsibility Assignment Matrix (RAM / RACI).	4
26	Network analysis – CPM and	4
27	PERT	4
28	Project financing - sources of financing a project.	2
29	Business incubators - definition, types and their benefits.	4
30&31	Project control - monitoring time performance (Gnatt Charts, Control Charts), performance index and per cent complete index.	2
32	Project audit and project closure.	2
	Total	100

B) Practical:

Exercise No	Title
1	Generation of agribusiness project ideas
2	Project proposals in agribusiness sector (private),
3	Project proposals in agribusiness sector (public),
4	Exercises on feasibility studies .
5	Formulation of detailed project proposals.
6&7	Time value of money - compounding and discounting, choice of discount rate Undiscounted measures of project worth
8	To Study of NPV
9	To Study of BCR
10	To Study of IRR
11	To Study of Profitability Index (PI)
12	To Estimation of Accounting Rate of Return (ARR),
13	To Estimation of Ranking by inspection,
14	To Estimation of Payback period,
15	To Estimation of Proceeds per rupee of outlay
16	To Estimation of Average annual proceeds per rupee of outlay

Suggested Readings:

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) Johl, S. S and Charles V. Moore. Essentials of Farm Financial Management
4) Kahlon, A. A. and Karam singh. Managing Agriculture Finance- Theory and Practice
5) S. Subba Ready. Agricultural Economics.

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Course	MKT-355	Credit: 3 (2+1)	Semester: V
Course title	Value chain and Retail Management in Agribusiness		

LECTURE NO	TOPIC	SUBTOPIC	WEITAGE (%)
1 & 2	value and value chain	1. Definition 2. Importance Scope 3. Characteristics	
3	Concept of value chain	1. History 2. Meaning and importance	
4	Supply Chain	1. Definition 2. Importance 3. Scope	8
5	Comparison between value chain and Supply chain	1. Difference between value chain and Supply chain	
6	Components of value chain	1. Components and its explanation with example	5
7&8	Value Chain Governance	2. Introduction 3. Types of Value Chain Governance, 4. Determinants of Governance Structure, 5. Dynamism in Governance 6. Factors 7. Recommended Good Practices	8

9 ,10& 11	Value chain methodology and analysis	1. Value Chain Analysis 2. Theory of Value Chain Analysis 3. Advantages and Disadvantages of Value Chain Analysis, 4. Application of Value Chain Analysis 5. Economics of value chain	6
12,& 13	Financing of agricultural chain	1. Definition 2. Importance 3. Meaning 4. Models 5. Financial Instruments , Strategy and design recommendations for programmes dealing with agricultural value chains and 6. agricultural value chain finance 7. General principles and insights for development agencies	8
14	Market linkages in value chain	1. Value chain development and market linkage	5
15	Mapping of value chain	2. Introduction 3. Meaning 4. Importance 5. Process steps for putting together a value chain map 6. Limitations	5
16	Porter's Value Chain	1. Meaning 2. Importance 3. Potters value chain model	
17 ,18&19	Introduction to Retail Management	1. Definition 2. Meaning ,Importance & Scope 3. Evolution of retailing 4. Benefits to national economy 5. Overview of Indian Retail Industry 6. Present scenario 7. Challenges 8. Function of retailer and wholesaler 9. Career Opportunities 10. Needs	10
20 & 21	Retailing in India	1. Importance	

		2. Scope 3. sectors 4. Opportunities 5. FDI 6. Retail Players 7. Problems 8. Growing Diversity of Retailing Formats 9. E-Commerce 10. Franchise 11. New trends	5
22 ,23&24	Types of retailers	1. Classification of retail formats 2. stores formats by location 3. store formats by ownership 4. store formats by merchandise 5. categories 6. store formats by size 7. store formats by price 8. store formats and non-store formats 9. Traditional 10. Specific retail formats 1. Organized retailing and unorganized retailing	10
25 ,26 & 27	Retail location and layout	1. Retail location and retail layout – importance of location decision 2. Market area analysis 3. Factors affecting the store location 4. Current Location trends 5. Trade area analysis 6. Selection of city/area, selection of a specific site 7. Types of location 8. Site Evaluation 9. Advantages and Disadvantages 10. Retail layout patterns – layout guidelines, external factors and internal factors, building interiors 11. Internal and External Factors affecting store layout	10
28	Retail strategies	1. Meaning 2. Business model 3. Steps /process of Strategy Formulation 4. Vision and mission	

		5. Mission 6. Product Positioning and Differentiation	5
29 & 30	Merchandise and inventory management	1. Meaning 2. Importance 3. Types 4. Role 5. Principles of Merchandising 6. Steps in Merchandising Planning and decision 7. Merchandising Procurement Process 8. Classifications of merchandise 9. Tools 10. SKU and SOU	5
31	Retail marketing mix	1. Definition 2. Meaning &Importance 3. Elements 4. Retail Pricing and strategies 5. Retail Advertising	5
32	role of IT in retail management	1. Role of IT in retail 2. E-retailing	5

Reference Books:

1. Dr. R. Balkrishna Supply chain management for Indian Agriculture
2. Logistics and supply chain Integration-ian-sadler –sage-207
3. Sunil Sharma Supply Chain Management-oxfard University-2010
4. Joel D.Wisner,G,K leong. Keah principles of supply chain management-ABalanced approach –choon tan-cengage learning.
5. Retail Management, Michael Levy & Barton A Weitz, Tata McGraw Hill
6. Retailing Management, Gibson C Vedamani , Jaico Publishing House, Mumbai
7. Retail Strategies- understanding why we shop, Jim, Jaico Publishing House, Mumbai
8. Retail Management, Dunne Lusch, South Western Cengage Learning
9. Store Management, K.S. Menon, Macmillan India Ltd.,
10. How to succeed at Retail, Keith Lincoln & Lars Thomassen, –
11. Retailization – Brand survival in the age of retailer Power , Keith Lincoln & Lars Thomassen & Anthony Aconis, Kogan Page Ltd.,
12. Retailing Management – Text and Cases, Swapna Pradhan, 3rd Edn., Tata Mc Graw Hill.
13. Retail Management, Bajaj, Tulli & Shrivastava, Oxford University Press

14. It happens in India & The Wall Mart Story, Kishore Biyani, –
15. Store Manager, Organiser / Planner – DMS retail, -, –
16. International Retail Marketing Strategies, Dr. Ramkishen Y., Jaico Publishing House, Mumbai.

PRACTICAL LESSON PLAN

PRACTICAL NO.	PRACTICAL NAME
1	Presentation on value and value chain
2	Presentation on Value Chain Governance
3	Presentation on Value Chain Analysis
4	Presentation on Mapping of value chain
5	Porter's Value Chain
6	Retailing Management in India
7	Classification of retail formats
8	Retail location and layout
9	Retail strategies
10	Merchandising in retail
11	New trends in Retailing
12	Visit to different retail formats found in India
13	Visit to Processing Unit
14	Visit to logistics
15	Visit to Storage Unit
16	Visit to Warehouse

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Course	**COMP-352**	**Credit: 2(2+0)**	**Semester: V**
Course title	**Information Communication Technology**		

Teaching Schedule – Theory

Lectures No.	Topics	Subtopic	Weightage (%)
1 & 2	ICT	IT-enabled services and their impact on society	**15**
3 & 4	ICT Importance	Computer fundamentals;	

5 & 6	IT Concept	Hardware and software	
7	IT tools	Input and output devices	
8 & 9	Computer Fundamental	Word and character representation.	**10**
10 & 11	System of computer	Features of machine language, assembly language, high-level language	
12 & 13	Languages uses	Advantages and disadvantages of Programming Languages	**21**
14 & 15	Programming Languages	Principles of programming - algorithms and flowcharts.	
16 & 17	Operating systems (OS) -	definition, basic concepts; Introduction to WINDOWS and LINUX Operating Systems	
18 & 19	Operating systems (OS) -	Local area network (LAN); Wide area network (WAN)	**10**
20, 21 & 23	Internet	Internet and World Wide Web; HTML and IP. Internet Applications: Email, File sharing web apps, Social Networks, Online shopping.	**12**
24	Internet Applications	Email, File sharing	
25 & 26	Uses of Internet	web apps, Social Networks, Online shopping.	
27 & 28	Audio visual aids concept:	definition, advantages, classification and choice of Audio visual aids;	**21**
29 & 30	Audio visual aids details	Criteria for selection and evaluation of Audio visual aids	
31	Audio visual aids -	Video conferencing.	
32	Introduction to MS Office	Word, Excel, Power Point. Communication process and barriers to communication.	**12**

Reference Book

Course :	**BFA – 354**	**Credit:**	3(2+1)	**Semester –V**
Course title:	**Introduction to Accountancy**			

Theory:

Introduction to accountancy: Meaning and importance of accounting. Meaning & definition of book keeping. Accountancy objectives of book keeping: branches of accounting. Accounting cycle. Generally Accepted Accounting Principles (GAAP) - concepts and conventions. System of book keeping: Single entry and Double entry system of keeping, Classification of accounts. Golden rules of accounting; Books of accounts: Journal & Ledger –journalizing, ledger posting,

and preparation of ledger accounts. Subsidiary books-Kinds of subsidiary books- Day books: purchase book, sales book, returns book, Bill books, journal proper, Cash books - nature & objectives of cash book, types of cash book, petty cash book; Bank reconciliation statement; Preparation of Trial balance-Methods of trial balance; Final accounts - Trading account, Profit & loss account and Balance sheet; Single entry system of accounts - preparation of statement of affairs, profit or loss statement, advantages & disadvantages. Non-trading organizations. Preparation of accounts relating to non-trading organization. Concepts of revenue & capital expenditure and income, Receipts and payment account, Income and expenditure account, and Balance sheet.

Practical:

Preparation of journal and recording the business transactions in journal, Preparation of ledger and ledger posting, Preparation and solving of problems relating to subsidiary books, Preparation of cash book with single column, Preparation of cash book with double column, Preparation of cash book with triple column and contra entries, Preparation petty cash book in imprest system, Preparation of bank reconciliation statement, Preparation of trial balance, Preparation of final accounts- trading, profit and loss accounts and balance sheet, Preparation of profit and loss account and balance sheet under single entry system. Preparation of non-trading accounts receipts and payment accounts. Preparation of non-trading accounts -income and expenditure accounts and balance sheet.

Theory
Teaching Schedule

Lecture No.	Main Topic	Sub Topic	Weightage (%)
1, 2, 3	Introduction to accountancy	Meaning and importance of accounting. Meaning & definition of book keeping. Objectives of book keeping, branches of accounting, Accounting cycle	10
3, 4	Generally Accepted Accounting Principles (GAAP)	Concepts and Conventions, Basic Accounting Terminologies	10
5, 6, 7	System of book keeping	Single entry and Double entry system of keeping, Classification of accounts. Golden rules of accounting	10
8, 9, 10	Books of accounts	Journal & Ledger –journalizing, ledger posting, and preparation of ledger accounts.	10
11, 12, 13, 14	Subsidiary books	Kinds of subsidiary books- Purchase book, Sales book, Returns book, Bill books, Journal proper, Cash books, nature & objectives of cash book, types of cash book and Petty cash book	10
15, 16, 17,	Bank reconciliation statement	Meaning, Characteristics, Importance, Proforma & Preparation of Bank reconciliation statement	10
18, 19, 20,	Trial balance	Proforma, Meaning, Purpose & Preparation of Trial Balance	10

21, 22, 23	Final accounts	Trading account, Profit & loss account and Balance sheet	10
24, 25, 26, 27	Single entry system of accounts	Preparation of statement of affairs, profit or loss statement, advantages & disadvantages.	10
28, 29, 30, 31, 32	Non-trading organizations	Preparation of accounts relating to non-trading organization. Concepts of revenue & capital expenditure and income, Receipts and payment account, Income and expenditure account, and Balance sheet.	10
		Total	**100**

Practical Exercise

Exercise	Title of Exercise
1, 2	Preparation of journal.
3	Preparation of ledger and ledger posting.
4, 5	Preparation of subsidiary books.
6	Preparation of cash book with single column.
7	Preparation of cash book with double column.
8	Preparation of cash book with triple column and contra entries.
9	Preparation petty cash book in imprest system.
10	Preparation of bank reconciliation statement.
11	Preparation of trial balance.
12, 13	Preparation of final accounts- trading, profit and loss accounts and balance sheet.
14	Preparation of profit and loss account and balance sheet under single entry system.
15	Preparation of non-trading accounts receipts and payment accounts.
16	Preparation of non-trading accounts -income and expenditure accounts and balance sheet.

Suggested Readings:

1. M. G. Patkar Book Keeping & Accountancy; Phadke Prakashan, Kolhapur.
2. Ambrish Gupta, Financial Accounting for Management, 4th edition, Pearson.
3. M. Y. Khan, P. K. Jain, Financial Management, Tata Mc – Graw Hill.
4. Jain S. P. Advanced Accountancy
5. Raman B. S. Accountancy.
6. S. M. Inamdar Cost & Management Accounting, Everest Publishing House, Pune

Elective Courses Select Any One

Course	ELE-ECON-3510	Credit: 3 (2+1)	Semester:V
Course title	Cooperative Legal System		

Theory:

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History of co-operative legislations in India: Co-operative Credit Societies Act, 1904-essential features, Co-operative Societies Act, 1912-essential features. Constitutional reforms act -Special features of Report of the Committee on Model Co-operative Societies Act 1991. Multistate Co-operative Societies Act 2002-objects, need, application, registration, rights and liabilities of members, management, audit, inquiry and winding up. 97th Constitutional Amendment Act 2011- Historical Perspective. History of co-operative legislations in the respective states. Important provisions of state Co-operative Societies Act and Rules: Registration, Amendment of bye-laws, amalgamation and division, Members-rights and liabilities. Management of societies: general body, representative general body, committee, election, supersession. Properties and funds of co-operative societies, Disposal of net profit, Investments, Audit, Inquiry, supervision and inspection, Settlement of disputes, winding up and dissolution of co-operative societies. Organisational structure of Department of Co-operation and Directorate of Co-operative Audit. Functions of Registrars of Cooperative societies.

Practical:

Exercises on cases of registration, amendment of bylaws, amalgamation and division of co-operative societies, membership, management, election, supersession, settlement of disputes and winding up.

Teaching Schedule

Theory

Lecture	Topic	Weightage (%)
1	History of co-operative legislations in India	10
2	: Co-operative Credit Societies Act, 1904-essential features, Co-operative Societies Act, 1912-essential features.	10
3	Constitutional reforms act -Special features of Report of the Committee on Model Co-operative Societies Act 1991.	10
4, 5 & 6	Multistate Co-operative Societies Act 2002-objects, need, application, registration, rights and liabilities of members, management, audit, inquiry and winding up.	10
7	97th Constitutional Amendment Act 2011- Historical Perspective. History of co-operative legislations in the Maharashtra state.	10

8, 9 & 10	Important provisions of state Co-operative Societies Act and Rules: Registration, Amendment of bye-laws, amalgamation and division, Members-rights and liabilities. .	15
11, 12 13& 14	Management of societies: general body, representative general body, committee, election, supersession. Properties and funds of co-operative societies, Disposal of net profit, Investments, Audit, Inquiry, supervision and inspection, Settlement of disputes, winding up and dissolution of co-operative societies	20

15, 16, 17 & 18	Organisational structure of Department of Co-operation and Directorate of Co-operative Audit. Functions of Registrars of Cooperative societies	15
	Total	**100**

B) Practical:

Exercise	**Topic**
1	Exercise on registration of co-operative societies
2	Exercise on amendment of bylaws of co-operative societies
3	Exercise on amalgamation and division of co-operative societies
4	Exercise on membership of co-operative societies
5	Exercise on management of co-operative societies
6	Exercise on Election of co-operative societies
7	Exercise on Supersession of co-operative societies
8	Exercise on settlement of disputes of co-operative societies
9	Exercise on winding up of co-operative societies
10	
11	
12	
13	
14	
15	

Suggested Readings:

1. GOI. 2002. Multi- State Co-operative Societies Act, 2002.
2. GOI. 2002. Multi- State Co-operative Societies Rules, 2002.
3. GOI. 1991. Report of the Committee on Model Act, Planning Commission.
4. Cracogna, Dante, Fici, Antonio, Henry, Hagen (Eds.) .2013.International Handbook on Cooperative Law, Springer, New York.
5. ILO .2002.R 193-Promotion of Co-operatives Recommendation, 2002(No.193), Geneva.
6. Journal of Co-operative Studies, UK Society for Co-operative Studies.
7. The Cooperator, National Cooperative Union of India, New Delhi.
8. M. Karthikeyan and R. Karunakaran, Cooperative Legal System.

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Course	**ELE-ECON-3511**	**Credit: 3 (2+1)**	**Semester:V**
Course title	**Agro-tourism**		

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 nearby Agro – tourism center and prepare a successful entrepreneur story with facilities provided by them. To study considerations before start of Agro tourism center. To study basic requirements to start Agro Tourism center. To study Guidelines to start Agro Tourism Centre. To study best management practices on Agro tourism center. To study services provided on Agro Tourism center. To study Agro tourism: Performance, problems and prospects for the farmers in Maharashtra. To study Indian Agro Tourism Industry: Challenges and strategies. SWOT Analysis for Agro Tourism enterprise. To study key technique of success in Agro tourism. To study Human Resource management and customer service at Agro tourism center. To study promotional strategies for Agro tourism marketing. Developing website for agro tourism marketing. Developing information broacher for agro tourism marketing. Preparation of Project Proposal for Agro tourism. Visit to Agro tourism Centre.

Teaching Schedule

Theory

Lecture No.	Topic	Subtopic	Weightage (%)
1-4	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
5-8	Role of Govt. and laws	1. Govt. policies and legislations in respect of tourism and agro-tourism and environment protection laws.	10
9-12	Trends and constraints in AT	1. Constraints in operation and management of Agro-tourism activities.	10
13-16	Resource Management in AT	1. Human Resources 2. Natural Resources	15

		3. Garbage & waste Management	
17-20	Entrepreneurship development	1. Role and function 2. Hospitability Food and beverages and accommodation services. 3. Communication skill and service	10
21-24	Project Proposal	1. Capital investment, 2. sources and capital budgeting. 3. **Project proposal**- Preparation and feasibility tests, 4. Accounts and record keeping etc	15
25-28	Marketing in Agro Tourism	1. Marketing strategies for Agro-tourism products and services. 2. Publicity of tourism- Advertisement and use of media.	15

B) Practical:

Exercise	Topic
1	. Visit to nearby Agro – tourism center and prepare a successful entrepreneur story with facilities provided by them.
2	To study considerations before start of Agro tourism center.
3	To study basic requirements to start Agro Tourism center.
4	To study Guidelines to start Agro Tourism Centre.
5	To study best management practices on Agro tourism center.
6	To study services provided on Agro Tourism center.
7	To study Agro tourism: Performance, problems and prospects for the farmers in Maharashtra.
8	To study Indian Agro Tourism Industry: Challenges and strategies. SWOT Analysis for Agro Tourism enterprise.
9	To study key technique of success in Agro tourism.
10	To study Human Resource management and customer service at Agro tourism center.
11	To study promotional strategies for Agro tourism marketing.
12	Developing website for agro tourism marketing.
13	Developing information broacher for agro tourism marketing.
14	Preparation of Project Proposal for Agro tourism.
15	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).

Course	**ELE-EMKT-3510**	**Credit: 3 (2+1)**	**Semester:V**
Course title	**Agricultural Marketing Regulatiions**		

Lesson No.	**Name of Topic**	**Content**	**Weightage %**
1	Regulation of market, regulated market Definition	Definition and meaning of regulated market. Evolution of market legislation, Regulation of market	4
2	Growth and development of regulated market	Regulated markets, history of regulated markets, Objectives, Functions of DMI	4
3	Need and Scope for Market Legislation	Need and Scope for Market Legislation	3
4	Review Of Agricultural Produce Market Acts In India And Maharashtra	Role and Growth of regulated agricultural markets in India and Maharashtra, Impact of regulated markets	3
5	Essential Commodities Act-Food Safety And Standards Act 2006,	Salient Features	3
6	Consumer Protection Bill 2019, Patent Act 2002,	Salient Features	3
7	Monopolies And Restrictive Trade Practices Act/ Competition Act 2002, Forward Markets Act 1952, Standards Of Weights And Measures Act 1976,	Salient Features	4
8	The Central Warehousing Corporation Act. Provisions Of Maharashtra Agricultural Marketing (Development Regulation) Act 2007	Salient Features	4
9	Regulated marketing act 1937	Introduction- features	3
10	Organization of regulated markets	Introduction and details	3
11	Constitution of market committees	Introduction and details	3
12	Finance of the market committees	Source of Finance	3
13	Functions of a market committee	Various Functions of Market	3

		Committee	
14	Features of Regulated Markets	Classification of Regulated Markets, Method of Sale, Weighment of produce, Grading, Market Committee	8
15	Features of Regulated Markets	Market News service, Market Charges, Payment, Licensing, Supervision, Disputes settlement, Eliminating malpractices, etc.	
16	Maharashtra State Agricultural Marketing Board	Constitution And Functions.	3
17	Role Of State Department Of Agricultural Marketing And Directorate Of Agricultural Marketing And Inspection.	Introduction, Activities	4
14	Agricultural Marketing Policies Of The Government – Administered Price Policies	Introduction, meaning, etc.	3
15	Commission For Agricultural Costs And Prices (CACP) And Its Working.	Introduction, meaning and working of CACP	4
16	Policies Of Procurement, Levy And Public Distribution System.	Policies Of Procurement, Levy And Public Distribution System.	4
17	Minimum Support Prices, Ceiling Price And Parity Prices. Floor Price Scheme.	Meaning, Concept and examples	4
18	Food Security Policy - Procurement, Buffer Stock, Distribution, Subsidies.	Meaning, Concept, Features	3
19	Food Zone, Agri Export Zones (AEZS)/ Export Oriented Units (EOUS)	Introduction, meaning and working	3
20	Intellectual Property	Introduction , Meaning	3
21	GATT, WTO, Trips and WIPO	Brief Introduction	3
22	Treaties For IPR Protection	Madrid Protocol, Berne Convention, Budapest Treaty, Etc	4
23,24	Types Of Intellectual Property And Legislations	Introduction, IPR, Patents, Copyrights, Trademark, Industrial Design, Geographical Indications, Integrated Circuits	
25	Patents Act 1970	Introduction, Salient Features	5
26,27	Patent System In India,	Introduction, Features,	

	Patentability, Process And Product Patent	Provisions, Process	
28,29, 30	Filing Of Patent, Patent Specification, Patent Claims	Introduction, Provisions, Process, etc.	6
31	Patent Opposition And Revocation, Infringement, Compulsory Licensing	Introduction, Concept, Procedure	
32	Patent Cooperation Treaty, Patent Search And Patent Database	Introduction, Procedure	
		Total	**100**

Practical

Exercise	Title of Exercise
1	Study of evolution and Historical Perspectives of Agricultural Marketing Legislation
2	Study of Marketing Tax and Fees
3,4	Study of different Agents Involved In Marketing Practices
5,6	Study of Various Agricultural Marketing Models
7,8	Study of Agricultural Marketing Policies in India
9	Study on Reform in Agricultural Marketing Sectors in India
10,11	Study of Agricultural Produce Market Committee
12	Study of State Agricultural Marketing Board
13,14	Presentation and group discussions
15	Visit to APMC.
16	Visit to Agricultural Marketing Institution

Suggested Reading:

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

2. Mamoria, C.B. and R.L. Joshi. Principles and practices of marketing in India.KitabMahal, 15, thorn hill road, Allahabad.

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

Course	ELE-BFA-356	Credit: 3 (2+1)	Semester:V
Course title	Advances in banking		

Theory

Lecture No.	Topic	Points to be Covered	Weightage %
1 & 2	Introduction to banking system in India	1. Public, Private and Co-operative sector banks in India. 2. Organized and unorganized banking sector.	6 %
3&4	Reserve Bank of India	1.Genesis, Nature and functions of RBI, 2.Role of RBI, Departments of RBI	6%
5&6	National Bank for Agriculture and Rural Development (NABARD)	1. Functions of NABARD 2. Resources of NABARD 2.Role of NABARD in rural credit	6%
7&8	Commercial banks	1. Classification and functions of commercial banks – services rendered by commercial banks, 2. General structure and methods of commercial banking.	6%
9&10	Cooperative banks	1. Structure of Cooperative banking sector, 2. Types of Co-operative Bank 3. Functions of Co-operative Bank	6%
11	Credit Creation	1.Credit Creation Concept 2.Mechanisam of Credit creation by bank 3.Limitations on the power of banks to create credit	3%
12&13	Banking sector reforms and recommendations	1. Nationalization of banks 2. Social control - Sources of funds for bank.	6%
14,15&16	Systems of banking	1.Group v/s Chain banking 2.Unit v/s Branch banking 3.Mixed v/s Investment banking 4.Universal banking 5.Merchant banking 6.Virtual banking 7.Green banking	10%
17	Priority sector lending	1.Priority sector lending	3%
18	Non-Performing Assets (NPA)	1. Concept of NPA 2. Management of NPA	3%
19,20,21&22	Financial inclusion drives in banking	1. Branch expansion, No-frill accounts, Business correspondents, 2. Financial literacy and credit counseling, 3.PradhanMantri Jan DhanYjana, 4.Joint liability groups and Self Help Groups	15%

23&24	Use of ITC in banking and promotion of cashless payment system	1. ATMs, NEFT, RTGS, 2. Internet banking, mobile banking etc.	6%
25&26	The Banking Ombudsman Scheme	1. Appointment of ombudsman, powers and duties, 2. Procedure for redressal of grievances	6%
27&28	Impact of Economic Reforms on Indian Banking sector	1. Retail banking, Rural banking, 2. Corporate banking, International banking.	6%
29&30	Mudra Bank	1. Origin, purpose, 2. Types of loans under MUDRA.	6%
31&32	Merger of commercial banks	1. Purpose, 2. Status and impact	6%

Practical

Practical No. No.	Name Of Exercise
Assessment of performance of Financial Inclusion Drives	
1	Branch expansion
2	No-frill accounts
3	Business correspondents
4	Financial literacy
5	Credit counseling
6	Pradhan Mantri Jan DhanYojana
7	Joint liability groups
8	Self Help Groups and any other
Study of trend in NPAs of Commercial banks.	
9	Term Loans.
10	Cash Credit and Overdraft.
Study of NABARD schemes for agriculture and allied sectors and their performance	
11	Agriculture Activities (Short term Loan)
12	Agriculture & Allied Activities (Term Loan)
13	Non-Farm Sector
14	Informal credit delivery system(Micro-Finance)
15	Rural Infrastructure Development Fund (RlDF)
16	Financial Inclusion

Reference Books

1. 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 -110055.
2. Dewett, K.K Modern Economic Theory. Shyam Lal Charitable Trust , Ravindra Mansion Ramnagar, New Delhi-110055.
3. Vaish, M.C. Monetary Theory. Ratan Prakashan, Educational and University Publishers, 21 Dayanad Marg, Darya Ganj, New Delhi – 110002
4. M.L.Jhingan, Money,Banking ,International Trade and Public Finance,Vrinda Publicatiob(P) Ltd.
5. R.R.Paul,Money,Banking and International Trade,Kalyani Publishers,New Delhi-110002.
6. Gorden E. and Natarajan, K.2006, Banking-Theory,Law & Practice,Himalaya Publishing House,New Delhi.
7. Paramesswaran,R. and Natarajan S,2003.Indian Banking, S.Chand & Co.
8. Maheswari S.N and Paul R.R.2003,Banking theory,Law & Practice Kalyani Publishers.
9. Shekhar, K.C.2000 Banking Theory and Practice ,Vikas Publishing House Pvt,Ltd., New Delhi.
10. IIBF.2017.Principles and Practice of Banking ,Macmillan Education

Semester VI

Sr. No.	Course No	Course Title	Credit hrs.
1	ENGG-363	Post-harvest Physiology of Market Produce	3 (2+1)
2.	FSHM-361	Food Science and Human Nutrition	2 (1+1)
3.	ECON-366	International Trade and Policy in Agriculture	2 (2+0)
4.	ECON-367	Forest Resource Management	2 (1+1)
5.	MKT-366	Agricultural Price and Policy Analysis	3 (2+1)
6.	MKT-367	Market Information and Intelligence	3 (2+1)
7.	BM-366	Entrepreneurship Development and Business Communication	2 (1+1)
8.	BM-367	Environmental Studies & Disaster Management (Comman Coures)	2 (2+0)
9.	BFA-365	Managerial Accounting	3 (2+1)
10.	EDNT-361	Educational Tour	1(0+1)
	ELECTIVE COURSES (Select any one)		
1	ELEBM-369	Strategic Business Management	3 (2+1)
2	ELEBM-3610	Corporate Social Responsibility and Managerial Ethics	3 (2+1)
3	ELEBM-3611	Advances in Agribusiness Management	3 (2+1)
4	ELEBFA-367	Financial Systems and Services	3 (2+1)
		Total	**25 = 17 +8**

- Study Tour :1 (0+1) During the semester Break of V & VI

Course	ENGG-363	Credit:3(2+1)	Semester: VI
Course title	Post-harvest Physiology of Market Produce 3(2+1)		

Syllabus

Theory:

Introduction: Definition and scope of post-harvest physiology. Estimates of post-harvest losses and their impact on market economy.

Pre-harvest factors influencing post-harvest life of produce and their marketability: Pre-harvest conditions/ factors influencing post-harvest performance. Influence of production practices. Physiological maturity indices for harvesting.

Perishability and produce losses: *Principal causes of post-harvest losses*: Physiological changes during produce deterioration and their control, mechanical damage (physical injury). Types of fresh produce and their post-harvest physiology.

Factors associated with weight loss: Respiration; post-harvest water loss, the concept of water potential, and VPD.

Ripening of fruits: Climacteric and non-climacteric fruits. The effect of ethylene on post-harvest shelf life of produce. Loss of nutrients and other compositional parameters during storage. Modified and controlled atmosphere, Postharvest disorders, Responses to postharvest stress (chilling injury, high temperature stress, water stress).

Role of mineral elements in postharvest biology. Physiological practices to enhance post-harvest storability, retention of quality in food grains, fresh fruits and vegetables, cut flowers and ornamentals.

Harvesting and post-harvest handling and processing: Packaging of fruits, flowers and vegetables and other agricultural crops: Importance of packaging, the cost-effectiveness of packaging, selection of packaging for fresh produce, packaging materials. Physiological aspects of cold storage and refrigerated transport.

Practical:

Preparation of standard solutions; methods of measuring water status in plant tissue; measurement of tissue water potential; measurement of respiration rate; environmental factors influencing post-harvest losses; measurement of quality parameters; physiological maturity indices, effect of plant hormones in delaying leaf senescence, ripening and shelf life of fruits and vegetables. Measurement of product quality: Composition--sugars, acids, nutrients, aroma volatiles, color, texture, taste. Demonstrations and hands on activities on storage practices and quality characteristics.

Teaching schedule

Theory

Lecture No.	Topic / Topics	Points to be Covered	Weightage %
1 to 5	Introduction: Definition and scope of post-harvest physiology. Estimates of post-harvest losses and their impact on market economy.	1) Definition 2) Scope of post-harvest physiology. 3) Estimates of post-harvest losses and their impact on market economy.	10%
6 to 11	Pre-harvest factors influencing post-harvest life of produce and their marketability	Pre-harvest factors influencing post-harvest life of produce and their marketability: 1) Pre-harvest conditions/ factors influencing post-harvest performance. 2) Influence of production practices. Physiological maturity indices for harvesting.	20%
12 to 17	Perishability and produce losses	• *Principal causes of post-harvest losses*: 1) Physiological changes during produce deterioration and their control. 2) Mechanical damage (physical injury). 3) Types of fresh produce and their post-harvest physiology. • *Factors associated with weight loss*: 1) Respiration 2) Post-harvest water loss 3) The concept of water potential, and VPD	20%
18 to 26	Ripening of fruits	1) Climacteric and non-climacteric fruits 2) The effect of ethylene on post-harvest shelf life of produce 3) Loss of nutrients and other compositional parameters during storage 4) Modified and controlled atmosphere 5) Postharvest disorders 6) Responses to postharvest stress (chilling injury, high temperature stress, water stress).	30%
		7) Role of mineral elements in postharvest biology 8) Physiological practices to enhance post-harvest storability 9) Retention of quality in food grains, fresh fruits and vegetables, cut flowers and ornamentals	

27 to 32	Harvesting and post-harvest handling and processing	1) Packaging of fruits, flowers and vegetables and other agricultural crops: 2) Importance of packaging 3) The cost-effectiveness of packaging 4) Selection of packaging for fresh produce Packaging materials 5) Physiological aspects of cold storage and refrigerated transport	20%

Practicals

Exercise	Title of Exercise
1	Preparation of standard solutions
2	Methods of measuring water status in plant tissue
3	Measurement of tissue water potential
4	Measurement of respiration rate
5	Environmental factors influencing post-harvest losses
6	Measurement of quality parameters
7	Physiological maturity indices
8	Effect of plant hormones in delaying leaf senescence
9 & 10	Ripening and shelf life of fruits and vegetables
11	Measurement of product quality
12	Composition--sugars, acids, nutrients, aroma volatiles, color, texture, taste
13 & 14	Demonstrations and hands on activities on storage practices and quality characteristics.
15	Visit to post harvest laboratories
16	Visit to cold storage / various storage structures / APMC

Suggested Readings:

1) Fruits and Vegetables (Principle and Practices). Shrivastva, R.D and Kumar Sanjeev. 3rd Edition.
2) Post Harvest Technology and Quality Management of Fruits and Vegetables by P. Suresh Kumar, V. R. Sagar and M. Kanwat (2009), Agrotech Publishing Academy, Udaipur.
3) Post Harvest Technology of Horticultural Crops. Kader, A. A. Publication Co. 3311 University of California, Division of Agricultural and Natural Resources, California.
4) Post Harvest Technology of Fruits and Vegetables, Vol. II.Varma, L. R. and V. K. Joshi. Indus Publishing Company, New Delhi-110 027.
5) Post Harvest Biotechnology of Vegetables.Salunke. D. K. and Desai, B. B. II CRC Press,

7. Chadda .K.L.Handbook of Horticulture.ICAR.

6) Post Harvest Technology, Handling, Utilization of Tropical and Subtropical Fruits and Vegetables. Pantastico. E. R., B. The AVI Publishing Co. West-Post, Connecticut, USA.
7) A Text Book of Post Harvest Management & Value addition of Fruits and Vegetables. Jature,S.J,S.J Shinde andV.S.Khandare, Shri.Rajlakshmi Prakashan.Aurangabad.

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Course	FSHM-361	**Credit:2(1+1)**	**Semester: VI**
Course title	Food Science and Human Nutrition		
Syllabus			

Theory:
Concepts of Food science (definition, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems, etc); Food composition and Chemistry(water carbohydrates, proteins, fats, vitamins, minerals, flavors, colours miscellaneous, Bioactives and important reactions); Functions and sources of water carbohydrates, proteins, fats, vitamins, Minerals; Food Microbiology (bacteria, yeast, moulds, spoilage of fresh and processed foods, Production of fermented foods); Principals and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying, etc); Relationship between food, nutrition, agriculture and malnutrition (over and under nutrition), nutritional deficiencies (PEM, IDA, IDD, VAD and fluorosis) and nutritional disorders (diabetes mellitus and CVD), Energy metabolism (carbohydrates, fat and proteins); RDA; Balanced/modified diets, Menu planning, New trends in Food Science and nutrition (nutraceuticals, antioxidants, nanotechnology and functional foods)

Practical:
Market survey to collect information about cost of different foods in five food groups, availability of food supplements and processed foods. Survey of households to know food habits of families. Learning to plan recipes rich in energy, protein and micronutrients. Planning balanced diets for adults and different income groups.

Teaching schedule

Theory

Lecture	Topic	Weightage (%)
1-2	Concepts of Food science (definition, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems, etc)	**7**
3-4	Food composition and Chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavors, colours miscellaneous, Bioactives and important reactions)	**11**
5-6	Functions and sources of water carbohydrates, proteins, fats, vitamins, Minerals.	**13**
7-8	Food Microbiology (bacteria, yeast, moulds, spoilage of fresh and processed foods, Production of fermented foods)	**7**
9	Principals and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying, etc)	**11**
10	Relationship between food, nutrition, agriculture and malnutrition (over and under nutrition)	**11**
11	Nutritional deficiencies (PEM, IDA, IDD, VAD and fluorosis) and nutritional disorders (diabetes mellitus and CVD)	**15**
12	Energy metabolism (carbohydrates, fat and proteins)	**11**
13	RDA; Balanced/modified diets, Menu planning	**7**

14-15	New trends in Food Science and nutrition (nutraceuticals, antioxidants, nanotechnology and functional foods)	**7**
	Total	**100%**

Practical

Exercise	Topic
1-2	Market survey to collect information about cost of different foods in five food groups.
3-4	Market survey of food supplements and processed foods.
5-6	Survey of households to know food habits of families.
7-12	Learning to plan recipes rich in Energy Protein Micronutrients.
13-14	Planning balanced diets for Adults (Sedentary, Moderate and Heavy Work)
15-16	Plan balanced diet for different income groups.

Suggested Readings

1) Owen R, Fennema.1996.Food Chemistry,3rd Ed. Marcel Dekker,Inc.,New York, USA.
2) M.Shafiur Rahman.2007. Handbook of Food Preservation ,2nd Ed .CRC Press, Boca Raton, FL,USA.
3) James G. Brennan .2006 Food Processing Handbook Wiley –VCH Verlag GmBH &co KGaA ,Weinheim,Germany.
4) Fellows P.2000.Food Processing Technology :Principles and Practice,2nd Ed.CRC Press,Boca Raton FL,USA.
5) Willium C. Frazier and Dennis c Westoff 1987 Food Microbiology 4th Ed. Tata Mc Grew –Hill Education, New Delhi.
6) Carolyn dberdanier Elaine B.feldman and johnanna dwyer 2008 .handbook of nutrition and food, 2nd Ed. CRC Press, Boca Raton, FL, USA.
7) Sehgal, S. and Raghuvanshi, R. S. (2007) Text Book of Community Nutrition. ICAR, New Delhi.
8) Agrwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication, Delhi.
9) Peter Zeuthen and Leif Bugh-Surensen.2003.Food Preservation Techniques.CRC Press LLC,Boca Raton,FL,USA.
10) Kalia,M.and Sood,S.(2010).Food Preservation and Processing.Revised Edition, Kalyani Publishers,New Delhi.
11) Swaminathan,M.(1999).Food Science, Chemistry and Experimental Foods.2nd ed. The Banglore Printing and Publishing Co., Banglore.
12) B.Srilakshmi Dietetics 7th Edition Programme-incharge Indira Gandhi National Open University Chennai.
13) Dr. M.S.Swaminathan Handbook of Food and Nutrition by Dr. M.S.Swaminathan Published by Banglore Printing and Publishing.
14) Text Book of Human Nutrition S.Bamji 2003 Published by Vijay Primlani for Oxford and IBH Publishing New Delhi.

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Course	**ECON-366**	**Credit:2(2+0)**	**Semester: VI**
Course title	**International Trade and Policy in Agriculture**		
Syllabus			
Theory: International Trade - meaning, definition, nature and scope. Salient features of international trade, differences between internal trade and international trade, advantages and disadvantages of international trade. Theories of international trade - mercantilism, theory of absolute cost advantage, theory of comparative cost advantage and modern theory of international trade. Terms of trade - meaning and types. Free trade - meaning, advantages and disadvantages, free trade agreements. Protectionism - meaning, advantages and disadvantages of protectionism, types of protection			

- tariffs, quotas, subsidies, dumping, cartels and commodity agreements.
Balance of Trade (BoT) and Balance of Payments (BoP) - meaning, differences between BoT and BoP, India's BoT and BoP position. Foreign exchange – meaning, foreign exchange rate, types of foreign exchange rate, mechanisms of determining foreign exchange rate. Foreign exchange market – meaning and functions, instruments of international payments, foreign exchange control and foreign exchange reserves.
WTO – origin, structure, objectives and functions. Agreement on Agriculture - domestic support, market access and export subsidies. FAO / WHO Codex Alimentarious and SPS measures.
Export procedures and documentations, types of export - direct export and indirect export, export houses – objectives and types. Agricultural export promotion organizations - APEDA, MPEDA, Commodity Boards and State Export Promoting Agencies. India's agricultural exports and imports – composition and trading countries. India's foreign trade policy – meaning and objectives.

Teaching Schedule

Theory

Lecture	Topic	Weightge (%)
1, 2, 3	International Trade - meaning, definition, nature and scope. Salient features of international trade, differences between internal trade and international trade, advantages and disadvantages of international trade.	10
4,5,6	Theories of international trade - mercantilism, theory of absolute cost advantage, theory of comparative cost advantage and modern theory of international trade.	10
7,8	Terms of trade - meaning and types. Free trade - meaning, advantages and disadvantages, free trade agreements.	5
9,10	Protectionism - meaning, advantages and disadvantages of protectionism, types of protection - tariffs, quotas, subsidies, dumping, cartels and commodity agreements.	5
11, 12	Balance of Trade (BoT) and Balance of Payments (BoP) - meaning, differences between BoT and BoP, India's BoT and BoP position.	8
13, 14, 15,16	Foreign exchange – meaning, foreign exchange rate, types of foreign exchange rate, mechanisms of determining foreign exchange rate. Foreign exchange market – meaning and functions, instruments of international payments, foreign exchange control and foreign exchange reserves.	15
17,18, 19	WTO – origin, structure, objectives and functions. Agreement on Agriculture - domestic support, market access and export subsidies. FAO / WHO Codex Alimentarious and SPS measures.	12
20,21	Export procedures and documentations, types of export - direct export and indirect export,	5
22	export houses – objectives and types	4
23,24, 25	. Agricultural export promotion organizations - APEDA, MPEDA, Commodity Boards and State Export Promoting Agencies.	8
26, 27	India's agricultural exports and imports – composition and trading countries.	8

29 &30	India's foreign trade policy – meaning and objectives.	5
	Total	100

Suggested Readings:

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.
6. Vaish, M.C. Monetary Theory.Ratan Prakashan, Educational and University Publishers, 21 DayanandMarg, Darya Ganj,New Delhi – 110 002.
7. 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

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Course	**ECON-367**	**Credit:2(1+1)**	**Semester: VI**
Course title	**Forest Resource Management**		
Syllabus			

Theory:

Principles of forest management; scope and objects of forest management, ecosystem management, development of forest management in India. Site quality evaluation and importance. Stand density, classical approaches to yield regulation in forest management, salient features and strategies. Inter-regional and international trade in forest products. Forest valuation and appraisal in regulated forests. Natural and environmental resource accounting –methods and implications. Discounting concepts and formulae. Review on financial analysis. Financial criteria – NPV, IRR, B/C. Growth and yield concepts. Intermediate treatments. The Land Expectation Value (LEV) and optimal rotations - Biological and Financial. Forest Value – the value of forestland with trees. Forest Value with inflation. Thinning and other intermediate treatments. Uneven-aged management. The DeLiocourt Q. Cutting cycles and residual basal area. Financial maturity. Long-term sustained yield. Working Plan and Management Plan presentations. Preparation of Management Plan Maps

and Working Plan Maps. Valuation – Timber and Non-timber forest products. Classical Forest Management. Principle and concept of Sustainable Forest Management (SFM). Pre-requisites for SFM. Criteria's and indicators for SFM**.**

Practical

Exercises on estimation of demand and supply functions. Exercises on financial and economic appraisal of forestry projects. Exercises on marketing of forest products and international trade competitiveness. Exercises on discounting concepts and measures (Financial criteria – NPV, IRR, and B/C ratio). Exercise on Environment Impact Assessment. Exercises on model project preparation of plantation establishment of any tree species. Study on different forest based industries to know the business activities of production of Minor Forest Products. Exercises on valuation of Timber and Non-timber forest products. Exercises on major timber and non-timber forest produce market to collect price data and quantity sold and to observe the type of auctions and degree of competition. Study of systems and methods of sale of forest produces in different forest timber depots. Computer applications for using programming techniques in evaluating forest management alternatives.

Teaching Schedule

Theory

Lecture	Topic	Weightage (%)
1	Principles of forest management; scope and objects of forest management, ecosystem management,	5
2	development of forest management in India. Site quality evaluation and importance	5
3	Stand density, classical approaches to yield regulation in forest management, salient features and strategies	5
4	Inter-regional and international trade in forest products.	20
5	Forest valuation and appraisal in regulated forests.	
6 &7	Natural and environmental resource accounting –methods and implications. Discounting concepts and formulae. Review on financial analysis. Financial criteria – NPV, IRR, B/C. Growth and yield concepts.	15
8 & 9	Intermediate treatments. The Land Expectation Value (LEV) and optimal rotations - Biological and Financial. Forest Value – the value of forestland with trees. Forest Value with inflation. Thinning and other intermediate treatments.	
10	Uneven-aged management.	10
11	The DeLiocourt Q. Cutting cycles and residual basal area. Financial maturity. Long-term sustained yield	
12 & 13	. Working Plan and Management Plan presentations. Preparation of Management Plan Maps and Working Plan Maps.	20
14	Valuation – Timber and Non-timber forest products.	
15	Classical Forest Management.	20
16	Principle and concept of Sustainable Forest Management (SFM). Pre-requisites for SFM. Criteria's and indicators for SFM**.**	
	Total	**100**

Practical

Exercise	Title of Exercise

1	Exercises on estimation of demand and supply functions.
2	Exercises on financial and economic appraisal of forestry projects
3	Exercises on marketing of forest products and international trade competitiveness.
4 & 5	Exercises on discounting concepts and measures (Financial criteria – NPV, IRR, and B/C ratio).
6	Exercise on Environment Impact Assessment.
7	Exercises on model project preparation of plantation establishment of any tree species.
8 & 9	Study on different forest based industries to know the business activities of production of Minor Forest Products.
10 &11	Exercises on valuation of Timber and Non-timber forest products.
12 & 13	Exercises on major timber and non-timber forest produce market to collect price data and quantity sold and to observe the type of auctions and degree of competition.
14	Study of systems and methods of sale of forest produces in different forest timber depots.
15	Computer applications for using programming techniques in evaluating forest management alternatives
16	Semester End Practical Exam

Suggested Readings

Course	**MKT-366**	**Credit:3(2+1)**	**Semester: VI**
Course title	**Agricultural Price and Policy Analysis**		
Syllabus			

Theory:

Principles of forest management; scope and objects of forest management, ecosystem management, development of forest management in India. Site quality evaluation and importance. Stand density, classical approaches to yield regulation in forest management, salient features and strategies. Inter-regional and international trade in forest products. Forest valuation and appraisal in regulated forests. Natural and environmental resource accounting –methods and implications. Discounting concepts and formulae. Review on financial analysis. Financial criteria – NPV, IRR, B/C. Growth and yield concepts. Intermediate treatments. The Land Expectation Value (LEV) and optimal rotations - Biological and Financial. Forest Value – the value of forestland with trees. Forest Value with inflation. Thinning and other intermediate treatments. Uneven-aged management. The DeLiocourt Q. Cutting cycles and residual basal area. Financial maturity. Long-term sustained yield. Working Plan and Management Plan presentations. Preparation of Management Plan Maps and Working Plan Maps. Valuation – Timber and Non-timber forest products. Classical Forest Management. Principle and concept of Sustainable Forest Management (SFM). Pre-requisites for SFM. Criteria's and indicators for SFM**.**

Practical

Exercises on estimation of demand and supply functions. Exercises on financial and economic appraisal of forestry projects. Exercises on marketing of forest products and international trade competitiveness. Exercises on discounting concepts and measures (Financial criteria – NPV, IRR, and B/C ratio). Exercise on Environment Impact Assessment. Exercises on model project preparation of plantation establishment of any tree species. Study

on different forest based industries to know the business activities of production of Minor Forest Products. Exercises on valuation of Timber and Non-timber forest products. Exercises on major timber and non-timber forest produce market to collect price data and quantity sold and to observe the type of auctions and degree of competition. Study of systems and methods of sale of forest produces in different forest timber depots. Computer applications for using programming techniques in evaluating forest management alternatives.

Teaching Schedule
Theory

Lecture No.	Main Topic	Sub Topic	Weightage (%)
1, 2	Agricultural Prices	Meaning and concepts of agricultural prices: Farm harvest price, wholesale price, retail price, futures and spot prices, producer price, Market prices, administrated prices, price spread, Functions and importance of prices.	7
3, 4	Estimation of demand for and Supply of agricultural commodities.	Sources of price statistics, Price, income, cross price and promotional elasticity of demand and supply. Point and Arc elasticity concepts.	7
5, 6, 7	Price Determination	Price and output determination under perfect competition, monopolistic competition, oligopoly and monopoly markets, Cobb web models of price quantity determination – convergent, divergent and perpetually oscillating models.	7
8, 9	Fluctuations in agricultural prices:	Temporal and spatial, types and their causes.	8
10, 11, 12, 13	Analysis of price movements:	Estimation of trend, seasonal, cyclical and irregular movements in prices over time. Analysis of spatial price variations and market integration.	10
14, 15, 16, 17	Index numbers	Price relatives and weighted index numbers. Types, construction and uses	10
18, 19	Inflation	General price level and inflation. Types of inflation. Retail and wholesale price index based inflation measures.	7
20, 21	Minimum Support Price	Minimum Support Price Scheme, Determinants, and Price stabilization measures.	7
22, 23	Commission on Agricultural Costs and Prices (CACP) and State Agricultural Price Commissions.	History, Functions of Commission on Agricultural Costs and Prices (CACP) and State Agricultural Price Commissions.	6

24, 25	Administered prices of GoI, meaning and purpose:	Minimum support prices, levy prices, procurement prices. Factors considered in fixing administered prices. Trends in minimum support prices of food grains, oilseeds, commercial crops and sugarcane. FAQ parameters for produce under MSP policy. Problems in fixation and implementation of minimum support price policy.	6
26, 27	Procurement centres	Procurement centres for implementation of MSP – issues of constraints, inadequacy and rejection of produce.	7
28, 29	New initiative of GoI	With respect to support prices.	6
29, 30	Sugarcane pricing policy	Issues of sugarcane pricing policy of GoI and state government.	6
31, 32	Market Intervention Schemes	Market Intervention Schemes of state governments in respect of fruits and vegetables and their performance.	6

Practical Exercise

Exercise No.	Title
1, 2	Collection of data on arrivals and prices of agricultural produce from APMCs.
3	Analysis of farm harvest prices
4	Administrated prices for agricultural produce
5	Wholesale prices for agricultural produce
6	Construction of index numbers for prices
7	Exercises on the calculation of inflation rate using wholesale and retail price index numbers
8	Estimation of demand and its forecasting
9, 10, 11	Analysis of minimum support prices of important agricultural commodities and quantity procured under the scheme
12	Visits Report of procurement centres
13, 14	Analysis of problems faced by procurement centres and farmers under MSP scheme
15, 16	Analysis of net farm returns from MSP sales and distress sales

Suggested Readings:

Agricultural Economics 2nd edition, S. Subba Reddy, P. Raghu Ram, T. V. Neelakanta Sastry I. Bhavani Devi.

1. Agricultural Price Analysis by Thomson
2. Reading in Agricultural Development by K. A. Fox.
3. Agricultural Marketing in India by S. S. Acharya & N. L. Agarwal.
4. Books on Micro Economic Theory.
5. Statistical Methods by S. P. Gupta.

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Course	**MKT-367**	**Credit:3(2+1)**	**Semester: VI**
Course title	**Market Information and Intelligence**		

Syllabus

Theory:

Market information-Meaning, Need for market information, Merits of Market Information, Importance of market information - Types of Market Information-Market Intelligence, Market News and Market Outlook - Essential Characteristics of Good Market Information and means of data collection. Compilation, analysis and dissemination of market information and intelligence in India. Sources of compilation and dissemination of market information-institutional and non-institutional. Deficiencies, problems and reliability of market information. Simple forecasting tools for price and demand estimation: time series analysis (trend, seasonal indices), Consumer surveys, Expert opinion survey methods, Market experiments methods, Graphical methods, smoothing techniques and regression methods. Evaluation of forecasts.

Practical:

Price and demand analysis of selected agricultural commodities using time series analysis, Consumers' surveys, Experts' opinion survey methods, Market experiments methods, Graphical methods, smoothing techniques, Delphi method and regression methods . Developing market intelligence and information reports.

Teaching Schedule

Theory

Lectures No.	**Topics**	**Subtopic**	**Weightage (%)**
1 & 2	Market information	Meaning, Need for market information	
3 &4	Merits	Merits of Market Information	**14**
5 & 6	Market scope	Importance of market information	
7,8 & 9	Bases of Market	Types of Market Information	**21**
10 & 11	About advance market	Market Intelligence	
12, 13 & 14	Market News and Market Outlook	Essential Characteristics of Good Market Information and means of data collection.	
15,16 & 17	Spreading of market information	Compilation, analysis and dissemination of market information and intelligence in India.	**16**
18,19 & 20	Sources of Market information	Sources of compilation and dissemination of market information-institutional and non-institutional. Deficiencies, problems	

		and reliability of market information.	
21 & 22	Market organization	institutional and non-institutional.	**16**
23, 24 & 25	Terms of market information	Deficiencies, problems and reliability of market information.	
26 & 27	Market Forecasting	Simple forecasting tools for price and demand estimation: time series analysis (trend, seasonal indices	**16**
28 & 29	Market Survey	Consumer surveys, Expert opinion survey methods	
30 & 31	Market view and process	Market experiments methods, Graphical methods, smoothing techniques and regression methods.	**14**
32	Market Evaluation	Evaluation of forecasts.	**3 %**

Practical Exercises

Exercise	Title of Title
1	Study of village markets
2	Study of weekly market
3	Study of APMC
4	Study of process of marketing of Agricultural commodity in market
5	Study of Price analysis of selected agricultural commodities
6	Study of Demand and Supply.
7	Study of market survey.
8	Study of Demand analysis of selected agricultural commodities
9	Study of availability of Agricultural produce market and their survey, on the basis of time and series analysis.
10	Study of consumer survey
11	Study of methods of survey
12	Study of Market experiments methods
13	Study of Graphical methods
14	Study of Smoothing Techniques
15	Study of forecasting of Delphi method
16	Study of Historical development of futures market in India

Suggested Readings:

1) Kotler. P. 2015. Marketing Management.Prentice Hall of India, New Delhi.
2) Kotler, P., Koshi, A., and Keller., K. L. 2009. Marketing Management. Dorling Kindersley (India) Pvt. Ltd, New Delhi,
3) Ramaswamy, V.S and Namakumar, S2013. Marketing Management: A Global Prespective Indian Context, McGraw Hill Education (India) Pvt. Ltd. New Delhi.

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Course	BM-366	Credit: 2(1+1)	Semester:VI
Course title	Entrepreneurship Development and Business Communication		

Syllabus

Theory:

Entrepreneur and entrepreneurship: Meaning, definitions, concepts and thoughts of Richard Cantillon, Adam Smith, Joseph Schumpter, Carl Menger, Peter Drucker and Jean Baptiste. Entrepreneurship development: Definitions, need, scope and motive factors Characteristics of entrepreneurs and Assessment of entrepreneurship skills. SWOT analysis. Achievement motivation. Entrepreneurial behavior Government policy for entrepreneurship development Government programmes (PMEGP, CMEGP, SGSY), institutions (DIC, CEDOK, MSMEDI, VIC, SFC, NIESBUD) for promotion of entrepreneurship

Entrepreneurial development process/programme: objective, phases, and problems Business leadership skills. Communication skills for entrepreneurship development. Developing organisational skills and managerial skills. Problem solving skills. Achievement motivation. Time management. Supply chain management. Total quality management. Project planning formulation and report preparation. Opportunities for Entrepreneurship and rural Entrepreneurship

Practical:

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

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1	**Entrepreneur :** Meaning, definitions, characteristics of entrepreneurship	10
2	Assessment of entrepreneurship skills, identifying potential entrepreneurs	5
3	**Entrepreneurship development** – Concept of entrepreneurship, Process of entrepreneurship development	5
4	Achievement motivation and entrepreneurship development	5
5	Generation, incubation and commercialization of business ideas and innovations	5
6	**SWOT analysis :** Concept and technique	10
7	Government schemes and incentives for promotion of entrepreneurship. Government policy on Small and Medium Enterprises (SMEs/SSIs)	5
8	Supply chain management, Time management and Total quality management	5

9	**Market Survey :** Meaning, objectives, methods of conducting survey	10
10	Formulation of project, financial analysis of project	10
11	Communication – Meaning and process of communication	5
12	Communication skills for entrepreneurship – Written communication, Verbal communication, Investigating and	5

	analyzing, Planning and Organizing, Negotiating and persuading, Cooperative (Team work), Leadership and Numeracy	
13	Developing different skills for entrepreneurship - Leadership Skills, Speaking Skills, Listening Skills, Organizational skill , Managerial skills, Problem solving skill	5
14	Writing Skill – Business letter, letters of enquiry, quotation, orders, and tenders, complaint letter	5
15	Oral presentation skills – Preparation, presentation and evaluation	5
16	Advertisements – Meaning, types, forms, functions	5
	Total	100

Practical

Exercise	Title of Exercise
1	Assessing entrepreneur potential
2	Assessment of problem solving ability
3	Exercises in creativity
4	Conducting market survey to know the demands for different products
5	Preparing advertisements for popularization of products and news writing
6	Preparing project proposals
7	Individual and group presentations and evaluation of presentation
8	Individual and group presentations and evaluation of presentation
9	Telephonic conversation : Rate of speech, clarity of voice, speaking and listening politeness, telephonic etiquettes
10	Conducting meeting – Purpose, procedure, participation, physical arrangements, recording and writing of minutes of meeting
11	Seminar and conferences : Use of body language
12	Conducting mock interviews – testing initiative, team spirit and leadership
13	Group discussion and debates on current topics
14	Visit to entrepreneurship institute/ case study of successful entrepreneurs
15	Presentations by the students
16	Presentations by the students

Suggested Readings

1. Akhouri, M.M.P., Mishra, S.P. and Sengupta, Rita (1989). Trainers Manual on Developing Entrepreneurial Motivation, NIESBUD, New Delhi

2. Betty, Gorddan B. (1979). Entrepreneurship, Playing to Win, Taraporewala, Mumbai

3. Entrepreneurship Development Institute in India (1987). Developing New Entrepreneurs, EDII, Ahmedabad, NISIET, Library : 338.93/EDI/87/25104.

4. Mancuso, Joseph (1974). The Entrepreneurs Handbook, Vol.I& II, Artech House Inc. USA.

5. Patel, V.G. (1987). Entrepreneurship Development in India and its relevant Developing Countries, Entrepreneurship Development Institute of India, Ahmedabad, NISIET, Library : 338.93 (540)/PAT/87/25103.

6. Singh, A.K., Lakhan Singh, R. and Roy Berman (2006). Dimensions of Agricultural Extension, Aman Publishing House, Meerut.

7. MondalSagar and G.L.Ray (2009). Text Book of Entrepreneurship and Rural Development. Kalyani Publishers, Ludhiana. ISBN 978-81-272-5599-2

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Course	BM 367	Credit:2(2+0)	Semester:VI
Course title	Environmental Studies & Disaster Management		

Syllabus

Theory:

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources. Natural resources and associated problems. Discussion on Use and over-exploitation of forest, water, mineral, food, energy and land resources. World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, Ecosystems: concept, 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 different ecosystems Biodiversity and its conservation-Introduction, definition, genetic, species & ecosystem diversity. 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. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. 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. Pollution prevention- case studies. Social Issues and the Environment: From Unsustainable to Sustainable development. Urban problems related to energy, Water conservation, rain water harvesting, and watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents. Consumerism and waste products. Environment Protection Acts: 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. Disaster management: Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management-

Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework.

Teaching Schedule

Theory

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. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. 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 non-renewable 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 and ecological 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 & ecosystem diversity 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:	
15-17	Environmental Pollution:- Types of pollution, definition, cause, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal pollutions and Nuclear hazards.	08
18	Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.	
19-20	Carbon Credit: Concept, Exchange of carbon credits. Carbon Sequestration, Importance, Meaning and ways.	14
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 of Pollution) 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

25	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, their types 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, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.	08
31-32	Disaster Management:-Concept, Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. 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
	Total	100

Suggested Readings:

1. Text book of Environmental Studies for undergraduate courses by Erach Bharucha University Grants Commission, New Delhi.
2. Ecology and Environment by P.D. Sharma, Rastogi Publication. Meerut.
3. Environmental Sciences by S.S. Purohit, Q.J. Shammi and A.K. Agrawal, Student Edition, Jodhpur.
4. A text book on Ecology and Environmental Science by M.Prasanthrajan and P.P. Mahendran., Agrotch Publishing Academy, Udaipur-313002.
5. The biodiversity of India, Maplin Publishing Pvt. Ltd., Ahmadabad.
6. Disaster Management by Sarthak Singh. Oxford Book Company.
7. Disaster – Strengthening community Mitigation and Preparedness by Dr. B.K. Khannna and Nina Khanna. New India Publication Agency.

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Course	**BFA-365**	**Credit : 3 (2+1)**	**Semester:VI**
Course title	**Managerial Accounting**		
Syllabus			
Theory: Definition, Meaning, Nature, Objectives, Scope, Importance, Advantages and Limitations Of Management Accounting, Distinction Among Financial, Cost And Management Accounting Systems. Financial Statement Analysis-Meaning, Nature, Uses and Limitations Of Financial Statements Financial Analysis Tools-Comparative Financial Statements, Common Size Financial Statements, Trend Analysis, Ratio analysis -meaning & expression of ratios, objectives and importance of Ratio analysis. Classification and computation of liquidity ratios, solvency ratios,			

activity ratios and profitability ratios. Statement of Changes in Financial Position-Cash Basis, Fund Basis and Total Financial Resources Basis. Cash flow statement - concepts, objectives, uses and preparation of cash flow statement, source and applications of cash, cash from operation, procedure of cash flow statement, difference between funds and cash flow statement. Cost Management-Definition and Purpose of Cost Accounting. Business Environment: Just-in-Time (JIT), Total Quality Management (TQM), Process Reengineering, The Theory of Constraints (TOC); Concept of Cost, Cost Center, Cost Unit, Elements of Cost, Classification of Cost, Analysis of Total Cost, Cost Sheet. Absorption Costing, Marginal Costing, Difference between Absorption Costing And Marginal Costing Cost – Volume –Profit Analysis, Break Even Chart, Profit Graph Activity Based Costing Budgetary Control-Nature and Scope, Organization for Budgetary Control, Preparation of Various Functional and Master Budgets, Fixed Vs. Flexible Budgeting Standard Costing- Nature and Scope, Types of Standards Variance Analysis – Material Variance, Labour Variance, Overhead Variance Accounting for Price Level Changes. System design: Job-Order costing and Process costing; Standard Costing Methods - standard Costing - material, labour and overhead variances -Inflation accounting - Accountant and the role of computers in Accounting.

Practical:

Preparation of comparative and common size statements, trend analysis, Computation of interpretation of ratios, Analysis of financial statements of Joint Stock Companies and Co-operatives. Preparation of cash flow and funds flow statements, Preparation of Break Even Chart and Profit Graph, Exercises in Activity Based Costing, Preparation of Functional Budgets, Flexible Budgets, Exercises in Variance Analysis and Inflation Accounting.

Teaching Schedule

Theory

Lecture No.	Main Topic	Sub Topic	Weightage %
1, 2	Management Accounting	Definition, Meaning, Nature, Objectives, Scope, Importance, Advantages and Limitations	6
3, 4	Distinction	Among Financial, Cost And Management Accounting Systems.	6
5, 6, 7	Financial Statement Analysis	Meaning, Nature, Uses and Limitations of Financial Statements	6
8, 9	Financial Analysis Tools	Comparative Financial Statements, Common Size Financial Statements, Trend Analysis	7
10, 11	Ratio analysis	Meaning & expression of ratios, objectives and importance of Ratio analysis.	6
12, 13	Classification and computation	Liquidity ratios, solvency ratios, activity ratios and profitability ratios.	6
14, 15	Statement of Changes in Financial Position	Cash Basis, Fund Basis and Total Financial Resources Basis.	6
16, 17	Cash flow statement	Concepts, objectives, uses and preparation of cash flow statement, source and applications of cash, cash from operation, procedure of cash	6

		flow statement, difference between funds and cash flow statement.	
18, 19	Cost Accounting	Definition and Purpose of Cost Accounting, Concept of Cost, Cost Center, Cost Unit, Elements of Cost, Classification of Cost, Analysis of Total Cost, Cost Sheet	7
20, 21	Marginal Costing	Absorption Costing And Marginal Costing, Cost – Volume –Profit Analysis, Break Even Analysis, Profit Graph.	6
22, 23	Activity Based Costing	Meaning, Different stages , classification of activities, Advantages	6
24, 25	Budgetary Control	Nature and Scope, Organization for Budgetary Control, Preparation of Various Functional and Master Budgets, Fixed Vs. Flexible Budgeting	6
26	Business Environment	Concept of Just-in-Time (JIT), Total Quality Management (TQM), Process Reengineering, The Theory of Constraints (TOC);	4
27, 28	Standard Costing & Variance Analysis	Nature and Scope, Types of Standards Variance Analysis – Material Variance, Labour Variance, Overhead Variance	6
28, 29	Inflation accounting	Accounting for Price Level Changes.	6
30, 31	System design	Job-Order costing and Process costing; Standard Costing Methods - standard Costing - material, labour and overhead variances	6
32	Role of computers in Accounting	Accountant and the role of computers in Accounting.	4
		Total	**100**

Practical Exercise

Exercise	Title of Exercise
1, 2	Preparation of comparative Statement
3, 4	Preparation of common size statements
5, 6	Exercises in trend analysis
7, 8	Exercises in Ratio Analysis
9, 10	Analysis of financial statements of Joint Stock Companies and Co-operatives
11	Preparation of cash flow and funds flow statements
12, 13	Preparation of Break Even Chart and Profit Graph
14	Activity Based Costing
15	Exercises in Preparation of Functional Budgets, Flexible Budgets
16	Exercises in Variance Analysis and Inflation Accounting.

Suggested Readings:

1. M. G. Patkar Book Keeping & Accountancy; Phadke Prakashan, Kolhapur.
2. Ambrish Gupta, Financial Accounting for Management, 4th edition, Pearson.
3. M. Y. Khan, P. K. Jain, Financial Management, Tata Mc – Graw Hill.
4. Jain S. P. Advanced Accountancy
5. S. M. Inamdar Cost & Management Accounting, Everest Publishing House, Pune.

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Elective Courses (Select any One)

Course	**BM-369**	**Credit: 3 (2+1)**	**Semester: VI**
Course title	**Strategic Business Management**		
Syllabus			

Theory:

Introduction to Strategies: Introduction, Fundamentals of Strategy, Conceptual Evolution of Strategy, Scope and Importance of Strategies. Strategic Management: Introduction, Need, scope, key features and importance of strategic management. Strategists at various management levels, Types of Strategies, Limitations of Strategic Management. Strategy Analysis and its Importance. The External Environment-The General, Industry, and Competitor Environments -External Environmental Analysis -Scanning – Monitoring- Forecasting – Assessing. Segments of the General Environment -The Demographic Segment -The Economic Segment- The Political/Legal Segment - The Socio cultural Segment - The Technological Segment - The Global Segment-Industry Environment Analysis - Competitor Analysis - Ethical Considerations.

The Internal Environment-The Nature of Internal Environmental Analysis -The Context of Internal Analysis-Creating Value -The Challenge of Internal Analysis -Resources, Capabilities, and Core Competencies-Building Core Competencies -Value Chain Analysis –Outsourcing-Competencies, Strengths, Weaknesses, and Strategic Decisions.

Business-Level Strategy -The Purpose of a Business-Level Strategy -Types of Business-Level Strategies -Cost Leadership Strategy -Differentiation Strategy -Focus Strategies -Integrated Cost Leadership/Differentiation Strategy.

Competitive Rivalry and Competitive Dynamics -Competitor Analysis -Market Commonality -Strategic and Tactical Actions -Type of Competitive Action.

Corporate-Level Strategy -Levels of Diversification -Value-Creating Diversification: Related Constrained and Related Linked Diversification -Unrelated Diversification -Value-Neutral Diversification: Incentives and Resources -Value-Reducing Diversification: Managerial Motives to Diversify.

Acquisition and Restructuring Strategies -Merger and Acquisition Strategies -Reasons for Acquisitions -Restructuring -Downsizing -Downs coping.

International Strategy -Identifying International Opportunities: Incentives to Use an International Strategy -International Business-Level Strategy -International Corporate-Level Strategy -Environmental Trends -Risks in an International Environment -Political Risks -Economic Risks.

Cooperative Strategy -Strategic Alliances as a Primary Type of Cooperative Strategy -Business-Level Cooperative Strategy -Corporate-Level Cooperative Strategy -International Cooperative Strategy -Network Cooperative.

Practical:

Case studies of agribusiness units with respect to their objectives and evaluation of their business strategies, strategic alliances, strategy implementation, implications and challenges. Resource Similarity -Drivers of Competitive Actions and Responses

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1, 2, 3	Introduction to Strategies: Introduction, Fundamentals of Strategy, Conceptual Evolution of Strategy, Scope and Importance of Strategies.	5
4, 5	Strategic Management: Introduction, Need, scope, key features and importance of strategic management	5
6	Strategists at various management levels,	5
7,8	Types of Strategies, Limitations of Strategic Management. Strategy Analysis and its Importance.	5
9,10 11,12 13	The External Environment-The General, Industry, and Competitor Environments -External Environmental Analysis -Scanning – Monitoring- Forecasting – Assessing. Segments of the General Environment -The Demographic Segment -The Economic Segment-The Political/Legal Segment - The Socio cultural Segment - The Technological Segment - The Global Segment-Industry Environment Analysis - Competitor Analysis - Ethical Considerations.	15
14,15 16,17, 18	The Internal Environment-The Nature of Internal Environmental Analysis -The Context of Internal Analysis-Creating Value -The Challenge of Internal Analysis -Resources, Capabilities, and Core Competencies-Building Core Competencies -Value Chain Analysis – Outsourcing-Competencies, Strengths, Weaknesses, and Strategic Decisions.	15
19,20, 21,22	Business-Level Strategy -The Purpose of a Business-Level Strategy - Types of Business-Level Strategies -Cost Leadership Strategy - Differentiation Strategy -Focus Strategies -Integrated Cost Leadership/Differentiation Strategy.	10
23,24, 25	Competitive Rivalry and Competitive Dynamics -Competitor Analysis - Market Commonality - Strategic and Tactical Actions -Type of Competitive Action.	5
26,27	Corporate-Level Strategy -Levels of Diversification -Value-Creating Diversification: Related Constrained and Related Linked Diversification -Unrelated Diversification -Value-Neutral Diversification: Incentives and Resources -Value-Reducing Diversification: Managerial Motives to Diversify.	5
28	Acquisition and Restructuring Strategies -Merger and Acquisition Strategies -Reasons for Acquisitions -Restructuring -Downsizing - Downs coping.	5
29	International Strategy -Identifying International Opportunities: Incentives to Use an International Strategy -International Business-Level Strategy -International Corporate-Level Strategy -Environmental Trends -Risks in an International Environment -Political Risks -	10

	Economic Risks	
30	Cooperative Strategy -Strategic Alliances as a Primary Type of Cooperative Strategy -Business-Level Cooperative Strategy -Corporate-Level Cooperative Strategy -International Cooperative Strategy - Network Cooperative.	5

B) Practical:

Exercise	Title of Exercise
1	Case Study on Strategic Management Process.
2	Case Study on Strategic Intent
3	Case Study on Strategic Alternatives
4	Case study of agribusiness unit – I evaluation of business strategies.
5	Case study of agribusiness unit – II evaluation of business strategies.
6	Case study of agribusiness unit – I evaluation of its strategic alliances.
7	Case study of agribusiness unit – II evaluation of its strategic alliances.
8	Case study of agribusiness unit – I evaluation of its strategy implementation.
9	Case study of agribusiness unit – II evaluation of its strategy implementation.
10	Case study of agribusiness unit – I strategy implications.
11	Case study of agribusiness unit – II strategy implications.
12	Case study of agribusiness unit – I with respect to challenges in strategy implications.
13	Case study of agribusiness unit – II with respect to challenges in strategy implications.
14	Case study of agribusiness unit – I with respect to Resource Similarity -Drivers of Competitive Actions and Responses
15	Case study of agribusiness unit – II with respect to Resource Similarity -Drivers of Competitive Actions and Responses.
16	Visit to Agro based Industry Report on Strategic Management in visited Industry.

Suggested readings:

1. Azhar Kazmi Strategic Management & Business Policy, Tata McGraw – Hill, Third Edition.
2. M. V. Kulkarni Business Policy & Strategic Management, Everest Publishing House.
3. Saroj Datta, Jaico Strategic Management Publishing House.
4. Thomas L. Wheelen & J. David HungerConcepts in Strategic Management & Business Policy Toward Global Sustainability
5. R. David Strategic Management. Fred Prentice Hall International
6. . Dr. Azhar Kazmi Business Policy & Strategic Mgt - Tata Mc Graw Hill Publi. Co. Ltd.
7. Beni Banerjee Strategic Management.

Jauch Lawrence R & William Business Policy & Strategic Mgt. Glueck McGraw - Hill Book Co.

Course	ELE-BM-3610	Credit: 3 (2+1)	Semester:VI
Course title	Corporate Social Responsibility and Managerial Ethics		

Theory:

Introduction to Corporate Social Responsibility **(**CSR): Meaning & Definition of CSR, History &evolution of CSR. Concept of Charity, Corporate philanthropy, Corporate Citizenship, CSR-an overlapping concept. Concept of sustainability &StakeholderManagement.CSR through triple bottom line and Sustainable Business; relation between CSR and Corporate governance; environmental aspect of CSR; Chronological evolution of CSR in India; models of CSR in India, Carroll's model; drivers of CSR; major codes on CSR; Initiatives in India.

International framework for corporate social Responsibility, Millennium Development goals, Sustainable development goals, Relationship between CSR and Millennium Development Goals (MDGs).United Nations (UN) Global Compact 2011.UN guiding principles on business and human rights. Organisation for Economic Co-operation and Development (OECD) CSR policy tool, International Labour Organization (ILO) tri-partite declaration of principles on multinational enterprises and social policy.

CSR-Legislation In India & the world. Section 135 of Companies Act 2013.Scope for CSR Activities under Schedule VII, Appointment of Independent Directors on the Board, and Computation of Net Profit's Implementing Process in India.

The Drivers of CSR in India, Market based pressure and incentives, civil society pressure, the regulatory environment in India. Counter trends. Performance in major business and programs. Voluntarism Judicial activism.

Identifying key stakeholders of CSR & their roles. Role of Public Sector in Corporate, government programs that encourage voluntary responsible action of corporations. Role of Non-profit &Local Self-Governance in implementing CSR; Contemporary issues in CSR & MDGs. Global Compact Self-Assessment Tool, National Voluntary Guidelines by Govt. of India. Understanding roles and responsibilities of corporate foundations.

Practical:

Review of current trends and opportunities in CSR. Review of successful corporate initiatives & challenges of CSR. Analysis and presentation of case Studies of Major CSR Initiatives.

Teaching Schedule

Theory

Lecture No.	Topic	Weightage (%)
1	Introduction to Corporate Social Responsibility **(**CSR): Meaning & Definition of CSR,	4
2 & 3	History &evolution of CSR. Concept of Charity, Corporate philanthropy, Corporate Citizenship, CSR-an overlapping concept. Concept of sustainability &Stakeholder Management.	4
4& 5	CSR through triple bottom line and Sustainable Business; relation between CSR and Corporate governance	4
6	Environmental aspect of CSR;	4
7	Chronological evolution of CSR in India; models of CSR in India, Carroll's model; drivers of CSR; major codes on CSR;	4
8	CSR- Initiatives in India.	4
9	International framework for corporate social Responsibility,	4
10, 11	Millennium Development goals, Sustainable development goals, Relationship between CSR and Millennium Development Goals (MDGs).	5
12	United Nations (UN) Global Compact 2011.UN guiding principles on business and human rights.	4
13	Organisation for Economic Co-operation and Development (OECD) CSR policy tool,.	4
14	International Labour Organization (ILO)	4
15	tri-partite declaration of principles on multinational enterprises and social policy	4
16 17	CSR-Legislation In India & the world. Section 135 of Companies Act 2013.Scope for CSR Activities under Schedule VII,	5
18	Appointment of Independent Directors on the Board, and Computation of Net Profit's Implementing Process in India.	5
19, 20 21	The Drivers of CSR in India, Market based pressure and incentives, civil society pressure, the regulatory environment in India. Counter trends.	5
22	Performance in major business and programs.	4
23	Voluntarism Judicial activism.	4
24	Identifying key stakeholders of CSR & their roles.	4
25	Role of Public Sector in Corporate, government programs that encourage voluntary responsible action of corporations.	3
26	Role of Non-profit &Local Self-Governance in implementing CSR;	3
27	Contemporary issues in CSR & MDGs.	3
28	Global Compact Self-Assessment Tool	3
29	National Voluntary Guidelines by Govt. of India.	3
30	Understanding roles and responsibilities of corporate foundations.	3

B) Practical:

Exercise	Title of Exercise
1	Review of current trends and opportunities in CSR
2	
3	
4	
5	Review of successful corporate initiatives & challenges of CSR.
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11	Analysis and presentation of case Studies of Major CSR Initiatives.
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Suggested Readings
1. Paul Hohnen and Jason Potts. 2007. Corporate Social Responsibility- An Implementation Guide for Business. International Institute for Sustainable Development, Manitoba.
2. Confederation of Indian Industry. 2013.Handbook on Corporate Social Responsibility in India, PwC India, Gurgaon.
3. Philip Kotler and Nancy Lee. 2005. Corporate Social Responsibility: Doing the Most Good for Your ompany and Your Cause .Wiley India Pvt. Ltd, New Delhi.
4. Deborah Leipziger. 2011. The Corporate Responsibility Code Book. Viva books Pvt.Ltd, New Delhi
5. Sage Brief Guide to Corporate Social Responsibility. 2012. Sage Publications,USA .
6. International Journal of Corporate Social Responsibility, Springer Open.
Social Responsibility Journal, Emerald

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Course	ELE-BM-3611	Credit: 3 (2+1)	Semester: VI
Course title	Advances in Agribusiness Management		

Theory:

Agri-business: Meaning, definition, history scope and nature of agri-business. Distinction between agriculture and agribusiness, Concept of agri-business management. Changing dimension of agricultural business. Agri-business Management-distinctive features, nature and components. Status in developed and developing nations - Classification of enterprises - Forms of business organizations, Agro based industries- importance and classification.

Functional areas of agribusiness: Production and operations management - marketing management - financial management - human resource management. Management functions: Planning, meaning, definition, types of plans. Purpose and objectives, Strategies, polices procedures, rules, programs and budget. Components of a business plan, Steps in planning and

implementation. Organization: Meaning, definition, importance, Characteristics/Nature of organization. Principles & Process of organization. Staffing, Directing: definition, functions, techniques, qualities of good supervisor. Motivation. Supervision, Communications and Controlling: Definition, Elements, Process of control, Techniques/ Tools of control. Leadership: meaning and styles. Capital Management and Financial management of Agribusiness. Linear programme- components, objectives and applications, Six sigma, Total Quality Management, e-commerce, Agribusiness Policy, Agri clinics and Agribusiness Centers. SWOC and PEST Analysis, Market plan-characteristics, steps in preparation of market plan, Project report-contents.

Agri-business ecosystem: Export Promotion Councils, APEDA, MPEDA, MOFPI, Small Farmers' Agri-business Consortium (SFAC), Food Safety and Standards Authority of India, Public Policy relating to import and export of agricultural commodities

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 and capital ratio. Study of balance sheet financial ratio analysis. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Case study of agro-based industries.

Teaching Schedule

Theory

Lecture No	Topic	Weightage %
1to 4	Agri-business: Meaning Agri-business: definition history scope and nature of agri-business Distinction between agriculture and agribusiness,	10
5 to 9	Concept of agri-business management Changing dimension of agricultural business Agri-business Management-distinctive features nature and components. Status in developed and developing nations	10
10 to18	Classification of enterprises Forms of business organizations Agro based industries- importance and classification Functional areas of agribusiness: Production and operations management - marketing management - financial management - human resource management. Management functions . Management functions: Planning, meaning, definition, types of plans. Purpose and objectives, Strategies, polices procedures, rules, programs and budget.	20

19 to 21	Components of a business plan, Steps in planning and implementation. Organization: Meaning, definition, importance, Characteristics/Nature of organization. Principles & Process of organization. Staffing, Directing: definition, functions, techniques, qualities of good supervisor. Motivation. Supervision	10
22 to 24	Communications and Controlling: Definition, Elements, Process of control, Techniques/ Tools of control. Leadership: meaning and styles.	10
25 &26	Capital Management and Financial management of Agribusiness. Linear programme- components, objectives and applications, Six sigma,	10
27&28	Total Quality Management, e- commerce, Agribusiness Policy, Agri clinics and Agribusiness Centers.	10
29&30	SWOC and PEST Analysis, Market plan-characteristics, steps in preparation of market plan, Project report- contents.	10
31&32	Agri-business ecosystem: Export Promotion Councils, APEDA, MPEDA, MOFPI, Small Farmers' Agri-business Consortium (SFAC), Food Safety and Standards Authority of India, Public Policy relating to import and export of agricultural commodities	10

Practical:

Exercise	Title of Exercise	
1	Study of various business models in agri-business	
2	Study of farm records	
3	Study of Systems of book keeping.	
4	Study of measures of farm income	
5	Study of measures of farm efficiency	
6	Study of farm planning techniques & situations	
7	Study of farm budgeting techniques & types	
8	Study of farm inventory.	
9	Study of cost ratios and capital ratio	
10	Study of balance sheet financial ratio analysis.	
11	Preparations of projects and Feasibility reports for agribusiness entrepreneur.	
12	Case study of agro-based industries.	
13		
14		
15		
16		

Suggested Readings:

3. K.Loknandhan, K.Mani, K.Mahendran Innovations in AB
4. D.K.Tripathi Principles& Practices of Management.

Course	**ELE BFA-367**	**Credit: 3(2+1)**	**Semester:VI**
Course title	**Financial Systems and Services**		

Syllabus

Theory:

Financial System: Meaning and Significance; Functions of the financial system. Financial Assets, Financial markets, Financial instruments, financial institutions, financial services. Weakness of Indian financial system. Financial Institutions: commercial banks; Development Financial Institutions; Nonbanking financial corporations. Regulatory Institutions: RBI – Role and Functions. SEBI- objectives- function- powers- SEBI guidelines for primary and secondary market. Financial instruments: money market instruments and capital market instruments. Financial services companies in India: NBFCs-Evolution, growth, definition, services provided, comparison with banks, categories, sources of funds, role of NBFCs in the Indian financial system. Factoring- Concept and forms, factoring vs. bills discounting, international factoring, functions of a factor, advantages and disadvantages. Forfeiting. Venture capital: Nature and scope, venture capital investment process, limitations, venture capital schemes in India. Merchant banking: Origin, definition, nature and scope and functions; structure of merchant banking industry in India, regulation of merchant banking activity, pre-issue and post issue management of public issue. Mutual funds: Objectives, types, mutual fund industry in India.

Practical:

Money market: Operation of various constituents of money market; Procedure for issue of Treasury Bills; Computation of issue price of Certificate of Deposits. Capital market: Process of Trading and Settlement in Stock Market; Accounting for primary issue of shares.

Teaching Schedule

Theory

Lecture No.	**Topic**	**Points to be Covered**	**Weightage %**
1	Financial System	Financial System: Meaning and Significance	20
2		Functions of the financial system.	
3		Financial assets	
4		Financial markets, Financial instruments	
5		Financial institutions, financial services.	
6		Weakness of Indian financial system.	
7	Financial Institutions	Financial institutions	8
8		Commercial banks	
9		Development financial institutions	
10	Nonbanking financial corporations.	Nonbanking financial corporations.	6
11		Regulatory institutions	
12	RBI	RBI – Role and Functions.	
12	SEBI	SEBI- objectives- function- powers	

14		SEBI guidelines for primary and secondary market. Financial instruments:	9
15	Money market and capital market	Money market instruments and capital market instruments.	6
16		Financial services companies in India	
17	BFCs	Bfcs-Evolution, growth, definition, services provided, comparison with banks	
18		Categories, sources of funds	9
19	NBFCs	Role of nbfcsin the Indian financial system.	
20	Factoring	Factoring- Concept and forms	15
21		Factoring vs. Bills discounting international factoring	
22		Functions of a factor,advantages and disadvantages.	
23		Forfeiting.	
24	Venture capital	Venture capital: Nature and scope	10
25		Venture capital investment process	
26		Limitations, venture capital schemes in India.	
27	Merchant banking	Merchant banking: Origin, definition, nature and scope and functions	12
28		Structure of merchant banking industry in India	
29		Regulation of merchant banking activity	
30		Pre-issue and post issue management of public issue.	
31	Mutual funds	Mutual funds: Objectives, types	5
32		Mutual fund industry in India.	

Practicals

Exercise	Title of Exercise.
1.	Study of RBI – Role and Functions.
2.	Study of SEBI- objectives, functions, powers and guidelines.
3.	To study the main instruments of money markets in India.
4.	To study the Capital Market Instruments in India
5.	Study of Important Constituents of Indian Money Market in india.
6.	To study of Procedure for issue of Treasury Bills
7	A study of stock exchange market –A case study of Pune/ Bombay Stock Exchange Market
8.	To study the Process of Trading and Settlement in Stock Market
9.	Computation of issue price of Certificate of Deposits
10.	Study of Factoring
11.	Study of Forfeiting.
12.	Practical on venture capital.
13	Merchant banking
14	Mutual funds

15	Public issue
16	Accounting for primary issue of shares

Suggested Readings

1. Thummuluri, S. 2017. Financial services, Pearson Education. New Delhi.
2. Khan, M. Y. 2016. Financial Services (8 th ed.). Mcgraw Hill Educations Pvt. Ltd, New Delhi.
3. Machiraju, R. H. 2012. Indian Financial System.Vikas Publishing House.
4. Khan, M.Y. 2016. Indian Financial System (9th ed.) Tata McGraw Hill Educations Pvt. Ltd., NewDelhi.
5. Pathak, V. B. 2014: Indian Financial System (4th ed.), Pearson Education. New Delhi.

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SEM-VII

Sr. No.	Module No	Course Title	Credit hrs.
1.	RAWE-471	Rural Awareness Works Experience (RAWE)	0+10
2.	SPW-472	Agribusiness Student Project (SPW)	0+10
		Total	**0+20**

SEM-VIII

Sr. No.	Module No	Course Title	Credit hrs.
1.	IA-483	Internship /Industrial Attachment	0+10
2.	HOT -484	Hands on Training	0+10
		Total	**0+20**