

SKILL FACULTY OF AGRICULTURE

B. Voc. (Agriculture) Scheme and Syllabus

2019-22



SHRI VISHWAKARMA SKILL UNIVERSITY
DUDHOLA, PALWAL

SCHEME

Semester-I															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Communication Skills	3	1	4	15	35	50	35	15	50	100	45	30	75	
	Fundamental of Computers	3	1	4	15	35	50	35	15	50	100	45	30	75	
	Fundamental of Rural Development	3	1	4	30	70	100	0	0	0	100	45	30	75	
		9	3	12	60	140	200	70	30	100	300	135	90	225	
Skill Education Component	Basics of Agriculture Farming	2	1	3	30	70	100	0	0	0	100	30	30	60	
	Organic Farming	2	1	3	15	35	50	35	15	50	100	30	30	60	
	OJT	0	12	12	-	-	0	245	105	350	350	0	540	540	
	Total	4	14	18	45	105	150	280	120	400	550	60	600	660	
	Grand Total	13	17	30	105	245	350	350	150	500	850	195	690	885	

SUBJECT CODE

S.No	Subject Code	Subject
1.	ENG -501	Communication Skills
2.	AGRCS-501	Fundamental of Computers
3.	AGR-502	Fundamental of Rural Development
4.	AGR-503	Basics of Agriculture Farming
5.	AGR-504	Organic Farming
6.	ENG-501L	Communication skills -Labs
7.	AGR-504L	Organic Farm L
8.	AGRCS-501L	Fundamentals of computers -Lab
9.	AGR-505	On the Job Training

(Amit Sinha *Amit Sinha*)

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Fundamental of Agrimanagment and Safety	3	1	4	15	35	50	35	15	50	100	45	30	75	
	Entrepreneurship development	3	0	3	30	70	100	0	0	0	100	45	0	45	
	Integrated pest and disease management in agriculture	3	2	5	30	70	100	0	0	0	100	45	60	105	
		9	3	12	75	175	250	35	15	50	300	135	90	225	
Skill Education Component	Seed, Soil and fertilizer management	2	1	3	30	70	100	0	0	0	100	30	30	60	
	Irrigation and Weed Management in Agriculture	2	1	3	30	70	100	0	0	0	100	30	30	60	
	OJT	0	12	12	-	-	0	245	105	350	350	0	540	540	
	Total	4	14	18	60	140	200	245	105	350	550	60	600	660	
	Grand Total	13	17	30	135	315	450	280	120	400	850	195	690	885	

JOB ROLE: Agribusiness Technician/ Agribusiness Consultant

SUBJECT CODE

S. No	Subject Code	Subject
1.	AGR 705	Fundamental of Agri management and Safety
2.	ENTR 506	Entrepreneurship development
3.	AGR 507	Integrated pest and disease management in agriculture
4.	AGR 508	Seed, Soil and fertilizer management
5.	AGR 509	Irrigation and Weed Management in Agriculture
6.	AGR 510	OJT

Semester-III															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	EVS	4	0	4	15	35	50	35	15	50	100	60	0	60	
	Value chain management	3	1	4	15	35	50	35	15	50	100	45	30	75	
	Lean manufacturing	3	1	4	30	70	100	0	0	0	100	45	30	75	
		10	2	12	60	140	200	70	30	100	300	150	60	210	
Skill Education Component	Dairy farming	2	1	3	30	70	100	0	0	0	100	30	30	60	
	Dairy technology	2	1	3	30	70	100	0	0	0	100	30	30	60	
	OJT	0	12	12	-	-	0	245	105	350	350	0	540	540	
		4	14	18	60	140	200	245	105	350	550	60	600	660	
Grand Total		14	16	30	120	280	400	315	135	450	850	210	660	870	

SUBJECT CODE

S.No	Subject Code	Subject
1.	AGR 605	EVS
2.	AGR 606	Value chain management
3.	AGR 607	Lean manufacturing
4.	AGR 608	Dairy farming
5.	AGR 609	Dairy technology
6.	AGR 610	OJT

Semester-IV															
Category	Subject Code	Subject Name	Credits			Marks							Hrs		
						Theory			Practical			Total			
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	AGR-706	Industrial Ethics	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-707	Agriculture extension services	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-708	Warehousing	4	0	4	30	70	100	0	0	0	100	60	0	60
Total			10	0	10	90	210	300	0	0	0	300	150	0	150
Skill Education Component	AGR-709	Utility and Maintenance	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-710	Quality Assurance and Food Safety	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-711	OJT	0	12	12	0	0	0	245	105	350	350	0	540	540
Total			6	12	18	60	140	200	245	105	350	550	90	540	630
Grand Total			16	12	28	150	350	600	245	105	350	850	240	540	780

Job Role: Agriculture extension officer, Warehouse supervisor, Quality control supervisor

Semester-V															
Category	Subject Code	Subject Name	Credits			Marks						Hrs			
						Theory			Practical						Total
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	AGR- 805	Consumer Affairs	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-806	Basics of Accounting	3	1	4	15	35	50	35	15	50	100	45	30	75
	AGR- 807	Indian Economy-I	3	0	3	30	70	100	0	0	0	100	45	0	45
Total			9	1	10	75	175	250	35	15	50	300	135	30	165
Skill Education Component	AGR-808	Community Service Centre	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-809	Microfinance	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-810	OJT	0	12	12	-	-	0	245	105	350	350	0	540	540
Total			6	12	18	60	140	200	245	105	350	550	90	540	630
Grand Total			15	13	28	135	315	450	280	120	400	850	225	570	795

Job Role: Loan Officer, Microfinance executive, Community Service Executive, Program Coordinator in a NGO

Semester-VI															
Category	Subject Code	Subject Name	Credits			Marks						Hrs			
						Theory			Practical						Total
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	AGR- 905	Business Planning and Project Management	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-906	Marketing Management	3	0	3	30	70	100	0	0	0	100	45	0	45
	AGR-907	Indian Economy-II	3	0	3	30	70	100	0	0	0	100	45	0	45
Total			9	0	9	90	210	300	0	0	0	300	135	0	135
Skill Education Component	AGR-908	Internship/Village immersion Programme/Industrial Project/NGO Development Programme/OJT: Project Report Submission followed by Viva-Voce	0	18	18	0	0	0	345	205	0	550	0	810	810
		Total	0	18	18	0	0	0	345	205	0	550	0	810	810
Grand Total			9	18	27	90	210	300	345	205	0	850	135	810	945

JOB ROLE: Asst. Branch Manager Micro-finance/ Micro-insurance/Agriculture Extension Officer

SYLLABUS

Semester I

Subject: Communication Skills

Subject: ENG -501

Semester-I															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Communication Skills	3	1	4	15	35	50	35	15	50	100	45	30	75	

Category: Communication Skills

Code: ENG -501

SYLLABUS

Unit	Topic	Learning Outcome
I	<p>Communication:</p> <ol style="list-style-type: none"> 1. Meaning and importance of communication 2. Types of communication 3. Process of communication, Communication network in an organization 4. Barrier to communication 5. Essentials of good communications 6. Communication techniques 	Understand the basic understanding on skills of communications.
II	<p>Remedial English Grammar</p> <ol style="list-style-type: none"> 1. Articles, agreement between verb and subject, tenses 2. Modal and their uses, Prepositions, active and passive voices 3. Understanding and applying vocabulary 4. One-word substitute, Synonyms, Antonyms 5. Word formation, Prefixes, Bases and suffix 6. One-word substitution, homonyms, homophones 	Students are equipped to understand basic English grammar knowledge and its uses in communication.
III	<p>Listening skills</p> <ol style="list-style-type: none"> 1. The process of listening 2. Types of listening 3. Benefits of effective listening 	Understand the listening skills, multidisciplinary approach and ability to understand the agri-

	4. Barriers of listening	management of farm, businesses and its constrains.
IV	<p>Reading skills</p> <ol style="list-style-type: none"> 1. Process and methodologies of readings, skimming and scanning. 2. Level of reading and proof reading summarizing 3. Precise writing, unseen comprehension, passage note 4. Taking and reviewing, conversion of given information and charts and graphs. 	Students are strengthen with reading methologies, writing and reading skills to enhance their knowledge in multidisciplinary approach and skills in Agriculture
V	<p>Elements of effective writing</p> <ol style="list-style-type: none"> 1. Main forms of written communication 2. Notices and draft writing an Email. and correspondences. 3. Personal official and Business, Technical report writing 4. Preparing Agenda and minutes of meeting <p>Communication Skill Lab</p> <ol style="list-style-type: none"> 1. Greeting and starting conversation. 2. Information transfer and oral presentation 3. Reading activities 4. Extempore public speaking 5. Situational dialogues / role play 6. Telephonic skills 7. Group discussion, Intonation and common error in pronunciation 8. Listening and comprehension skills 	Students are equipped with writing methodologies to enhance their productivity through draft writing ,communication and technical reports.

Recommended Reading

1. Sethi, J & et al A Practice in English Pronunciation, Prentice Hall of India, New Delhi
2. Sen Leena. Communication skills, Prentice Hall of India, New Delhi
3. D.G. Saxena , Essential of communication skills ,Kuntal Tamang.
4. D.G. Saxena, Communication skills in India, Kuntal Tamang.
5. Roach Peter, English Phonetics and Phonology
6. Mc Carthy, Michael, English Vocabulary in Use, Cambridge University Press
7. Rajinder Pal and Prem Lata, English Grammar and Composition, Sultan Chand Publication.
8. Idioms and Phrases (English-Hindi), Arihant Publication (Pvt) Ltd
9. One-word substitution, Dr Ashok Kumar Singh, Arihant Publication (Pvt) Ltd

SUBJECT: Fundamentals of computers

SUBJECT CODE: AGRCS-501

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Fundamentals of computers	3	1	4	15	35	50	35	15	50	100	45	30	75	

Category: General Education Component

Code: AGRCS-501

Syllabus

Unit	Topic	Learning Outcome
I	Introduction to Computer System: Basic Applications of Computer; Input Output Devices, Computer Memory, Concepts of Hardware and Software, Computer Virus: Definition, Types of viruses, Characteristics of viruses, Anti-virus software,	Students are equipped with applications of Computers and understand the basic components of computer. Students are able to Identify & describe various parts of computers like CPU, keyboard, monitor, etc. (Theory)
II	Number System: Introduction to number system, Decimal to Binary and Vice Versa, Decimal to Octal and Vice Versa, Decimal to Hexa-Decimal and Vice Versa, ASCII Codes	Students imparted with understanding of the Binary Language of Computers.
III	Operating System: Overview of operating system: Definition, Functions of operating system, Need and its services, Types of operating system, Batch Processing, Multiprocessing, Multiprogramming, Time-	Students are acquainted with operations to view files, work with files and customize window and differentiate in various operating system.

	Sharing, On-Line Processing, Real-Time Processing	
IV	Understanding Office Applications: Introduction to MS Word, Introduction to MS Excel and its applications, Introduction to MS PowerPoint, Menus, Shortcuts, Document types, Formatting documents, spread sheet and presentations, Working with Spreadsheets, Different templates, Macros, Mail merge.	Students are able to use office Applications for the task assigned by the authorities.
V	Networking: Network Technologies, Introduction to Internet and protocol, Network connecting devices, Topologies, HTTP, HTTPS.	Students are strengthened with the basics of Networking. Make use of Internet and its applications when required.

Recommended reading:

1. Computer Fundamentals by Priti Sinha, Pradeep K., Sinha
2. Introduction to Computers by Peter Norton
3. Basic Computer Knowledge (Computer Basics Book 1) by John Monyjok Maluth
4. Introduction to Computing Systems: From bits and gates to C & beyond by Yale Patt, Sanjay Patel
5. Computer Systems, Digital Design, Fundamentals of Computer Architecture and Assembly Language by Elahi, Ata
6. Fundamentals of Information Technology by A. Ravichandran

SUBJECT: Fundamental of Rural Development

SUBJECT CODE: AGR-502

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Fundamental of Rural Development	3	1	4	30	70	100	0	0	0	100	45	30	75	

Category: General Education Component

Code: AGR-502

Syllabus

Unit	Topic	Learning Outcome
I	<p>Rural Economy and Development</p> <ol style="list-style-type: none"> 1. Basic understanding of sociology particularly in terms of society at large and concepts like caste, class, creed, race, gender etc 2. Basic understanding of Indian villages and their pattern in terms socio, economic, political and cultural pattern. 3. History of development 4. Rural development, History of Govt. Development Programmes, Panchayati Raj Institutions 	<p>Students are aware of rural ecology ,socio strata and cultural pattern in India and government support system and its influence in indian Agriculture</p>
II	<p>Rural Communication and extension</p> <ol style="list-style-type: none"> 1. SMCRE model, Relation of SMRCE with diffusion, Extension methods, organizing groups, discussion, farm and home visit, leaflet, pamphlets etc. <p>Communication Skills</p> <ol style="list-style-type: none"> 2. Communication exercises, Effective ways of communication, How to address the groups, Clear pronunciations, Putting the objectives to rural mass, A drama to be played by the students at the end of the week SHG a tool 3. Evolution of SHG, SHG a tool for development, Addresses women development, Women vis-à-vis rural India; Advance study of SHG, Like records, Group 	<p>Understand methods of communication and extension methodologies and maintenance of reports, books and ledgers</p>

	meeting, models of SHGs, SHG and credit; How to form a SHG, different way to approach the community and mobilize women; Book keeping, cash book ledger, Book keeping: Basic of accounting, Need of accounts, some basic exercises	
III	<ol style="list-style-type: none"> 1. Rural Women- A perspective, why women are backward, what things need to be done etc. 2. Adult and Non Formal Education- Need of education, how to run NFE centers 3. Social Research- Develop Questionnaire, Survey methods, Case study etc 4. Rural Health- Rural health conditions with focus on child health, AIDS and RH issues, (Mostly theory parts) 5. Agriculture Extension- Agriculture in India, Agriculture research in India 6. Micro Credit- Micro credit work, Models, thumb rules, ways to do it etc. 	Students are equipped with basic knowledge on social strata, rural women status and rural health in Agriculture Importance of agriculture extension in sustainable agriculture
IV	<p>Understanding Cooperatives –</p> <ol style="list-style-type: none"> 1. History of cooperative and models of cooperatives, MACS Act. <p>Livelihood-</p> <ol style="list-style-type: none"> 2. Livelihood models, Need of livelihood <p>Micro Finance-</p> <ol style="list-style-type: none"> 3. How to give credit, Group recognition test, tracking of Loans 4. Different formats etc. Bank linkage; Models of Micro finance 5. Regulatory frame work, Need of financial services 6. MIS- Importance and Standards in MF- Calculating OTR, PAR, Rep. Rate, rating groups, 7. Transparency- Transparency in social life, MFI, Work, etc. 	Understand the cooperative and models of cooperatives ,livelihood and Microfinance models and its applications

Recommended Reading

1. Rural Development: Principles, Policies, and Management by Katar Singh, Anil Shishodia.
2. Fundamentals of Extension Education and Rural Development with practical by Sagar Mondal, Om Prakash Mishra
3. Participatory Rural Appraisal by N. Narayan
4. Handbook of Rural Development by EE publication

SUBJECT: BASICS OF AGRICULTURE FARMING**SUBJECT CODE: AGR-503**

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
Skill Education Component	Basics of Agriculture Farming	2	1	3	30	70	100	0	0	0	100	30	30	60	

CODE: AGR503**CATEGORY: Skill Education Component**

Unit	Topic	Learning Outcome
I	Introduction to Agriculture 1. Introduction, History of Agricultural Development 2. Factors affecting agriculture, Indian Agriculture under-five year plan 3. Role of agriculture in Indian economy 4. Cropping pattern, Agriculture practice	Understanding the basics of agriculture, pattern of development in different agro climatic zones of India.
II	Innovative Agriculture Practise 1. Information and communication technology (ICT) and Agriculture 2. Drone or UAV: Principal and mechanism 3. IOT :Role in Agriculture	Students must learn the recent technological interventions and its application in agriculture
III	OFF FARM ESSENTIALS 1. Dairy: traditional and modern Dairy 2. Three tier model –The Anand pattern 3. National Dairy Development Board 4. Fisheries	Students are strengthened about different aspects of dairy and fisheries
IV	FARM ESSENTIALS 1. Warehousing 2. Microfinance	Students are able to understand the non-farm component of agriculture and importance of microfinance.
V	Agriculture waste management 1. Introduction, Agriculture waste generation 2. Waste utilization and classification of waste. 3. BIO CNG: An alternative Fuel	Students are able to recognize agriculture waste generation and its management importance and utility in recycling for the sustainable Agriculture

Recommended Readings

1. Datt and Sundaram's Indian Economy
2. Modern Techniques of raising field crops by Chidda Singh, OXFORD & IBH publishing Co. Pvt Ltd
3. Handbook of Agriculture (ICAR Publication)
4. Text book of field crops by Rajendra Prasad, ICAR Publications
5. Basic Agriculture, student Handbook Class X NSQF Level -2.
6. Training manual for organic agriculture edited by SCIALABBA
7. Farm Power and Machinery, ICAR e course

SUBJECT: Organic Farming

SUBJECT CODE: AGR-504

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
Skill Education Component	Organic Farming	2	1	3	15	35	50	35	15	50	100	30	30	60	

CATEGORY: Skill Education Component

CODE: AGR504

Unit	Topic	Learning Outcome
1.	<p>Introduction to Organic Farming</p> <p>Nutrient Management</p> <ol style="list-style-type: none"> 1. Introduction, Need of organic farming. 2. Principal of organic farming 3. Difference between organic and conventional farming. 	Understand fundamentals of organic farming and its application under sustainable crop management.
2.	<p>Nutrient Management</p> <ol style="list-style-type: none"> 1. Nurture soil biodiversity, soil testing, soil analyses. 2. Composting, green manures, animals manures, fertilizers. 	Student are equipped with learning on soil types, soil analyses, soil biome and replenishment techniques for sustainable farming.
3.	<p>Organic Standard and Certification.</p> <ol style="list-style-type: none"> 1. Organic certification, purpose of certification process. 2. Certification process: operational structures, national's accreditations only, evaluation committee, certification agencies, inspectors 	Student are provided with organic certification basic information on process and recommended agencies for exploiting the knowledge in sustainable agriculture and export oriented produce.
IV	<p>Urban Farming</p> <ol style="list-style-type: none"> 1. Need of urban farming Urban farming, 2. Factors involved, technology used and different case studies 3. Aquaponics 4. Hydroponics 	Student are equipped with expanding demand on urban agriculture with interventions of latest technology.

V	Pest and Insects 1. Pesticides Insecticide, Herbicide 2. Environmental impact and reducing impact with Integrated Pest Management	Student are attributed with different component of pest and disease management and role of major category pesticides under intensive farming.
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Recommended Readings

1. Organic Farming and sustainability by P K Shetty, Claude Alvares and Ashok kumar
2. Organic Agriculture: A Global Perspective, Paul Kristiansen, Acram Taji and john Reganold
3. The complete book on organic farming Production of organic compost by NPCS Bard of consultant and Engineers
4. Future of urban agriculture in India, Meera Sahasranaman December 2016

Semester II

SUBJECT: Fundamental of Agri-Management and Safety

SUBJECT CODE : AGR 705

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Fundamental of Agri-management and Safety	3	1	4	15	35	50	35	15	50	100	45	30	75	

CATEGORY: General Education Component

Subject Code: AGR705

Unit	Topic	Learning Outcome
I	Introduction to Agri/Farm Management 7. What is a farm? 8. Some basic functions of farm management 9. Farming as a business 10. Farmers knowledge for better farm management	Understand the basic functions of farm and farming as business
II	Farm Resources 7. The extent of land available for cultivation 8. Source of irrigation 9. Family labor 10. Availability of labor 11. Skill level of labors 12. Livestock, availability of fodder 13. Availability of farm machinery 14. Availability of inputs such as seeds and fertilizers 15. Credit requirement and availability, source of credit 16. Market demand for produce 17. Infrastructure such as cold storage and godowns. etc.	Students are equipped to understand the farm, its resources and management to make farming a profitable venture for themselves
III	Management of farm for generating a sustainable income 5. Farm Planning 6. Income and Expenditure 7. Ways to increase revenue	Understand the management of farm for generating a sustainable income

	8. Management of money throughout the year 9. Risk in agriculture	
IV	Safety Practices 5. Important occupational health hazards in agriculture 6. Factors that may increase risk of injury or illness for farm workers 7. Snake or other animal bites or attacks and precautions 8. Physical and mental drudgery 9. Safety tips to reduce the risk of injuries and fatalities while handling machineries First aid for accidents	Students have the awareness of health hazards in agriculture
V	Safe handling of Agrochemicals 1. Precautions to be observed while buying Pesticides 2. Care in use of pesticides 3. First aid measures for pesticide poisoning	Students are prepared to take preventive measures for any health hazards associated with agriculture

Recommended Reading -

10. Farmer's Handbook on Basic Agriculture
11. Introduction to Agricultural economics (6th Addition)
12. Agribusiness management (Routledge Textbooks in Environmental and Agricultural economics) 5th Addition

SUBJECT: Entrepreneurship Development

SUBJECT CODE: ENTR506

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Entrepreneurship development	3	0	3	30	70	100	0	0	0	100	45	0	45	

Category: General Education Component

Subject Code: ENTR 506

Syllabus of Entrepreneurship		
Unit	Topic	Learning Outcome
1	Introduction to Entrepreneurship	Understanding of Entrepreneurship. Nature and Type
1.1	Meaning and Importance	
1.2	Evolution of the term entrepreneurship	
1.3	Factors influencing entrepreneurship	
1.4	Types of Entrepreneur	
1.5	Social Entrepreneurship	
1.6	Agri Entrepreneurship	
2	Entrepreneurial Motivation	Understanding and distinction between primary need and social recognition. Personal ethics and motivation as a prime mover for entrepreneurial development. Enterprise can happen only on the basis of risk taking behavior.
2.1	Motivation	
2.2	Maslows theory	
2.3	Herjburg's theory	
2.4	Culture & Society	
2.5	Values / Ethics	
2.6	Risk taking behavior	
3	Creativity	Understanding of creativity, innovation in terms of product and process. Skills in terms of innovations and application of left and right brain functions along with decision making.
3.1	Creativity and entrepreneurship	
3.2	Steps in Creativity	
3.3	Innovation and inventions	
3.4	Skills of an entrepreneur	
3.5	Decision making and Problem Solving	

4	Organization Assistance	Understanding of the support available for entrepreneurship. Financial assistance scheme. Understanding of venture capita, angel investors and government platforms to support entrepreneurship.
4.1	Assistance to an entrepreneur	
4.2	Industrial Park (Meaning, features, & examples)	
4.3	MSME Act Small Scale Industries	
4.4	Financial assistance by different agencies	
4.5	National Small Industries Corporation (NSIC)	
4.6	NABARD	
4.7	The Small Industries Development Bank of India(SIDBI)	
5	Rules And Legislation	Understanding of relevant regulations for an entrepreneur.
5.1	Applicability of Legislation	
5.2	Industries Development (Regulations) Act, 1951.	
5.3	Factories Act, 1948.	
5.4	The Industrial Employment (Standing Orders) Act, 1946	
5.5	West Bengal Shops and Establishment Act, 1963	
5.6	Environment (Protection) Act, 1986	
5.7	The sale of Goods Ac, 1950	
5.8	Industrial Dispute Act 1947	

Recommended reading:

7. Entrepreneurship: Creating and leading an Entrepreneurial Organization By: Arya Kumar/Pearson's Publication
8. Entrepreneurship by: Robert D Hisrich; Michael P Peters: Dean A Shepherd / Tata McGraw Hills Education Private Limited
9. Every Day Entrepreneurs: The Harbingers of Prosperity and Creators of Jobs By: Aruna Bhargava/Vikas Publishing House Pvt. Ltd
10. Theories of Entrepreneurship by: Vasant Desai/Himalaya Publishing House
11. Entrepreneurship in Action by: Mary Coulter/PHI Learning
12. Entrepreneurship Development by Dr. T.N. Chhabra/Sun India Publications.
13. Men of Steel by: Vir Sanghavi
14. Women of Vision by: Alam Srinivas
15. Stay Hungry Stay Foolish By: Rashmi Bansal
16. Connect The Dots by: Rashmi Bansal

SUBJECT: Integrated pest and disease management in agriculture

SUBJECT CODE: AGR507

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Integrated pest and disease management in agriculture	3	2	5	30	70	100	0	0	0	100	45	60	105	

Category: General Education Component

Code: AGR507

Unit	Topic	Learning Outcome
I	<p>Fundamentals of Plant Pathology</p> <ol style="list-style-type: none"> 1. Introduction to plant diseases and Plant Pathology 2. Causes / factors affecting disease development 3. Commonly grown crops in local area: Diseases and Pests affecting them 4. Diseases and symptoms due to abiotic causes 	Understand the various causes of plant diseases and the mechanisms by which plant pests or other abiotic causes result in plant disease
II	<p>Fundamentals of Entomology</p> <ol style="list-style-type: none"> 1. Introduction to Entomology 2. Insect Ecology <ul style="list-style-type: none"> • Introduction to Environment and its Components • Effects of abiotic factors (On Insect Ecology) • Effects of abiotic Factors (On Insect Ecology) 3. Methods of detection and diagnosis of insect pest and diseases 	Understand methods of detection and diagnosis of insect pests and diseases
III	<p>Fundamentals of Pests, Pest outbreaks, resurgence and losses caused by pests</p> <ol style="list-style-type: none"> 1. Pest: Definition and Introduction 2. Categories of pests <ul style="list-style-type: none"> • Based on Occurrence • Based on level of Infestation 3. Causes of pest outbreak <ul style="list-style-type: none"> • Deforestation an bringing under cultivation 	Identify the stages of pest incidence

	<ul style="list-style-type: none"> • Destruction of natural enemies • Intensive and Extensive cultivation • Introduction of new varieties and crops • Improved agronomic practices • Introduction of new pest in new environment • Accidental introduction of pests from foreign countries • Large scale storage of food grains <p>4. Resurgence of Pests 5. Losses Caused by Pests</p>	
IV	<p>Integrated Pest Management</p> <ol style="list-style-type: none"> 1. Principles and concepts of Integrated pest management <ul style="list-style-type: none"> • History of Pest Management • Concept of Pest Management • Concept of Integrated Pest Management 2. Ecological management of crop environment 3. Introduction to conventional pesticides for the insect pests and disease management 4. Aim of Selected IPM strategies and prescriptions <ul style="list-style-type: none"> • Resistant varieties, crop rotation, inter crop, border crop, trap crops, intercultural operations, understand the natural enemies of pest, beneficial insects, bio-insecticides, etc 5. Case histories of important IPM programme. <p>What is the importance of Integrated Pest management? How is IPM advantageous to the farmer? How is IPM beneficial for the human health and environment?</p>	<ul style="list-style-type: none"> • Understand the use of suitable varieties • Apply preventive and curative care

Recommended Reading

1. Handbook of Integrated Pest Management (IPM) by Government of India Indian Council of Agriculture Research
2. Success Stories of Integrated Pest Management by S. Vennila Ajanta Birah Vikas Kanwar and C. Chattopadhyay

SUBJECT: Seed, Soil and Fertilizers Management

SUBJECT CODE: AGR508

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
Skill Education Component	Seed, Soil and fertilizer management	2	1	3	30	70	100	0	0	0	100	30	30	60	

CATEGORY: Skill Education Component

CODE: AGR508

Unit	Topic	Learning Outcome
I	<p>Seeds: Seed quality and types of seeds, methodology of seed sowing, time, depth and types of sowing, different classes of seeds - foundation and certified seeds, seed certification, field inspection, GM seeds and their detection, seed treatment, seed storage.</p> <p>Identification of different types of seeds, cereals pulses oilseeds fodder and vegetables, germination of seeds.</p>	<p>Understanding the concept of quality and certification of seeds its treatment and storage</p> <p>To identify types of seeds and their germination patterns in lab.</p>
II	<p>Soil: Definition, Soil Genesis, Soil forming rocks and minerals, Edaphology and Pedagogical concept, Soil properties - physical and chemical, Soil water, Soil colloids, Soil air, Soil temperature, Soil reaction-pH, Soil acidity and alkalinity, Soil organic matter, Soil regeneration, Soil organisms.</p> <p>Soil profile, Soil sampling methods Soil sampling tools, Soil forming rocks and minerals, Determination of soil moisture, pH Organic matter determination.</p>	<p>Students must learn genesis, properties and components of soil and living creatures along with organic matter</p> <p>To study soil profile in field. Lab work to determine physico chemical properties of soil sample</p>
III	<p>Fertilizers: Difference between fertilizer and manure, Integrated nutrient Management Fertilizers -Nitrogenous, phosphatic, potassic, Secondary and micronutrient fertilizers, Complex fertilizers, Nano fertilizer, Soil amendments.</p> <p>Identification of different fertilizers and amendments.</p>	<p>Students are aware about different types of fertilizers, Integrated nutrient management and manures.</p> <p>To identify fertilizers and amendments in lab</p>

Recommended Readings

3. Handbook of Soil Fertilizer and Manure by Dr. A. P. Jaiswal and Deo kant Prasad
4. Soil Fertility and Fertilizers by Tisdale and Nelson
5. Introductory Soil Science by Dilip Kumar Das
6. Textbook of Soil science 2nd edition by T.D. Das and S.K. Mukherjee
7. A Handbook of Weed Management by P.K. Gupta

SUBJECT: Irrigation and weed management**SUBJECT CODE: AGR 509**

Semester-II															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
Skill Education Component	Irrigation and Weed Management in Agriculture	2	1	3	30	70	100	0	0	0	100	30	30	60	

CATEGOTY: Skill Education Component

CODE: AGR509

Unit	Topic	Learning Outcome
1.	<p>Irrigation: Soil water, water requirement of crops, hydrology cycle, factors affecting evapotranspiration (ET), ET and crop yield, estimation of ET and crop field irrigation requirement, method of irrigation, subsurface, drip and sprinkler, micro irrigation, quality of irrigation water.</p> <p>To study drip and sprinkler system method.</p>	<p>Understand irrigation fundamentals, water requirement of a crop and to understand methodology and scheduling of irrigation</p> <p>Understanding different components of a sprinkler system and their assembling.</p>
2.	<p>Weed management: introduction to weeds, their harmful and beneficial effects on ecosystem, classification multiplication and dissemination of weeds, control of weeds-manual & chemical, use of herbicides, adjuvant, surfactants, herbicides formulation and their use, mode of action of herbicides and selectivity, allelopathy, bio herbicides, herbicide compatibility with agro-chemicals, herbicide resistance.</p> <p>Weed identification, study of herbicide formulation, spraying equipment.</p>	<p>Students must learn weeds their control by chemicals, its mode of action and formulation.</p> <p>Preparation of herbarium by collecting weeds preparation of pesticide formulation and their uses.</p>

Recommended Readings

1. Irrigation Water Management Principles and Practices II ed by Dilip Kumar Majumdar
2. Weed Management Principles and Practices III ed by O.P.Gupta

Semester III

SUBJECT: EVS

SUBJECT CODE: AGR 605

Semester-III														
Category	Subject Name	Credits			Marks							Hrs		
					Theory			Practical			Total			
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	EVS	4	0	4	15	35	50	35	15	50	100	60	0	60

Category: General Education Component

Code: AGR 605

SYLLABUS

Unit	Topic	Learning Outcome
I	<p>Introduction to Environmental Science</p> <ol style="list-style-type: none"> 1. Multidisciplinary nature of environmental studies, definition, scope and importance 2. The Development of Environmentalism 3. The history of the environmental movement 4. History and evolution of agriculture 5. Concept of Sustainable Development and Sustainable agriculture 	Students are able to understand the basics of Environmental Science and the working of its components and concept of sustainability and sustainable agriculture
II	<p>Ecosystem Structure and Function</p> <ol style="list-style-type: none"> 1. Concept of an ecosystem. 2. Types of Ecosystem 3. Natural Ecosystems 4. Agricultural Ecosystem 5. Structure and function of an ecosystem 6. Ecosystem Services 	Students acquainted with knowledge of Environmental Science in various aspects of agriculture and ecosystems

III	<p>Natural Resources</p> <ol style="list-style-type: none"> 1. Definition and concept of Natural Resources 2. Renewable and non-renewable resources. 3. Use and over-exploitation of natural resources in modern agriculture 4. Role of sustainable agriculture in conservation of natural resources 	<p>Students imparted with effective ability to understand the state of natural resources and ways to conserve natural resources and an ability to distinguish between renewable and non-renewable resources</p>
IV	<p>Biodiversity and its Conservation</p> <ol style="list-style-type: none"> 1. Definition, concept and scope of Biodiversity 2. Value of biodiversity 3. Hot-spots of biodiversity 4. Threats to biodiversity 5. Impact of Agriculture on Biodiversity 6. Measures to conserve biodiversity 7. Role of sustainable agriculture on biodiversity conservation 8. Ecosystem services provided by agricultural biodiversity and its benefits in farming 9. Biodiversity and IPM 	<p>Students imparted with skills to understand the concept of biodiversity in environment and agricultural field in specific and ability to identify multitude of ecosystem services provided by biodiversity in the environment and specifically in agricultural ecosystem An ability to apply the knowledge of ecosystem services extended by biodiversity in management of pests</p>
V	<p>Environmental Pollution</p> <ol style="list-style-type: none"> 1. Definition, cause, effects of Environmental Pollution 2. Impact of environmental pollution on agriculture 3. Impact of agriculture on environment 4. Role of sustainable agriculture in reducing the adverse impact of agriculture on environment 5. Solid Waste Management: causes, effects and control measures. Agricultural Waste Management 	<p>Student are aware of concept of environmental pollution, its causes, effects and control measures and to apply waste management techniques in managing agricultural waste.</p>

Recommended Readings:

1. Introduction to Environmental Science Hardcover by Arthur N. Strahler (Author), Alan H. Strahler
2. Introduction to Environmental Science 2nd Edition, by Felicia Armstrong
3. Concepts of Environmental Science by Sugandha Mishra and Dharendra Kumar
4. Basics of Environmental Science by Michael Allaby
5. Environmental Ecology: The Impacts of Pollution and Other Stresses on Ecosystem Structure and Function by Bill Freedman

6. **Stream Ecology. Structure and function of running waters. Authors: Allan, J. David, Castillo, María M.**
7. **Introduction to Natural Resource Planning 1st Edition, by Charles Yoe**
8. Environmental and Natural Resource Economics by Tom Tietenberg, Lynne Lewis
9. Biodiversity and Conservation By Jeyabalan Sangeetha, Devarajan Thangadurai, Goh Hong Ching, Saher Islam
10. Environmental Pollution Paperback – 1 December 2006 by Khitoliya R.K
11. Environmental Pollution & Management Paperback – January 1, 2015
by Prof. Hudson Bednarski and Alejandro Bogdasiewicz

SUBJECT: Value Chain Management**SUBJECT CODE: AGR 606**

Semester-III															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Value chain management	3	1	4	15	35	50	35	15	50	100	45	30	75	

Category: General Education Component

Subject code: AGR 606

SYLLABUS

Unit	Topic	Learning Outcome
I	Introduction to Value Chain Management <ol style="list-style-type: none"> 1. Concept of Value Chain Management 2. Value Chain Governance -Types 3. Difference between Value Chain Management and Supply Chain Management 4. Advantages of Value Chain Management 	Students provided with knowledge of value chain management in taking an agricultural product from farm to the consumers' table
II	Value Chain Analysis <ol style="list-style-type: none"> 1. What is value chain analysis? 2. Benefits of value chain analysis 3. Approaches of Value Chain Analysis 4. Cost advantage 5. Differentiation advantage 6. Case Studies - Cost leadership 7. Case Studies - Differentiation 	Students are able to conduct the value chain analysis and identify the challenges, strengths and weaknesses of an agribusiness
III	Michael Porter's Value Chain Analysis Model <ol style="list-style-type: none"> a. Introduction to Michael Porter's Value Chain Analysis Model b. Steps associated with Value Chain Analysis c. Primary and Support business activities 4. Application of Value Chain Analysis in reducing risk and increasing profit 	Students equipped with skills on value chain management focuses on improving business operations at the level of producers, processors and other factors in the chain.
IV	Agricultural Value Chain Management <ol style="list-style-type: none"> 1. Introduction to Agricultural Value Chains 2. Features of Agricultural Value Chain 3. Local Value Chain Development 	Student are aware of broad understanding of the wide network of agriculture value chain - Local, national and global and

	<ol style="list-style-type: none"> 4. Farmer Producer Organizations and Value Chain Management 5. Basic Concepts of Finance for Value Chain Management 6. Developing templates to Manage Value Chains 7. Sustainable agri value chains 8. Agricultural value chain - Challenges associated 9. Agricultural value chain - Opportunities associated 	Comprehensive knowledge of contemporary issues associated with agriculture value chain
V	<p>Upgrading Strategies in Agricultural Value Chain Management</p> <ol style="list-style-type: none"> 1. Introduction to upgrading strategies in Agricultural Value Chain 2. Types of Upgrading 3. Trajectories of upgrading 4. Opportunities for upgrading 5. The effect of value chain structures on upgrading 6. Ways to facilitate upgrading 	Students are able to recognition the need for upgrading strategies to improve the agribusiness and make it more profitable

Recommended Readings:

1. Agriculture Finance and management by S. Subba Reddy and P Raghu Ram
2. Agribusiness Supply Chain Management by N. Chandrasekharan and G. Raghuram
3. Agricultural Value Chain Edited by Gokhan Egilmez University of new Haven, USA

SUBJECT: Lean Manufacturing

SUBJECT CODE: AGR 607

Category: General Education Component

Semester-III															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
General Education Component	Lean manufacturing	3	1	4	30	70	100	0	0	0	100	45	30	75	

Subject code: AGR 607

SYLLABUS

UNIT	Topic	Learning Outcome
I	INTRODUCTION TO LEAN MANUFACTURING AND LEAN ELEMENTS <ol style="list-style-type: none"> 1. Introduction to seven waste and their narration 2. Evolution of lean; Global competition, Lean Manufacturing, Value flow and Muda, Muri and Mura 3. Need for LM, Meeting the stake holders requirement 4. Elements of LM. 	Student are acquainted with basics and need of lean management to use the knowledge in multidisciplinary approach.
II	LEAN TOOLS AND TECHNIQUES. <ol style="list-style-type: none"> 1. Various tool of LM, Fundamental blocks of Lean 2. Impact of Seiri Seiton Seiso Seiketsu and Shitsuke 3. Need for TPM, Pillars of TPM, Implementation of TPM 4. Overall Equipment Effectiveness (OEE) and its computation. 	Student are equipped with skills to apply appropriate approaches to project using Lean tools and techniques in sustainable profitable agriculture .
III	Lean system <ol style="list-style-type: none"> 1. Features manufacturing and services, Work flow, Small lot sizes 2. Pull Method, Kanban, A3 problem solving, Just In Time 	Student imparted with understanding and working concept of lean principles and implementation.
IV	Project Selection for lean	Student imparted with skills of executing lean projects and

	<ol style="list-style-type: none"> 1. Resource and project selection, Selecting projects, Process mapping, Current and future value stream mapping, project suitable for lean initiatives. 	importance of lean in enhancement of the productivity in different process of agriculture management.
V	<p>LEAN MANAGEMENT AND IMPLEMENTATION</p> <ol style="list-style-type: none"> 1. Standardized work, Continuous improvement. 2. Lean projects: Training, selecting the members, preparing project plan, implementation, review. 3. Productivity Improvement: Process, machinery Operator and equipment 	Student are strengthened with standardized skills in lean planning and process execution in place.

Recommended Reading

1. Arnheiter, E. D., & Maleyeff, J. (2005). The integration of lean management and Six Sigma. *The TQM magazine*, 17(1), 5-18.
2. Charron, R., Harrington, H. J., Voehl, F & Wiggin, H. (2014). *The lean management systems handbook (Vol. 4)*. CRC Press.
3. Emiliani, M. L. (2006). Origins of lean management in America: the role of Connecticut businesses. *Journal of management History*, 12(2), 167-184.
4. Feld, W. M. (2000). *Lean manufacturing: tools, techniques, and how to use them*. CRC press.
5. Forrest W. Breyfogle III, *Implementing Six Sigma: Smarter solutions Using Statistical Methods*, 1999.
6. James P. Womack, Daniel T. Jones, *Lean Thinking*, Free press business, 2003.
7. Liker, J. K. (1997). *Becoming lean: Inside stories of US manufacturers*. CRC Press.
8. Liker, J. K. & Convis, G. L. (2012). *The Toyota way to lean leadership*. McGraw-Hill.
9. Mann, D. (2009). The missing link: Lean leadership. *Frontiers of health services management*, 26(1), 15-26.
10. Michael L. George, *Lean Six Sigma*, McGraw-Hill, 2002.
11. N. Goplakrishnan, *Simplified Lean Manufacture*, PHI, 2010
12. Ohno, T. (2012). *Taiichi Ohnos Workplace Management: Special 100th Birthday Edition*. McGraw Hill Professional.
13. Pascal Dennis, *Lean Production Simplified*, Productivity Press, 2007
14. Ronald G. Askin and Jeffrey B. Goldberg, *Design and Analysis of Lean Production Systems*, John Wiley & Sons, 2003.
15. Rother M. and hook J., *Learning to See: Value Stream Mapping to add value and Eliminate Muda*, Lean Enterprise Institute, Brookline, MA.
16. Tapping, D, Luyster, T & Shuker, T. (2002). *Value stream management: Eight steps to planning, mapping, and sustaining lean improvements*. Productivity Press.
17. Womack, J. P. & Jones, D. T. (1997). Lean thinking—banish waste and create wealth in your corporation. *Journal of the Operational Research Society*, 48(11), 1148-1148.

SUBJECT: DAIRY FARMING**SUBJECT CODE: AGR 608**

Semester-III															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
Skill Education Component	Dairy farming	2	1	3	30	70	100	0	0	0	100	30	30	60	

Category: Skill Education Component

SYLLABUS

Subject Code: AGR 608

UNIT	Topic	Learning Outcome
I	<p>Introductory part related to Dairying</p> <ol style="list-style-type: none"> 1. Importance of livestock in Agriculture. 2. Relationship of plants with animal husbandry. 3. Dairying under specialized and mixed farming 	<p>Impact of Livestock in agriculture. Concept of relationship between animal and plants. Sustainable Farming concept integrated with Dairying.</p>
II	<p>Livestock development Program and Planning in India</p> <ol style="list-style-type: none"> 1. Place of livestock in the national economy 2. Different livestock development programs of Govt. Of India. 	<p>Status of dairying in India, its role and development policies framed out in India to boost national economy.</p>
III	<p>Care and management of Livestock</p> <ol style="list-style-type: none"> 1. Breeds, care and management of milk cows and after calving 2. Milk secretion, milking records, factors affecting milk yield and composition. 3. Selection and breeding of livestock for higher milk. 4. Feeding and management of calves, growing heifers and milch animals, housing principles, space requirements for different species of livestock. 5. Maintenance of livestock records milking methods and principles 6. Clean milk production. Pasture management 7. Study of external body parts, (phenotypic and physiological), difference between cow and 	<p>Students become familiarize with various aspects of care and management along with record keeping of higher yielding livestock, feeding and rearing of calves, types of shelters suited under varying climate conditions. Hygiene and sanitation during milking process. Maintaining pasture and grazing yard.</p> <p>Students have to examine about the phenotypic characteristics of</p>

	<p>buffaloes, marking for identification, castration, dehorning</p> <p>8. Estimation of judging cost of milk production, problems on computation of ration mixing of feeds, preparing scheme of round the year for green forage</p>	<p>livestock and various activities performed related to their wellness.</p> <p>To know about the basic aspects of calculating the cost benefit ratio of milk and computation of ration mixings.</p>
IV	<p>Health hygiene and Immunity Aspects</p> <ol style="list-style-type: none"> 1. Health care of Livestock, Toxic substances in feed. 2. Role of nutrition in immunity and nutritional disorders. 3. Sanitation and prevention of diseases, Control of External and Internal parasites 4. Estimation of body weight measurements, recording temperature, pulse and respiration of animals 	<p>Principles of health care, safe disposal of waste from animal house for sanitation, safety measures against toxic and hazardous substances come across with feeds. Parasitic and nutritional disorders.</p> <p>Students should aware the role of weight, temperature and pulse in relation to their health.</p>
V	<p>Illness and Transmission of diseases and control</p> <ol style="list-style-type: none"> 1. Signs of illness, control measures of diseases 2. Modes of transmission, prevention and treatment of diseases of bovine (HS, RP, BO, Anthrax, Brucellosis, Johne's, Mastitis, Milk fever, FMD) 3. Vaccination schedule for livestock 	<p>Illness due to various diseases their transmission, prevention and treatment.</p> <p>Students are strengthened with knowledge of techniques of vaccination required to prevent and control of different diseases.</p>

Recommended Reading

1. Arora SP. 1997. Feeding of Dairy Cattle and Buffaloes. Kalyani.
2. Dutta G. 1994. Care and Management of Dairy Cattle and Buffaloes. 3rd Ed. ICAR.
3. Thomas CK & Sastry NSR. 1991. Dairy Bovine Production. Kalyani.
4. Clarence HE. 2007. Dairy Cattle & Milk Production. Daya Publ. House.
5. Thomas CK & Sastry NSR. 1991. Dairy Bovine Production. Kalyani.

SUBJECT: Dairy Technology
SUBJECT CODE: AGR 609

Semester-III															
Category	Subject Name	Credits			Marks								Hrs		
					Theory			Practical			Total				
		T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO	
Skill Education Component	Dairy Technology	2	1	3	30	70	100	0	0	0	100	30	30	60	

CATEGORY: Skill Education Component

Code: AGR 609

SYLLABUS

Unit	Topic	Learning Outcome
I	<p>History Development and Procurement of Milk</p> <ol style="list-style-type: none"> History & development of market milk industry. Rural and urban milk production, milk procurement. Pricing of milk, producer's price, consumer's price, pricing on composition, species, two axis pricing system, administered price. Total production of milk in India and world. 	<p>Students are aware about the history and development of milk, its pricing and procurement.</p>
II	<p>Quality, standardization and treatment of marketed milk</p> <ol style="list-style-type: none"> Quality of market milk, legal standard, milk in relation to public health, various heat treatments, applied to milk-pasteurization, sterilization and preservation. Importance of refrigeration in market milk industry. Impact of milk and colostrum on human health. Merits and demerits of preserved milk. Sampling of milk and its analysis for its composition & acidity. Analysis of milk for total solids, protein, solid not fat, fat, Ash, specific gravity and acidity. Assessment of quality of milk by various plate forms tests. Knowledge of Chemicals and their names used in milk analysis. 	<p>Students are acquainted about the quality of milk, shelf life and measures to increase its keeping quality by using heat.</p> <p>Students are updated about the sampling of milk to analyses and assess the quality. Milk sampling methodology and processing.</p>
III	<p>Cleaning and sanitization of dairy equipment and procurement of milk and its packaging.</p>	<p>Students are aware about utilities and dairy equipment's, their cleaning and uses. They must study the process of</p>

	<ol style="list-style-type: none"> 1. To keep of dairy equipment, factors influencing their efficiency, cleaning and sterilization of dairy equipment. 2. Preparation of homogenized, standardized, toned, recombined, fermented milk and sterilized milk, legal standards, packaging of milk 3. Detection of preservatives and adulterants in milk. 	<p>manufacturing, standardization and packing of different milk products.</p> <p>To know the process of detection of adulterants, preservatives.</p>
IV	<p>Principles of manufacturing cream, butter and ghee</p> <ol style="list-style-type: none"> 1. Ghee – Manufacture of ghee under rural conditions, collection of ghee from rural areas, grading of ghee. 2. Manufacture of ghee from cream and butter by improved methods, standards for ghee, defects in market ghee; its causes and remedy, storage of ghee, Agmark specifications, judging parameters 3. Principles of cream- separation and of cream in the dairy, grading and defects, packing and transport. 4. Butter – Treatment of cream for butter making. Modern theory of churning, starter, preparation of desi and creamery butter, packing and grading butter for the market, defects in butter, their causes and remedies, judging parameters and legal standards. 	<p>Students are acquainted with the methodologies involved in making different milk products like Cream, Butter and Ghee as per Agmark specifications.</p>
V	<p>Principles of manufacturing process of Khoa, Paneer and Ice-cream</p> <ol style="list-style-type: none"> 1. Manufacturing process of Khoa, Chenna, Casein & Paneer its packing and storage, factors affecting quality as per legal standards and defects, causes and remedy 2. Ice-cream and Kulfi – Ingredients, calculations, manufacture, storage and sale defects – causes & remedies judging, legal standard. 3. Dahi & Srikhand – Manufacture, defects, causes and remedies. 4. Enlist Indian Milk processing industry profile and the products range made by them. 	<p>Students are imparted the knowledge to make different milk products of improved and of high quality as per norms followed for their standardization.</p> <p>To impart knowledge regarding the Indian milk processing industry.</p>

Recommended Readings

1. Dairy Science and Technology Handbook: By-Hui Y H, JOHN WILEY
2. Outlines of Dairy Technology, MeriPustak.com
3. Dairy Product Technology Recent Advances by Hati
4. Dairy Science and Food Technology: Advances and Applications by Aziz Homayouni

Semester IV

Course Title- **Industrial Ethics**

Course No. - AGR- 706

Course Credit: 03 (3-0-0)
Max. Marks: 100 (30I+70E)

Objectives:

The aim of the course is to develop moral responsibility and mould them as best professionals & to create an ethical vision and achieve harmony in life.

Learning Outcomes

1. Will be able to elaborate the business ethics, its rights, duties and principals.
2. Recognize potential ethical issues in the workplace and discuss with an appropriate person.
3. Apply ethical and inclusive practices in professional practice (Project/Practical) Identify the rights and responsibility as an employee of an organization, and understanding the moral issues.
4. Identify the rights and responsibility as an employee of an organization, and understanding the moral issues.
5. Identify, control and report HSE issues relating to immediate work environment according to procedures.
6. Reflect individual responsibilities and accountabilities in work goals.
7. Ensuring social responsibility and decision-making ability.
8. Demonstrate Controlling mind through yoga and meditation.
9. Perform consistently in accordance with the organization's goals and objectives and organizational/professional codes of conduct.
10. Make sure that the Working with safety in industry and understanding the laws of safety.
11. Work safely in the training environment including.
12. Promote a safe working environment and adhere to risk management strategies for clients, colleagues and others who enter the workplace.

UNIT I (LO 1,2,3): Business ethics

Meaning of ethics, why ethical problems occur in business. Ethical principles in business: Utilitarianism: weighing social cost and benefits, Rights and duties, Justice and fairness, ethics of care, integrating utility, rights, justice and caring

UNIT II (LO 4,5,6): Moral Issues:

Code of Conduct, An alternative to moral principles: virtue ethics, Moral issues in business: Worker's and employee's rights and responsibilities, Profit maximization vs. social responsibility.

UNIT III (LO 7): Controlling of the Mind

Control of the mind through Simplified physical exercise, Yoga- Objectives, Types, Asanas; Meditation- Objectives, Types, Effect on Body Mind and Soul.

UNIT IV (LO 8,9): Social Responsibility

Social Responsibility of Business, Ethical Decision-making, Social Responsibility of Business and Corporate Governance, Profession and Professionalism, Professional Ethics, Intellectual property rights

UNIT V: (LO 10,11,12): Employee Safety & Health

Basics of health safety & laws, employee theft, Fire & Earthquake safety, fire safety, first aid training, general office safety, terrorism, safety representatives, safety inspection, investigating accidents, Employee and Employer Relationship.

REFERENCES:

1. Values & Ethics in Management, Galgotia Publishers, by Kaur, Tripat;
2. Human values for Managers, by Chakraborty, S.K.
3. Ethics in Management: A Vedantic Perspective, Oxford Univ. Press, by Chakraborty S

Course Title - Agriculture Extension Services

Course No. - AGR-707

Course Credit: 03 (3-0-0)
Max. Marks: 100 (30I+70E)

Objectives:

The objective of the course is to transfer knowledge and skills so that a speedy transfer of information and technology can be done to the farmers by the students who go through this course and adopt the job role of Agriculture service provider. This will help them in reducing the time lag between generation of technology and its transfer to farmers for increasing production, productivity and income from agriculture and allied activities on a sustained basis.

Learning Outcomes

1. To facilitate basic understanding about agriculture extension services.
2. To enable students' awareness about the various cropping systems associated with sustainable agriculture, livelihood and asset pentagons.
3. To equip students with an in depth understanding of management of resources effectively and judiciously,
4. To familiarize students about the Non-farm and Off Farm aspects of agriculture,
5. To enable students, understand about basics of behavioral science, farmer psychology and ways to ensure good mental health of farmers and their needs.

UNIT I : (LO 1,2)

Introduction to Agriculture Extension Services. Meaning and scope of Agriculture Extension Services in context of Haryana, India and at International level. Status of Agriculture Extension Services in India and micro understanding at the level of Haryana.

UNIT II: (LO 1,2,3)

Meaning of Sustainable Livelihood. SL model of DFID. Agriculture extension services and Sustainable livelihood. Understanding of asset pentagons, value chains and technologies. Role of finance, natural resource management.

UNIT III: (LO 3,4,5)

Understanding of Government policies in context to Agriculture extension services. Central government policies and state policies.

UNIT IV: (LO 2, 3,4,5)

Understanding the structure and functions of government and non-government agencies at work in the domain of Agriculture Extension Services. Special focus on ATMA, MANAGE, ICAR, EEI and KVK.

UNIT V: (LO 1, 4,)

Agriculture Extension Services and Physical Infrastructure in India. Understanding gaps in the domain of Agriculture extension Services along with solutions to bridge the gaps.

UNIT VI : (LO 1, 4,)

Understanding of Agro Climatic zones, Soil sampling and testing, soil types and nutrient status, Fertilizers/micro nutrient management, weed management, Irrigation management, Harvesting, Storage and post harvesting, other farm operations, Safety and Tool handling. Introduction to promotion of extension services.

REFERENCES:

1. Extension Methodology for transfer of Agri technology (TNAU: Tamilnadu)
2. Dimension of Agriculture Extension Services (TNAU: Tamilnadu)
3. Case studies and observations by Vijay Mahajan (Basix)
4. Gazeted government policies on Agriculture extension services.
5. Research papers on new technologies in periodicals of ICAR and science journals.

Course Title – Warehousing

Course No: AGR-708

Course Credit: 04(4-0-0)
Max. Marks:100 (30I+70E)

Objectives:

The objective of the Course is to create a pool of warehouse professionals with capacity to manage Agri warehouse efficiently and to help them have latest knowledge and understanding of related aspects like negotiable warehouse receipts, inventory and collateral management.

Learning Outcomes

1. To be able to plan and decide on the transportation procedure, prepare and load the transport vehicle along with preventive handling practices and be able to ensure returns to the farmer
2. To understand the demand & supply trend in market and develop skills to identify the potential buyer and supplier.
3. Shall be able to estimate the requirement of stock and identify the potential area, supplier/farmer along with understanding of collection points with safety of products.
4. To enhance the understanding of handling of procured goods along with processes of Pre-cool/pre-warm the goods received and understand the storing procedure. Learn to plan and decide on the transportation procedure and preparation of load the transport vehicle with preventive handling practices.
5. To learn how to maintain standard safety procedures at the workplace and safety awareness campaigns. To understand potential sources of accidents and use of safety gears to avoid accidents.

UNIT I: (LO 1 TO 6)

Conceptual and regulatory framework of Warehousing. Understanding functional and structural aspect of Warehousing Corporation of India. Horticulture, CWC, NHB, schemes of ministry of agriculture and food processing ministries.

UNIT II: (LO 2,3)

Various types of Warehouses. Warehouse Business and operations. Grading and assaying.

UNIT III: (LO 1, 2,3,4)

Storage pest and their management. Warehousing receipt management. Risk management in warehousing.

UNIT IV: (LO 3)

Warehousing Cost Management. Record management and technology. Relationship Management.

UNIT IV: (LO 4,6)

Warehousing Storage, Warehousing packaging, Land Transportation, Shipping Transportation, Air Transportation and courier.

REFERENCES:

1. Warehouse Management: A Complete Guide to Improving Efficiency and Minimizing Costs in the Modern Warehouse. By Gwynne Richards
2. Lean Supply Chain and logistics Management (1st edition): Paul Myerson
3. Gazette of India.
4. References from google on Warehousing Corporation of India.
5. latest Budget
6. India Year Book
7. Latest Economic Survey of India.

Course Title - **Utility and Maintenance**

Course No- AGR-709

Course Credit: 03(3-0-0)
Max.Marks:100 (30I+70E)

Objective:

The purpose of the course is to strengthen fundamental knowledge and exposure to the concepts, theories and practices in the field of Utility and Maintenance in agriculture farms, dairy farms, dairy processing and food processing industry.

Learning Outcomes

1. To facilitate basic understanding about utility and maintenance, advances with modern technology.
2. To enable students' awareness about utility and maintenance in agriculture farming including indigenous and modern technology in sustainable agriculture.
3. To enable students' awareness about utility and maintenance in dairy farming including indigenous and modern technology for sustainable dairy farming.
4. To enable students' awareness about utility and maintenance in dairy processing including indigenous and modern technology for sustainable dairy processing.
5. To enable students' awareness about utility and maintenance in food processing including indigenous and modern technology for sustainable food processing
6. To equip students with an in depth understanding of maintenance machinery used in various operations effectively and judiciously.
7. To equip students with the knowledge of animal food processing specially fish and its storage.

UNIT I (LO 1): Introduction to Utility and Maintenance

Concept of utility, Concept of sustainability and apply it in utility and maintenance.

UNIT II (LO 1,2): Utility and Maintenance of Farm machineries

Different farm machineries, equipment's and tools, Maintain and track records, and monitor the farm machinery, equipment and tools on a regular basis, Sustainable agricultural farm operations

UNIT III (LO 3,4): Utility and Maintenance in Dairy Farm

Scope and importance of Dairy farms in India and the role of automation in Dairy farms, scope and importance of Dairy farms in India and the role of automation in Dairy farms, Maintenance of machinery, equipment and tools, Maintain and track records, and monitor the dairy machinery, equipment and tools on a regular basis, units and other financial institutions, units and other financial institutions.

UNIT IV (LO 4,5): Utility and Maintenance in Dairy Processing Industry

Scope and importance of Dairy Processing industry in India and the role of automation in Dairy Processing Industry, Different dairy processing machineries, equipment's and tools, Maintenance of machinery, equipment and tools, collect information related to various subsidies/funds/ schemes offered by the government, authorized state units and other financial institutions, sustainable dairy processing operations

UNIT V: (LO 5,6) Utility and Maintenance in Food Processing Industries

Scope and importance of Food Processing industry in India and the role of automation in Food

Processing Industry, Different food processing machineries, equipment's and tools, Maintenance of machinery, equipment's and tools ,Maintain and track records, and monitor the food processing machinery, equipment and tools on a regular basis, Collect information related to various subsidies/funds/ schemes offered by the government, authorized state units and other financial institutions, Sustainable Food Processing operations

Practice health and safety at the work place in terms of personal as well as others" safety and introduction to dangerous Machinery Regulation Act.

UNIT VI: (LO 7)

Principle of animal food processing:

Introduction, Classification, Scope & Importance of animal food processing-Milk processing, Meat processing, Fish processing, Poultry processing. Classification of fresh water fish and marine fish; Blast freezing, fishpond management Commercial handling, storage and transport of raw fish; Average composition of fish; Freshness criteria and quality assessment of fish; Spoilage of fish; Methods of Preservation of fish: Canning, Freezing, Drying, Salting, smoking, curing, fermentation (fish sauce).

REFERENCES:

1. Farm Power And Machinery- ICAR E-Course PDF Book
2. Dairy Engineering PDF Book ICAR E-Course PDF Book
3. Macmillan RH. The Mechanics of Tractor - Implement Performance, Theory and Worked Example. University of Melbourne
4. Culpin C & Claude S. 1968. Profitable Farm Mechanization. Crosby Lockwood & Sons.
5. Verma SR, Mittal JP & Surendra Singh 1994. Energy Management and Conservation in Agricultural Production and Food Processing. USG Publ. & Distr., Ludhiana.

Course Title - **Quality Assurance and Food Safety**

Course No. -AGR 710

Course Credit: 03(3-0-0)
Max. Marks:100 (30I+70E)

Objective:

The objective of this course is to facilitate the understanding of basics of quality assurance and food safety. The students will be equipped with an overview of food safety standards (Global and Indian) and regulation according to FSSAI. Students will have the knowledge on legal regulations pertaining to work place such as health and safety, control of substances hazardous to health, handling/storage/ disposal/ cautions for use of sanitizers and disinfectants, fire precautions/ occurrences, hygiene practice, disposal of waste, environmental protection, etc. This will enable students to work efficiently in agricultural food processing industry.

Learning Outcomes

1. To facilitate basic understanding of basic concept of quality assurance and food safety
2. To enable students' awareness about global food safety standards, Indian food safety standards and regulation according to FSSAI
3. To equip students with an in depth understanding of management of resources effectively and judiciously,
4. To familiarize students about the food infection, pathogens and illness
5. To enable students to apply principles of quality assurance and food safety in processing of agricultural products

UNIT I : (LO 1,2)

Introduction to concept of Food Safety and Quality Assurance. Definition and Terminology; Current changes in global food safety standards and their harmonization. HACCP concept, principle and application in food industry. General Principles, Fundamentals and Standards requirements of QMS (ISO: 9000:2000); TQM tools and techniques. Biosafety concept, principles and safety levels. Legal regulations pertaining to work place such as health and safety, control of substances hazardous to health, handling/storage/ disposal/ cautions for use of sanitizers and disinfectants, fire precautions/ occurrences, hygiene practice, disposal of waste, environmental protection

UNIT II: (LO 2,3,4)

Introduction to Risk Analysis. Microbiological risk profile of pathogen/toxins. ICMSF Risk Ranking of Dairy Products. Risk Management Issues and Control Strategies for dairy products. Food infection, intoxication and toxi-infection. Growth /survival of pathogens, their pathology of illness, mode of transmission, virulence and infectivity. description of different systems: GAP, GMP, TQM, ISO. Indian food standards- Voluntary and Obligatory standards (PFA, FPO, MMPO, AGMARK etc.)

UNIT III: (LO 3,4,5)

Introduction to Principles of Food Law: Integrated Food Law and its harmonization. Standards, Specifications and guidelines; 2 and 3 class sampling plans. FSSAI Microbiological criteria for different foods including dairy products. Conventional / rapid detection methods/commercial kits for hygiene and safety indicators; Bio-sensors and their current application in food safety evaluation. Indian food standards- Voluntary and Obligatory standards (PFA, FPO, MMPO,

AGMARK etc.)

UNIT IV: LO 2, 3,4,5)

Introduction Classification of food related microorganisms, Sources of contamination, Types of food spoilages of raw and processed fruits, vegetables, meat and fish and milk products, preservative principle, microbial defects and their control measures, Role of different Bacteria in food fermentation; Clean milk production and antimicrobial systems in raw milk; Microbiological aspects of bacto-fugation, thermization, pasteurization, sterilization, boiling, UHT, non-thermal processes and membrane filtration techniques. NABL lab visit.

UNIT V: (LO 1, 2, 5)

Food Quality Analysis : Setting up of quality control labs; Accreditation of Quality control laboratory and Role of national & International organization viz. IDF; CAC; AOAC; WTO, BIS; CCFS; FSSAI and Agmark; Sampling techniques for chemical analysis of foods with respect to Macro & micro food nutrient analysis by colorimetric, spectrophotometric, fluorimetric and chromatographic techniques; Definition and importance of sensory evaluation and Detection of Chemical contaminants /residues: pesticides; antibiotics; heavy metals etc. ISO17025.

REFERENCES:

1. Textbook Food Safety and Quality Control by Pulkit Mathur
2. Srilakshmi B.(2018). Food Science. New Delhi: New Age International
3. Roday S.(1998). Food Hygiene and Sanitation 10th Reprint. New Delhi: Tata McGraw-Hill Education.

Semester V

Course Title - Consumer Affairs

Course No.: AGR- 805

Course Credit: 03(3-0-0)

Max. Marks: 100 (30I+70E)

Objectives:

Consumer rights and duties and protection is important not only for the urban population. It is equally pertinent for the rural, vulnerable and poor communities of the country This course will offer a clear understanding of consumer affairs right from evolution to protection in the contemporary times. This is very relevant for learners working with such communities and particularly associated with agriculture ad allied activities.

Learning Outcomes

1. Creating an overall awareness on Consumer Affairs.
2. To develop skills so that the learner can work as consumer activist in the industrial sector, with NGOs and government departments on consumer affairs.
3. To understand need, perceptions, behaviour patterns, attitude towards rights, responsibilities and concerns as consumers.
4. Understanding of various stakeholders in consumer affairs.
5. Legal rights and protection in consumer affairs.

UNIT I: (LO 1)

Evolution of The Consumer and Consumerism: Profile of The Consumer. Consumer laws Consumer Environment. Consumer Behaviour in a Market Economy. Consumer Dynamics.

UNIT II: (LO1 TO5)

Consumer Movement: Origin and Growth. Features, Issues and Trends. Consumer Movement in India. Global Scenario.

UNIT III: (LO 4 AND 5)

Consumer Protection: Consumer Rights. Consumer Responsibilities. Consumer Education in India Consumer and Corporate Social Responsibilities

UNIT IV: (LO 5)

Consumer Protection Legislations and Redressal Mechanism Under Consumer Protection Act, 1986: Evolution of Consumer Protection Laws. Consumer Protection Act, 1986 – Basic Features. Consumer Protection Act. 1986 – Limitations and Guidelines for Filing Consumer Complaints. Grievance Redressal Mechanism and their Limitations. CRPC.

UNIT V: (LO 5)

Redressal of Consumer Grievances. Role of Various Stakeholders: Role of Media and State/Govt. in Consumer Protection. Role of Industry Bodies and Voluntary Consumer Organisations (VCO). Alternate Dispute Redressal Mechanism. Consumer Organisations. IP Lays and Copyright laws.

REFERENCES:

1. Course material of IGNOU on consumer affairs and protection
2. Consumer Affairs by Ram Khanna, Savita Hanspal, Sheetal Kapoor, M.K. Awasthi
3. Consumer Protection by Geraint Howells, Stephen Wetherill

4. E-book by Ministry of Consumer Affairs
5. International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 4, Issue 2, February 2015
6. Annual report Department of Consumer Affairs
7. NGOs in India: A cross sectional Study by R. Sooryamorthy and K.D. Gangarade

Course Title- **Basics of Accounting**

Course No- AGR- 806

Course Credit: 04(3-1-0)
Max. Marks: 50 (15I+35E)
50 (35I+15E)

Objective:

The objective of this course is to expose the learner to the concept and methods of financial and management accounting. Focus will be on developing the understanding of accounting norms and principle.

Learning Outcomes

1. Students will be able to record and report the financial transactions of the business.
2. Demonstrate an understanding of the context within which Management Accounting is used for planning and control purposes.
3. Prepare cost estimates using appropriate assumptions.

UNIT I (LO1): Introduction

Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, users of accounting information and limitations of Financial Accounting.

UNIT II (LO1 TO3): Conceptual Frame work

Accounting Concepts, Principles and Conventions, Cooperate accounts-share capital, overview of corporate accounting.

UNIT III (LO1 AD 2): Recording of transactions

Accounting Process, Journals, Subsidiary Books, Ledger, Cash Book, Trial Balance.

UNIT IV (LO1 TO3): Depreciation

Meaning, need & importance of depreciation, methods of charging depreciation, Costing and pricing

UNIT V (LO 2 AND 3): Preparation of final accounts

Preparation of Trading and Profit & Loss Account, Understanding of final accounts of a Company, Computerised Accounting: Computers and Financial application, Capital budgeting, BPO specific Financial Metrics.

REFERENCES:

1. Book Keeping and Accounting by Aggrawal
2. Fundamentals of Accounting & Financial Analysis: By Anil Chowdhry (Pearson Education)
3. Financial accounting: By Jane Reimers (Pearson Education)
4. Accounting Made Easy By Rajesh Agarwal & R Srinivasan (Tata McGraw –Hill)
5. Financial Accounting For Management: By Amrish Gupta (Pearson Education)
6. Financial Accounting For Management: By Dr. S. N. Maheshwari (Vikas Publishing House)

Course Title- **Indian Economy -I**

Course No.- AGR- 807

Course Credit: 03(3-0-0)
Max. Marks: 100 (30I+70E)

Objective:

The objective of the course is to introduce the Idea of Indian economy for the learners. They will be able to understand the economic development in India. In addition to this they will also witness the budget, economic survey of the country ad would be able to compare it with the developed ad underdeveloped countries of the globe. They would understand the role of agriculture in this process ad areas of improvement as well.

Learning Outcomes

1. Using proper analytical framework to understand Indian Economy.
2. To review major trends in economic indicators and policy debates in India post-independence.
3. To understand paradigm shifts and turning points in Indian Economy
4. To understand the development paradigm adopted in India since independence.
5. To evaluate development impact on economic as well as social indicators of progress and well-being.

UNIT I: (LO 2, 3 AND 4)

Economic Development since independence

UNIT II: (LO1 AND 4)

Human Capital: Demography, Health and Education

UNIT III: (LO 1, 4 AND 5)

Growth and Distribution: Poverty, Inequality, unemployment and policy interventions

UNIT IV: (LO1 AND 5)

International Comparisons

UNIT V: (LO 3 AND 4)

History and Development of agriculture since independence. Five-year plans since independence and economic survey. Natural resource management.

REFERENCES:

1. Balakrishnan, P. (2007). The recovery of India: Economic growth in the Nehru era. *Economic and Political Weekly*, 42(45-46), 52-66. 21
2. Bardhan, P. (2012). *Awakening giants, feet of clay: Assessing the economic rise of China and India*. Princeton University Press.
3. Basu, K., Maertens, A. (2007). The pattern and causes of economic growth in India. *Oxford Review of Economic Policy*, 23, 143-167.
4. Bhagwati, J., Panagariya, A. (2012). *India's tryst with destiny*, Collins Business.
5. Centre for Sustainable Employment. (2018). *State of working India 2018*. Azim Premji University.
6. Desai, S. (2015). Demographic deposit, dividend and debt. *The Indian Journal of Labour Economics*, 58, 217-232.
7. Dreze, J., Khera, R. (2017). Recent social security initiatives in India, *World Development*, 98, 555-572.
8. Dreze, J., Sen, A. (2013). *India: An uncertain glory*. Allen Lane.

9. Joshi, V. (2016). *India's long road: The search for prosperity*. Allen Lane.
10. Meenakshi, J. (2016). Trends and patterns in the triple burden of malnutrition in India. *Agricultural Economics*, 47, 115-134.
11. Ministry of Finance. (2016). Universal basic income: A conversation with and within the mahatma. Chapter 9 in *Economic Survey*, 172-212.
12. Panagariya, A., Mukim, M. (2014). A comprehensive analysis of poverty in India. *Asian Development Review*, 31, 1-52.
13. Rangarajan Committee. (2014). Report of the expert group to review the methodology for measurement of poverty. Government of India
14. Rawal, V., Bansal, V., Bansal, P. (2019). Prevalence of undernourishment in Indian states: Explorations based on NSS 68th round data. *Economic and Political Weekly*, 54(15), 35-45.
15. Rodgers, G. (2018). Inequality in the Indian growth regime. *Indian Journal of Human Development*, 12, 134-148.
16. Thomas, J. (2014). India's labour market during the 2000s: An overview. In K. Ramaswamy (ed.): *Labour, employment and economic growth in India*. Cambridge University Press, 21-56.

Course Title- **Community Service Centre**

Course no- AGR- 808

Course Credit: 03(3-0-0)
Max. Marks: 100 (30I+70E)

Objective:

This course will help the learners to understand the non-farm activities being carried out by the farmers particularly in the rural areas. This course will also help them understand the financial and non-financial activities being carried out by the farmers. In addition to this it will open a gateway to understand rural innovations, collectives, migration pattern and consumption pattern. This course will also help In understanding the behavioural aspects of farmers.

Learning Outcomes

1. To develop basic Concept of Common Service Centre/Village Knowledge Centre
2. To discuss and disseminate the basic conceptual understanding of common service Centre(csc) To develop technical knowledge of CSC, VLE and governments e governance plan.
3. To induct professional skills like decision making, plan and organize, customer centricity, problem solving, analytical thinking and critical thinking.
4. To develop organizational context in terms of relevant legislations, standards, policies, and procedures in work.

UNIT I: (LO1, 2)

Understanding of CSC, VLE and CBOS. Understanding of group dynamics. To understand information on various services that CSC provides as in agricultural inputs, weather, commodity prices, health, as well as Services in the form of e-Government, tele-medicine, bill payments & bookings, data entry, digital pictures, entertainment, education & e-learning, micro-finance, etc.

UNIT II: (LO 5)

To understand relevant legislation, standards, policies, and procedures in work, relevant health and safety requirements applicable in the work environment. Job role and responsibilities and sources for information pertaining to work. Whom to approach for support in order to obtain work related information, clarifications and support. Importance of following health, hygiene, safety and quality standards and the impact of not following the standards on consumers and the business.

UNIT III: (LO 3)

Technical Understanding of service request procedures, tools, and techniques. Role and importance of VLE in supporting business operations. Service life cycle and type of service offered by the csc to the villagers. Feedback system and continuous improvement for betterment. Importance of critical data and security. Routing through local people and local government authority. significance of monthly sales. Importance of documenting, classifying, prioritizing service requests. Significance of daily meeting with local influential people of villagers.

UNIT IV: (LO3 AD 4)

Developing knowledge, skills and competence related to additional agricultural services.

Individual's role in workflow. To understand quality standards set by the organizations for the purpose of information flow and services. Methods and ways to reach out to farmers. Harvesting methods. Suitable location, climate and seasonal parameters for farming. Monitoring and data collection of plants. Management of pest and disease, health and safety, etc. Various scientific methods and technologies for increasing crop production, farmer productivity as well as earnings. Develop understanding of crop rotation, irrigation and drainage, plant breeding, plant physiology, soil classification, soil fertility, weed control, insect and pest control etc.

UNIT V: (LO 1, 4 AND 5)

Factors affecting farmer's decision. Socio economic patterns. Caste, class creed and race. Totems and taboos. Nudge Economics. Understanding of behavioural finance.

REFERENCES:

1. Digital Seva -Operational Manual.
2. The Art of C.S.C. by Mike Everely
3. Virtual Learning Environments: Using, Choosing and Developing your VLE by Martin Weller.
4. Nudge: Improving Decisions About Health, Wealth, and Happiness by Richard Thaler and Cass Sunstein.
5. Traditional Agricultural Practices: Applications and Technical Implementations Hardcover – Import, 1 January 2009 by T. Rathakrishnan
6. Predictably Irrational by Dan Ariely
7. Misbehaving: The Making of Behavioral Economics by Richard Thal

Course Title- **Microfinance**

Course No.- AGR- 809

Course Credit: 03(3-0-0)
Max. Marks: 100 (30I+70E)

Objective:

To develop a deep understanding of micro financial services based on collective and women. To inculcate the element of group dynamics, processes and systems along with learning in the domain of credit, insurance and remittance in particular and other services in general applicable for the rural areas and farmers.

Learning Outcomes

1. Knowledge and understanding of microfinance, organization and processes
2. Technical knowledge of products, standards and risks.
3. To acquire generic skills like reading, writing and oral communication
4. To acquire professional skills like planning, problem solving etc
5. Application of microfinance in agriculture sector and development of the country

UNIT I: (LO1)

Meaning and scope of Microfinance. Understanding of credit, savings, remittance, insurance and pension. History of microfinance in India. Technological application in microfinance.

UNIT II: (LO1 AND 2)

Understanding of Self-help group, Joint liability group, Neighbourhood group. Understanding of collectives and group dynamics, APO, FPC, FPO.

UNIT III: (LO1 AND 2)

Understanding of process and systems in a microfinance company. Mapping of processes. Reporting systems, operational manual, credit manual, HR manual and understanding of PMS.

UNIT IV: (LO 3 AND 4)

Standards in microfinance. Portfolio at risk, Operational Self sufficiency etc.... Understanding of risk in microfinance. Role of Insurance and methods to mitigate risk.

UNIT V: (LO5)

Microfinance as a tool for development. Role of microfinance in the development of agriculture. Debate in relation to microfinance and regulations associated with microfinance

REFERENCES:

1. The Economics of Microfinance by Jonathan Morduch and Beatriz Armendariz
2. Small, Short and Unsecured: Informal Rural Finance in India BOUMAN FJA
3. 3.Banker to the poor by Muhamad Younus
4. Annual report on microfinance industry of Sa-dhan
5. Reports of CGAP on standards of microfinance

Semester VI

Course Title- **Business Planning and Project Management**

Course No.- AGR-905

Course Credit: 03(3-0-0)
Max. Marks: 100 (30I+70E)

Objectives:

The objective of this course is to develop the skills for business planning and project management. The students will be equipped with standards (Global and Indian) business methods and planning so that they may develop as successful entrepreneurs.

Learning Outcomes

1. To understand the concept of Planning and its importance for Businesses.
2. To understand the concept of Project and importance of its management.
3. To critically examine which project needs to be undertaken using various models
4. To understand the importance of human resources for the projects
5. To learn the concept of project audit, project life cycle and project termination process.

UNIT I: (LO1)

Introduction, Nature and Limitations of Planning. Planning Devices & Obstacles in Planning and Techniques of Forecasting, Yield Forecasting.

UNIT II: (LO1, 2 AND 3)

Introduction and Process of Forecasting, Techniques of Forecasting. Difference between Forecasting and Planning, Introduction to Project Management.

UNIT III: (LO2 AND 5)

Project Management Maturity, Project Selection - Model & Types. Project Management and Project Manager, Organisation Structures for Project Management

UNIT IV: (LO 4 AND 5)

Project Organisation and Matrix Organisation, Project framework, The Nature of Negotiation, Conflict and Project Life Cycle. PERT and CPM, Critical Path Method & Crashing the Project, The Planning - Monitoring - Controlling

Unit V: (LO 2 , 3 and 4)

Fundamental Purposes of Project Control, Design of Control Systems. Some Essentials of an Audit, Varieties of Project Termination, Termination Process

REFERENCES:

1. Project management for non-project managers by Jack Ferraro
2. Project Management: Absolute Beginner's guide by Greg Horine
3. Project Management for Humans: Helping People Get Things Done by Brett Harned
4. Making things happen: Mastering Project Management by Scott Berkun
5. Project planning and control with PERT ad CPM by Dr. P.C. Punmia and K.K. Khandelwal
6. Project management maturity: An assessment of project management capabilities among and between selected industries. Authors Kevin Grant and James

7. Project Management Maturity Models – A Critical Review by Fredrik, Diana and Erik (Free Download available)
8. Business Planning and Project Management by Ravi Ahuja (Course available on swayam portal)

Course Title- **Marketing Management**

Course No- AGR- 906

Course Credit: 03(3-0-0)
Max. Marks: 100 (30I+70E)

Objectives:

To induct and sharpen marketing and selling knowledge and skills amongst the students. To prepare learners to face the objectives desired by companies, government and development institutions. To inculcate abilities to earn revenue for the institutions and prepare them for entrepreneurial skills.

Learning Outcomes

1. To understand the meaning of marketing, marketing concept and marketing mix. How marketing concept and marketing mix are integrated in practice, thus resulting in the marketing process and strategy.
2. Concept of a developing economy, relevance of marketing in a developing economy, relevance of social marketing and the role of marketing in relation to some selected industry and service sectors
3. To understand the basis for making a distinction between products and services. To understand the concept of service in terms of its special characteristics and understand the implications of these characteristics in designing a marketing strategy. To identify the various elements of a marketing strategy required to successfully market a service and develop familiarity with each element of the marketing strategy as it is applicable in the case of services
4. Significance of various elements of the marketing mix activities and importance of the marketing mix in marketing planning.
5. To understand marketing, selling, forecasting, distribution and monitoring of sales.
6. Application of marketing in the area of agriculture and allied sector in particular.

UNIT I (LO 1): Marketing and its applications

Introduction: The Meaning of Marketing. The Marketing Mix. The Marketing Strategy. Introduction to marketing in a developing economy. Marketing at Different Levels of Economic Development. Relevance of Marketing in a Developing Economy. Areas of Relevance. The Relevance of Social Marketing. Introduction to the Concept of Service. Reasons for Growth of the Service Sector. Characteristics of Services. Elements of Marketing Mix in Service Marketing. Product, Pricing, Promotion, Distribution and People. Physical Evidence and Process.

UNIT II (LO 1, 4 AND 5): Marketing Planning and Organisation

The Elements of the Marketing Mix. The Place of the Marketing Mix in Marketing Planning. The Relationship between Marketing Mix and Marketing Strategy. The Concept of Optimum Marketing Mix. What is grouped in Forming Segments? Bases for Segmentation. How is the basis for Segmentation Selected? Principles of Designing an Organisation. What is a Marketing

Organisation? The Changing Role of Marketing Organisation. Purpose of Marketing Research. Scope of Marketing Research. Marketing Research Procedure. Applications of Marketing Research. Marketing Research in India. Problems of Conducting Marketing Research in India.

UNIT III (LO 3): Understanding Consumers

Importance of Consumer Behaviour for Marketers. Types of Consumers. Buyer versus User. A Model of Consumer Behaviour. Factors influencing Consumer Behaviour. Psychological Factors. Personal Factors. Social Factors. Cultural Factors. What Is a Decision? Levels of Consumer Decisions. Process of Decision- Making. Types of Purchase Decision Behaviour. Stages in the Buyer Decision Process.

UNIT IV (LO 2 AND 4): Product Management

What is a Product? Types of Products. Marketing Strategy for different types of Products. Product Line Decision. Diversification. The Product Life Cycle Concept. Marketing Mix at Different Stages. Options in Decline Stage. New Product Development Strategy. Brand Name and Trade Mark. Branding Decisions. Advantages and Disadvantages of Branding. Selecting a Brand Name. Packaging. Packaging Industry. Functions of Packaging. Legal Dimensions of Packaging.

UNIT V (LO 2, 3 AND 4): Pricing and Promotion Strategy

Determinants of Pricing. Role of Costs in Pricing. Pricing Methods. Objectives of Pricing Policy. Consumer Psychology and Pricing. Pricing of Industrial goods. Pricing over the Life-cycle of the Product. Nature and Use of Pricing Discounts. Product Positioning and Price. Non price competition. The Promotion Mix. Determining the Promotion Mix. The Promotion Budget. Types of Advertising. Role of Advertising. Advertising Expenditure-Indian Scene. Advertising Management. Setting Advertising Objectives-Indian Experience. Developing Advertising Copy and Message. Role of Personal Selling. Types of Selling Jobs. The Selling Process. Sales Promotion. Sales Promotion Objectives. Sales Promotion Methods. Planning Sales Promotion. Towards Promotional Strategy

UNIT VI (LO 1 TO 5): Distribution and Public Policy

What is a Sales Forecast? How to Prepare a Sales Forecast? Product Sales Determinants. Approaches to Sales Forecasting. Importance of Channels of Distribution. Alternative Channels of Distribution. Role of Middlemen in Indian Economy. Selecting an Appropriate Channel. Physical Distribution Tasks. Selling and Sales Management. Recruitment and Selection of Salesman. Training of Sales Personnel. Motivating the Sales Personnel. Controlling the Sales Personnel. Regulatory Role of the Government. Role of Government in Marketing in Developing Economies. Government Control and Marketing Decision-Making Process. What is Cyber Marketing. Cyber Marketing and the Conventional Marketing. Cyber Marketing Model. The Nature of Cyber Marketing. Limitations of Cyber Marketing. Attracting Traffic to the Internet Site.

UNIT VII (LO 6): Rural Marketing

Rural Markets-An Overview. Understanding of rural Consumers. Product and pricing for the rural markets. Managing the promotion. Accessing the rural markets. Understanding rural marketing process. Case Studies.

REFERENCES:

1. This is Marketing by Seth Godin
2. Hacking Growth by Sean Ellis and Morgan Brown

3. Marketing Management by Philip Kotler
4. Marketing Planning Guide by Bruce Wrenn, Phylis M Mansfield
5. How the brands grow? By Byron Sharp (Part 1 and 2)
6. The Complete Guide to Understanding Consumer Psychology (Quora)
7. The Hard Thing about Hard Things: Building a Business When There Are No Easy Answers by Andreessen Horowitz cofounder Ben Horowitz's book.
8. Escaping the Build Trap: How Effective Product Management Creates Real Value by Melissa Perri's
9. Public Policy in India by Rajesh Chakrabarti and Kaushiki Sanyal.
10. Shaping Policy in India by Rajesh Chakrabarti and Kaushiki Sanyal.
11. Rural Management & Rural Marketing, Amity University, Noida (2017) by Pushyamitra Joshi
12. Rural Marketing: Pradeep Kashyap
13. Cases in Rural Marketing: An Integrated Approach: CSG Krishnamacharyulu and Lalitha Ramkrishnan

Course Title- **Indian Economy -II**

Course No.: AGR- 907

Course Credit: 03(3-0-0)
Max. Marks: 100 (30I+70E)

Objective:

As student of agriculture, one should be able to understand the policies formed by the government along with agriculture performance in the larger picture. A comparative yard stick vis a vie industry and services should be known. The course will help in understanding of the sector and areas of convergence as well.

Learning Outcomes

1. To understand sector specific policies and their impact in shaping trends in key economic indicators in India.
2. To analyse the highlights major policy debates and evaluate the Indian empirical evidence.
3. At the end of the course, a student should be able to understand the role of economic policies in shaping and improving economic performance in agriculture in particular and services in general.

UNIT I: (LO 1)

Macroeconomic policies and their impact

UNIT II: (LO 2 3)

Policies and performance in agriculture

UNIT III: (LO 3)

Policies and performance in industry and services, ODOP, Stagnation of crop to be included, reasons for downtrands.

UNIT IV: (LO 3)

Conceptions of Development Alternative measures of development, documenting the international variations in these measures, comparing development trajectories across nations and within these.

UNIT V: (LO 2 3)

Poverty and Inequality: Definitions, Measures and Mechanisms Inequality axioms; comparison of commonly used inequality measures; connections between inequality and development; poverty measurement; characteristics of the poor; mechanisms that generate poverty traps, and path dependence of growth processes.

REFERENCES:

1. Anand, R., Kochhar, K., Mishra, S. (2015). Make in India: Which exports can drive the next wave of growth? IMF working paper, WP/15/119. 24
2. Chatterjee, S., Kapur, D. (2017). Six puzzles in Indian agriculture. India Policy Forum 2016, Vol. 17.
3. Banga, R. (2014). Trade facilitation and 'hollowing-out' of Indian manufacturing. Economic and Political Weekly, 49(40), 57-63.
4. Mohan, R., Ray, P. (2017). Indian financial sector - structure, trends and turns. IMF working paper.
5. Todaro, M., Smith, S. (2015). Economic Development. Pearson Veeramani, C., Dhir, G. (2017). Make what in India? In M. Dev (ed.): India Development Report.
6. Kapoor, R., Krishnapriya, P. (2019). Explaining the contractualisation of India's workforce. ICRIER Working Paper 369.
7. Basole, A., Basu, D., Bhattacharya, R. (2015). Determinants and impacts of

- subcontracting: Evidence from India's unorganised manufacturing sector. *International Review of Applied Economics*, 29, 374-402.
8. Bhagwati, J., Panagariya, A. (2012). A multitude of labor laws and their reforms. In *India's tryst with destiny*. Collins Business.
 9. Centre for Sustainable Employment. (2018). *State of working India 2018*. Azim Premji University.
 10. Gulati, A., Saini, S. (2017) 25 years of policy tinkering in agriculture. In R. Mohan (ed.): *India transformed: 25 years of economic reforms*. Penguin.
 11. Ministry of Finance. (2017). Climate, climate change and agriculture. Ch. 6 in *Economic Survey*.
 12. Sen, K., Das, D. (2015). Where have all the workers gone? The puzzle of declining labour intensity in organised Indian manufacturing. *Econ Sen, K., Das, D. (2015). Where have all the workers gone? The puzzle of declining labour intensity in organised Indian manufacturing. Economic and Political Weekly*, 50(23), 108-115