University of Agricultural Sciences, Bangalore
Office of the Registrar, GKVK, Bengaluru-560 065
NAAC A^{+} Accredited

Dr. K.C. Narayanaswamy
Registrar

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No. R/AC/ABM Syllabus./2025-26

Date: 30.06.2025

Notification

Sub: Implementation of VI Deans Committee Syllabus for B.Sc. (Hons.) Agri Business Management degree programme w.e.f. the academic year 2024-25 in Faculty of Agri Business Management -reg.

Ref:
1. Approval in the 16th meeting of the reconstituted Board of Studies (UG), dated. 17.04.2025
2. Minutes of 201st meeting of Academic Council dated 26.04.2025, (Part B, item No.10)
3. Recommendations of the Director of Education, dt: 30.06.2025
4. Approval of the Hon'ble Vice-Chancellor, dt: 30.06.2025

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PREAMBLE:

The Indian Council of Agricultural Research (ICAR) New Delhi has played a crucial role in transforming the agricultural higher education to produce highly skilled human resource equipped with advanced knowledge and capable of fulfilling the technological needs of agricultural sector of the country. The National Education Policy (2020) of India represents a comprehensive and ambitious vision for the future of education in the country. There is an urgent need to revive and align the agricultural education system in the country in line with NEP 2020 norms to build a competent human resource for undertaking education, research and extension activities in the diversified, ecologically sustainable and economically viable agricultural and allied sectors with integration of skills, technology and innovation. The proposal for implementation of VI Deans committee course curriculum for B.Sc. (Hons.) Agri. Business Management degree programme was placed in 16th meeting of the reconstituted Board of Studies (UG) held on 17.04.2025 and after thorough deliberations the house approved to implement the syllabus for B.Sc. (Hons.) Agri Business Management course as per VI Deans Committee recommendations w.e.f. Academic year 2024-25.

Based on the minutes of 16th meeting of reconstituted Board of Studies (UG), an agenda item was placed before 201st meeting of the Academic Council held on 26.04.2025 for seeking approval for implementation of VI Deans Committee report w.e.f. the academic year 2024-25. Deliberations were held by the Academic Council regarding the key features of VI Deans Committee syllabus, namely, *Deeksharambha* (student orientation for 14 days), Academic Bank of Credits, Core Courses, Elective Courses, Multi-disciplinary Courses, Value Added Courses, Skill Enhancement Courses, Compulsory 10 Week Internship, Certificate Course (student exit after one year), Diploma Course (student exit after two years), Multiple Entry and Exit System and Migration of Students from one SAU to another etc. After thorough deliberations, the house approved the implementation of VI Deans Committee Syllabus w.e.f. the academic year 2024-25 for B.Sc. (Hons.) Agri Business Management degree programme (Annexure). Further, it was decided that 80% attendance is compulsory for the students in order to be eligible for taking final external examinations in all the courses offered during each semester, but there will be no weightage (marks allocation) for the attendance. Hence, the notification.

NOTIFICATION

As per the approval of the Academic Council in its 201st meeting held on 26.04.2025 (Part B, item No. 10), the VI Deans Committee Report has been implemented at UAS, Bangalore w.e.f. the academic year 2024-25 and onwards for B.Sc. (Hons.) Agri Business Management degree programme in the Faculty of Agri Business Management. Further, 80% attendance is compulsory for all the students in order to be eligible for taking final external examinations in all courses offered during each semester, but there will be no weightage (marks) for the attendance (Annexure).

UAS, GKVK, BENGALURU-560065 REGISTRAR INDIA

30/06/25

REGISTRAR

P.T.O

Copy to:

1. The Hon'ble Vice-Chancellor & Chairman of the Academic Council, UAS, GKVK, Bengaluru
2. The Director of Education, & Member-Secretary of the Academic Council, UAS.Bengaluru
3. The Director of Research, UASB & Member, Academic Council, UAS, GKVK, Bengaluru.
4. The Director of Extension, UASB & Member, Academic Council, UAS, GKVK, Bengaluru.
5. The Dean (PGS), UASB & Member, Academic Council, UAS, GKVK, Bengaluru.
6. The Dean (Agri.), College of Agriculture, GKVK & Member, Academic Council, UAS, GKVK, Bengaluru.
7. The Dean (Agri.), College of Agriculture, VC Farm, Mandya & Member Academic Council, UAS, GKVK, Bengaluru.
8. The Dean (Agri.), College of Agriculture, Hassan & Member Academic Council, UAS, GKVK, Bengaluru.
9. The Dean (Seri.), College of Sericulture, Chintamani & Member Academic Council, UAS, GKVK, Bengaluru.
10. The Dean of Student Welfare, UAS, GKVK & Member Academic Council, UAS, GKVK, Bengaluru.
11. The Director of Agriculture, Government of Karnataka, Seshadri Road, Bengaluru – 560009 & Member Academic Council, UAS, GKVK, Bengaluru
12. Dr. M.S. Nataraju, Former Director of Extension, UASB & Eminent Agriculture Educationist from outside the University & Expert Member, Academic Council, UAS, GKVK, Bengaluru.
13. Dr. Mohan I. Naik, Prof. & Head (Apiculture), & Univ. Head (Entomology), CoA, GKVK, Bengaluru & Member, Academic Council, UAS, GKVK, Bengaluru.
14. Dr. M. Mahadeva Murthy, Professor & Head, University Head, Dept. of Forestry and Environmental Science & Member, Academic Council, UAS, GKVK, Bengaluru.
15. Dr. Venkatesh, Professor & University Head (Plant Pathology) & Member of Academic Council for Agriculture faculty, UAS, GKVK, Bengaluru.
16. Dr. C. Doreswamy, Professor & Special Officer, CoA, Chamarajanagara, & Member, Academic Council for Sericulture faculty, UAS, GKVK, Bengaluru
17. Dr. C.T. Ramachamdra, Professor & Head, Dept. of Processing and Food Engineering, College of Agricultural Engineering, GKVK & Member of Academic Council for Agri. Engineering faculty, UAS, GKVK, Bengaluru
18. Dr. M.R. Girish, Professor, IABM & Member of Academic Council for IABM faculty, UAS, GKVK, Bengaluru.
19. Dr. Shyamalamma, S., Prof. & Head (Plant Biotechnology), CoA, GKVK & Member of Academic Council for Agri. Biotechnology, UAS, GKVK, Bengaluru.
20. Dr. K.G. Vijayalaxmi, Professor, Dept. of Food Science & Nutrition, CoA, GKVK & Member, of Academic Council for FS & N faculty UAS, GKVK, Bengaluru.
21. Dr. K.S. Jagadish, Professor & University Head, Department of Apiculture, and Scientific Officer, Directorate of Education & Invitee of Academic Council UAS, GKVK, Bengaluru.

Special Invitees:

1. The Administrative Officer, UAS, GKVK, Bengaluru.
2. The Comptroller, UAS, GKVK, Bengaluru.
3. The Coordinator PPMC & Nodal Officer - Agril. Education to ICAR, NODAEC, UAS, GKVK, Bengaluru
4. The Special Officer, College of Agriculture, Chamarajanagara.
5. The Special Officer, College of Agricultural Engineering, UAS, GKVK, Bengaluru.
6. The Controller of Examinations, UEC, UAS, GKVK, Bengaluru.
7. The Librarian, University Library, UAS, GKVK, Bengaluru.

CS to the Secretary to the Hon'ble Vice-Chancellor, UASB for kind information.

Semester-wise allocation of courses with code for B.Sc. (Hons.) Agri-Business Management degree programme as per VI Deans Committee Curriculum

I Year I Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SDAR111*	*Deeksharambh*	0+2	22 (12+10)
2.	SABM111	Introduction to Agribusiness Management	2+0	
3.	SAEC111	Fundamentals of Agricultural Economics	2+0	
4.	SAEX111	Communication Skills	1+1	
5.	SAGR112	Introduction to Agronomy and Crop Production Technology	1+1	
6.	SECM111***	SEC-I: Computer Applications in Agriculture	0+2	
7.	SECM112#	SEC-II: Production Technology for Bio-agents and Bio-fertilizers	0+2	
8.	SENT111	Management of Insect Pests of Crops and Stored Grains	1+1	
9.	SFES111 / SMAT112	Basic Botany / Basic Mathematics-I	2+0	
10.	SKAN111/ SKAN112**	Kannada-I*	0+1	
11.	SMDC111$	Farming Based Livelihood Systems	2+1	
12.	SNCC111/ SNSS111	National Cadet Corps (NCC-I)/ National Service Scheme (NSS-I)	0+1	
13.	SPAT111	Management of Plant Diseases	1+1	

***NB*: * Non-Gradial Course**

**** For Non-Kannada speaking students**

***** SECM111: SEC-I Offered by Department of Agricultural Statistics, Applied Mathematics and Computer Science**

 # SECM112: SEC-II Offered by Department of Agricultural Microbiology, Agricultural Entomology and Plant Pathology; coordinated by Department of Agricultural Microbiology

$ SMDC111 Jointly offered by Departments of Agronomy, Agricultural Economics, Animal Science, Horticulture and coordinated by Department of Agronomy

I Year II Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SABM121	Marketing of Agricultural Inputs and Outputs	1+1	23 (10+13)
2.	SABM122	Agricultural Finance and Insurance	1+1	
3.	SAEC121	Farm Management, Production and Resource Economics	2+1	
4.	SAEX122	Personality Development	1+1	
5.	SASC122	Livestock, Poultry and Fish Production Management	1+1	
6.	SECM121***	SEC-III: Seed Production and Seed Testing	0+2	
7.	SECM122#	SEC-IV: Livestock Production and Management	0+2	
8.	SFES121	Environmental Studies and Disaster Management	2+1	
9.	SGPB122	Introduction to Genetics and Plant Breeding	1+1	
10.	SKAN121/ SKAN122**	Kannada-II*	0+1	
11.	SNCC121/ SNSS121	National Cadet Corps (NCC-II)/ National Service Scheme (NSS-II)	0+1	
12.	SSST121	Principles and Practices of Seed Science and Technology	1+1	

***NB*: * Non-Gradial Course**

**** For Non-Kannada speaking students**

*****SECM121: SEC-III Offered by Department of Seed Science and Technology**

 # SECM122: SEC-IV Offered by Department of Animal Science

Post- II Semester Internship (10 weeks, only for exit options for award of UG certificate after first year)

II Year I Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SABM211	Food Business Management	2+0	20 (10+10)
2.	SABM212	Value Chain and Retail Management in Agribusiness	1+1	
3.	SABM213	Introduction to Accountancy	2+1	
4.	SAEG211	Protected Cultivation and Secondary Agriculture	1+1	
5.	SECM211**	SEC-V: Poultry Production Technology	0+2	
6.	SHRT211	General Horticulture	1+1	
7.	SMDC212***	Agricultural Marketing and Trade	2+1	
8.	SNCC211*/ SNSS211*	National Cadet Corps (NCC-III)/ National Service Scheme (NSS-III)	0+1	
9.	SPED211	Physical Education, First Aid, Yoga Practices and Meditation	0+2	
10.	SSAC212	Soil and Water Management	1+1	

NB: * **Non-Gradial Course**

** **SECM211: SEC-V Offered by Department of Animal Science**

***SMDC212 Jointly offered by IABM and Department of Agricultural Economics; coordinated by IABM**

II Year II Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SABM221	Business Laws and Ethics	2+0	21 (13+8)
2.	SABM222	International Trade and Policy in Agriculture	2+0	
3.	SABM223	Agricultural Marketing Regulations	2+1	
4.	SAEX223	Principles of Management and Organizational Behaviour	1+1	
5.	SAEG222	Farm Machinery and Power and Custom Hiring Services	1+1	
6.	SCSC221	Agricultural Informatics and Artificial Intelligence	2+1	
7.	SECM221**	SEC-VI: Development of Agribusiness Proposal	0+2	
8.	SHRT222	Post-harvest Management and Value Addition of Fruits and Vegetables	1+1	
9.	SMDC221***	Entrepreneurship Development and Business Management	2+1	
10.	SNCC221*/ SNSS221*	National Cadet Corps (NCC-IV)/ National Service Scheme (NSS-IV)	0+1	

NB: * **Non-Gradial Course**

** **SECM221: SEC-VI Offered by IABM**

***SMDC221 Jointly offered by Department of Agricultural Economics, IABM and Agricultural Extension; coordinated by Department of Agricultural Economics**

Post- IV Semester Internship (10 weeks, only for exit options for award of UG Diploma after second year)

III Year I Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SABM311	Grading, Standardization and Quality Management in Agri-food Products	1+1	21 (14+7)
2.	SABM312	Market Information and Intelligence	2+1	
3.	SABM313	Capital and Commodity Markets	1+1	
4.	SABM314	Cooperatives and Producers' Organizations	2+1	
5.	SABM315	Business Research Methods	2+1	
6.	SABM316	Social Entrepreneurship	1+0	
7.	SAGR312	Sustainable Farming Systems and Precision Agriculture	1+1	
8.	SAST312	Applied Business Statistics	1+1	
9.	SEDT311*	Educational Tour	0+2	
10.	SGPB312	Intellectual Property Rights	1+0	
11.	SPBT314	Fundamentals of Plant Biotechnology	2+0	

***NB*: *Non-Gradial course**

III Year II Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SABM321	Corporate Social Responsibility and Managerial Ethics	2+1	20 (15+5)
2.	SABM322	Introduction to Managerial Economics	2+1	
3.	SABM323	Marketing Management	3+0	
4.	SABM324	Agribusiness Project Management	2+1	
5.	SABM325	Strategic Business Management	2+1	
6.	SABM326	Rural Marketing	2+1	
7.	SABM327	Commodity Futures Trading	2+0	

IV Year I Semester

Sl. No.	Course Code	Course Title	Credit Hours	Total Credits
1.	SABM412	Food Retail Business Management	0+4	20 (0+20)
2.	SABM413	Supply Chain Management of Agricultural Commodities	0+4	
3.	SABM414	Agri-Export Management	0+4	
4.	SABM415	Packaging and Branding of Agricultural Commodities	0+4	
5.	SABM416	e-Commerce in Agribusiness	0+4	
6.	SABM417	Logistics Management of Agricultural Commodities	0+4	
7.	SABM418	Application of ICT in Agribusiness	0+4	
8.	SABM419	Financial Management	0+4	
9.	SAEG411	Storage and Warehousing of Agricultural Commodities	0+4	
10.	SAEG412	Custom Hiring of Agricultural Machinery	0+4	
11.	SAEX412	Agro-Tourism	0+4	
12.	SAGR414	Fertilizer Retailing	0+4	
13.	SFSN414	Value Addition to Agricultural Commodities	0+4	
14.	SHRT414	Hi-Tech Horticulture/Protected Cultivation	0+4	
15.	SSST412	Seed Business Management	0+4	

***NB*: Students should register for any five of the above 15 elective courses**

IV Year II Semester

Student READY Programme

Course No.	Course Title	Credits	Duration	Department
	Orientation	-	1 Week	All Dept.
SSRM421	Entrepreneurial Innovation Challenge Project	0+2	2 Weeks	AEX + AEC + IABM & mentors from concerned Depts.
SSRM422	KVK & other Institute Placements	0+2	2 Weeks	AEX
SSRM423	Agro Industrial Internships	0+4	4 Weeks	All Depts.
Practical Extension Work in Villages (0+11)				
SSRM424	Capacity enhancement through crop production interventions	0+2	10 Weeks	Depts. of Crop Production & Improvement
SSRM425	Capacity enhancement through crop protection interventions	0+2		Depts. of Crop Protection
SSRM426	Capacity enhancement through allied sector interventions	0+2		Ag. Econ, ABM, Ag. Engg., FS & N., Ani. Sci, F&ES
SSRM427	Capacity enhancement through transfer of technologies	0+3		AEX
SSRM428	Farmers Participatory Technology Demonstration Park	0+2		AEX with other relevant Depts.
-	Report submission and Examination	-	1 Week	ALL Depts.
SSRM429	Finishing School Programme	0+1	1 Week	CoA
	Total	**20**	**21 Weeks**	-

- For B. Sc. (Hons.) Food, Nutrition & Dietetics, B. Tech (Agricultural Engineering), B. Tech. (Food Technology) and B. Tech. (Biotechnology) students will undergo practical extension work in villages **during the last two weeks of village placement** along with students of B.Sc. (Hons.) Agriculture.

- Based on the season (Kharif season), the Student READY programme for IV year students may be implemented in either 7^{th} or 8^{th} Semester

- SSRM421: Entrepreneurial Innovation Challenge Project course shall be spread over for the entire semester and Innovation Day shall be organized after completing the village placement.

Summary of credit distribution among different categories of courses (Credit hours)

Semester	Core Courses-Major	Core Courses-Minor	Multi-Disciplinary Course (MDC)	Value Added Course (VAC)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Student READY	Total Credits	Non-Gradial	Internship	Online Courses (MOOC/SWAYAM etc.)
I	4	8	3[5]	-	1[3] + 2[2]	4	-	22	2[1]+1[4]	-	
II	7	6	-	3[7]	1[3] + 2[6]	4	-	23	1[4]	-	
Post-II	-	-	-	-	-	-	-	-	-	10[13]	
III	7	6	3[8]	-	2[9]	2	-	20	1[2]	-	
IV	9	4	3[11]	3[10]	-	2	-	21	1[3]	-	
Post-IV	-	-	-	-	-	-	-	-	-	10[14]	10[15]
V	13	8	-	-	-	-	-	21	2[12]	-	
VI	20	-	-	-	-	-	-	20	-	-	
VII	20	-	-	-	-	-	-	20	-	-	
VIII	-	-	-	-	-	-	20	20	-	-	
Total	**80**	**32**	**9**	**6**	**8**	**12**	**20**	**167**	**4+4**		**10**

(1) *Deeksharambh*
(2) Communication Skills
(3) National Cadet Corps (NCC) / National Service Scheme (NSS)
(4) Kannada
(5) Farming based Livelihood systems
(6) Personality Development
(7) Environmental Studies and Disaster Management
(8) Agricultural Marketing and Trade
(9) Physical Education, First Aid, Yoga Practices and Meditation
(10) Agricultural Informatics and Artificial Intelligence
(11) Entrepreneurship Development and Business Management
(12) Educational Tour (14 days)
(13) Internship (Only for those opting for an exit with UG-Certificate)
(14) Internship (Only for those opting for an exit with UG-Diploma)
(15) Online course: students will make their own planning and execution of online courses with intimation to the Dean

Summary of Credit Distributions

Type of courses		Credits
Core courses (Major & Minor/s)	:	112
Common courses (MDC+VAC+AEC)	:	23
Skill Enhancement Courses (SEC)	:	12
Student READY	:	20
Online course (MOOC/SWAYAM) - Non-gradial	:	10
Non-Gradial [*Deeksharambh* (0+2), NCC/NSS (0+2), Kannada (0+2) and Educational Tour (0+2)]	:	08
Total	:	**167+10+8**

B.Sc. (Hons.) Agri-Business Management

I YEAR I SEMESTER

SDAR111 ***Deeksharambh*** **(Induction-cum-Foundation Programme)** **2 (0+2)(NG)**

Objectives

The activities to be taken under *Deeksharambh*, in addition to giving a broad view and application areas of the subject of study, also will aim at creating a platform for

- Helping students from different backgrounds for cultural integration
- Knowing about the operational framework of academic process in university
- Instilling life and social skills, leadership qualities, team working spirit
- Developing social awareness, ethics and values, creativity
- Helping students to identify the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario.

The details of activities/ schedules will be decided by the parent universities. The structure shall include, but not restricted to:

I. discussions on operational framework of academic process in university, as well as interactions with academic and research managers of the University
II. creating awareness on the subject of study, and the traditional values and indigenous culture along with diverse potentialities both in indigenous and developed scenario
III. interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields, and people with inspiring life experiences;
IV. group activities to identify the strength and weakness of students (with expert advice for their improvement) as well as to create a platform for students to learn from each other's life experiences;
V. field visits to related fields/ establishments; and
VI. sessions on personality development (instilling life and social skills)

SABM111 **Introduction to Agribusiness Management** **2 (2+0)**

Objectives

1. To gain a comprehensive understanding of agribusiness structures, functions, and dynamics
2. To develop essential management skills applicable to agricultural enterprises
3. To explore strategies for optimizing production efficiency and maximizing profitability in agribusiness
4. To prepare for diverse careers in farm management, agricultural marketing, finance, and consulting

Theory

Indian Agriculture: Place of Agriculture in Indian Economy, trends in the structure of Indian Economy, Role of Agriculture in Economic Development in India. Trends in agricultural production and productivity, cropping pattern size of farms and farm efficiency. Functions of Management – Planning, organizing, staffing, motivation and control and Principles of

Management. Indian agriculture: Impact of Liberalization, Privatization and Globalization on Agribusiness sector. Agribusiness Management: Definition, importance, Scope of Agribusiness Management, Agribusiness Management- Nature, definition, scope and functions. Agribusiness input and output services, Agricultural credit and foreign trade, Planning and Organizing agribusiness. New trends in Agribusiness: Contract farming, Types and scope of contract farming, Working of contracts, Contract models, Organic farming, Genetically modified food, Farmer Producers' Organizations (FPO) Case Studies.

Suggested Readings

1. Farm Business Management: The Fundamentals of Good Practice by Peter L Nuthall.
2. Fundamentals of Agribusiness Finance by Ralph W. Battles and Robert C Thompson.
3. Objective Agribusiness Management by S R Panigrahy.
4. Agribusiness: Management, Marketing, Human Resource Development, Communication, and Technology by Robert H Usry and Lanny W Hass.
5. Agribusiness and Market Management by Amod Sharma.

SAEC111 **Fundamentals of Agricultural Economics** **2 (2+0)**

Objectives

1. To understand the fundamental principles of economics as they apply to agriculture;
2. To analyze the economic factors influencing agricultural production, distribution, and consumption.
3. To explore the role of government policies and international trade in shaping the agricultural economy.
4. To develop critical thinking skills to evaluate and address economic challenges and opportunities in agriculture.

Theory

Agricultural Economics: Meaning, definition, characteristics of agriculture, Nature and scope of agricultural economics, Distinction between agriculture and industry, Role of agriculture in economic development, Role of government interventions in agricultural development. Planning and Agricultural Development: Meaning and objectives, economic planning, benefits of planning, Agricultural development during different Five year Plans in India, Measures of reorganization of agriculture and NITI Aayog. Factors of production: Meaning of land and its characteristics, Labour concept, Characteristics of labour and efficiency of labour, Capital concept and its characteristics, Forms of capital in agriculture and process of capital formation, Organization of business firms, Forms of business organizations and their characteristics. Land reforms: Land reforms and Land tenure systems, Concepts of agricultural land holdings in India. Theory of production: Meaning, definition, types of production functions, Laws of Diminishing Marginal Returns and Elasticity of production. Scale of production: Meaning, classification and economies of scale. Theory of costs: Meaning, definitions and different types of costs and their measurement. Revenue concept: Total revenue, average revenue and marginal revenue and profit maximization.

Suggested Readings

1. Agriculture economics by Shubha Reddy
2. Finance by Shubha Reddy
3. Economic of farm production and management by VT Raju, VS Rao
4. Agricultural marketing in India by S S Acharya, NL Aggarwal

SAGR112 Introduction to Agronomy and Crop Production Technology 2 (1+1)

Objectives

1. To understand the principles of agronomy and crop production technology.
2. To learn about crop growth and development, including factors influencing yield and quality.
3. To explore sustainable and efficient farming practices to enhance crop productivity while minimizing environmental impact.
4. To gain practical knowledge of crop management techniques, including soil fertility, pest control, and irrigation.

Theory

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

Practical

Identificationof crops, seeds, fertilizers, herbicides, tillage andsowing implements, Identification of weeds in crops, Methods of herbicide and fertilizer application, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Methods of irrigation. Methods of sowing of different crops. Nutrient functions and deficiencies, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of important crops, Visit to research centers of related crops.

Suggested Readings

1. Principles of Agronomy by T.Y. Reddy and G.H. Sankara Reddi*: This book provides a comprehensive overview of agronomy principles, including crop production techniques, soil management, and crop physiology.
2. Fundamentals of Crop Production by Stephen R. Kaffka and Larry L. Strand*: This textbook covers the basics of crop production, including plant growth and development, crop management practices, and environmental factors affecting crop yield.
3. Introduction to Agricultural Engineering Technology: A Problem Solving Approach by Harry L. Field and John B. Solie*: This book offers insights into the technological aspects of agronomy, including machinery, irrigation systems, and precision agriculture techniques.
4. Crop Production: Evolution, History, and Technology by C. Wayne Smith and Julian R. Betters*: This book explores the history and evolution of crop production technologies, providing a

5. Modern microeconomics by Koutsoyiannis

SAEX111 **Communication Skills** **2 (1+1)**

Objective

To acquire competence in oral, written and non-verbal communication, develop strong personal and professional communication and demonstrate positive group communication

Theory

Communication process: The magic of effective communication. Building self-esteem and overcoming fears. Concept, nature and significance of communication process. Meaning, types and models of communication. Verbal and non-verbal communication. Linguistic and non-linguistic barriers to communication and reasons behind communication gap/ miscommunication.

Basic communication skills. Listening, speaking, reading and writing skills. Precise writing/ abstracting/summarizing. Style of technical communication. Curriculum vitae/resume writing. Innovative methods to enhance vocabulary, analogy questions.

Structural and functional grammar. Sentence structure, modifiers, connecting words and verbals. Phrases and clauses. Case: subjective case, possessive case, objective case. Correct usage of nouns, pronouns and antecedents, adjectives, adverbs and articles. Agreement of verb with the subject: tense, mood, voice. Writing effective sentences. Basic sentence faults.

Practical

Listening and note taking. Writing skills; precise writing, summarizing and abstracting. Reading and comprehension (written and oral) of general and technical articles. Micro-presentations and impromptu presentations. Feedback on presentations. Stage manners; grooming, body language, voice modulation, speed. Group discussions. Public speaking exercises; vocabulary building exercises. Interview techniques. Organization of events.

Suggested Readings

1. Allport GW, 1937, Personality: A Psychological Interpretation, Holt, New York.
2. Brown M and Gyles B, 1994, How to Interview and be Interviewed, Sheldon Press, London.
3. Carnegie D, 1997, The Quick and Easy Way to Effective Speaking, Pocket Books, New York.
4. Francis Peter SJ, 2012, Soft Skills and Professional Communication, Tata McGraw Hill, New Delhi.
5. Kumar S and Pushpa Lata, 2011, Communication Skills, Oxford University Press.
6. Neuliep JW, 2003, Intercultural Communication: A Contextual Approach, Houghton Miffiin Co Boston.
7. Pease A, 1998, Body Language, Sudha Publications, Delhi.
8. Raman M and Singh P, 2000, Business Communication, Oxford University Press.
9. Seely J, 2013, Oxford Guide to Effective Writing and Speaking, Oxford University Press.
10. Thomson AJ and Martinet AV, 1977, A Practical English Grammar, Oxford University

broader context for understanding modern agronomy practices.

SECM111 **SEC-I: Computer Applications in Agriculture** **2 (0+2)**

Objectives

1. To understand the role of computer applications in modern agricultural practices.
2. To learn to use agricultural software and tools for data analysis, modeling, and decision- making.
3. To explore the application of Geographic Information Systems (GIS) and remote sensing in precision agriculture.
4. To develop skills in utilizing technology to optimize farm management, improve productivity, and reduce environmental impact.

Practical

Working with MS-DOS. Database design. Data entry operation. Word processing: MS Office. Database management program. Use of electronic spreadsheet and graphics. Use of SPSS statistical application packages. Use of SAS in agriculture and its application. Working with MS- DOS. Database design. Data entry operation. Use of electronic spreadsheet and graphics. Basics of computer networking – LAN, SAN – BUS – Tokening – Star - Internet, Intranet – Basics of Email – Exposure to web browsing (structure of URL), Types of websites – Internet service provider – using internet news.

Suggested Readings

1. Computers in Agriculture: Fundamentals and Applications (Hardcover – 20 October 2016) by Sharma Manish, Anil Bhatt
2. Computer Applications in Agriculture By William Otto Rasmussen.
3. Computer Applications in Agriculture and Agribusiness (Paperback – Import, 1 June 1994) by Michael E. Newman (Author)

SECM112 **SEC-II: Production Technology for Bio-Agents and Bio-Fertilizers** **2 (0+2)**

Objectives

1. To understand the principles and methods of producing bio-agents and bio-fertilizers.
2. To learn techniques for mass production and formulation of beneficial microorganisms.
3. To explore the role of bio-agents and bio-fertilizers in sustainable agriculture and soil health management.
4. To develop skills to integrate bio-agents and bio-fertilizers into crop production systems for enhanced yield and reduced environmental impact.

Practical

A. Agricultural Microbiology: Relevance of Biofertilizer in Agriculture. Types of Biofertilizers [(a) Nitrogen fixers: *Rhizobium, Azotobacter, Azospirillum, Glucano* acetobacter, Cyanobacteria and Azolla; (b) P-solubilizers: PSB, PSF; (c) K-solubilizers; (d) Zn-solubilizers; (e) P-mobilizers: AM fungi; (f) Development of consortia]. Mass Production Techniques [(a) Carrier based; (b) Liquid Biofertilizers]. Methods of application. Quality Control (Standards as per FCO (1985) amended in 2009).

Suggested Readings

- Atlas Bartha. Microbial Ecology - Fundamentals and Application. Pearson (Fourth edn).
- Bhoopander Giri, Ram Prasad *et al.* Biofertilizers for Sustainable Agriculture and Environment (Soil Biology Book 55).
- Bikas R. Pati and Santi M. Mandal. Recent Trends in Biofertilizers.
- Eiri Board. Handbook of Biofertilizers and Vermiculture. 1 January 2009.
- Himadri Panda. Complete Technology Book on Biofertilizer and Organic Farming.
- J. Nicklin, K. Graeme-Cook, T. Paget and R. Killington. Instant Notes in Microbiology. Viva.
- M K Rai. Handbook of Microbial Biofertilizers.
- Mark S. Coyne. Soil Microbiology - An Exploratory Approach. Delmar Publishers-2004
- Michael Madigan, John Martinko, David Stahl and David Clark. Brock-Biology of Microorganisms. Pearson (Thirteen Edition).

B. Agricultural Entomology: Importance of biopesticides and other non-chemical approaches in pest management. Mass production of laboratory host, parasitoids and predators. Mass rearing techniques of rice moth, *Corcyra cephalonica* Stainton, *Trichigramma* Spp, *Goniozus nephantidis* (Muesebeck) and *Bracon bravicornins* Wesmael, predators, *Chrysoperla zastrowi* Sillemi (Esben- Petersen), *Cryptolaemus montrouzieri* Mulsant, *Micromus igorotus* Banks, Weed killers, *Zygogramma bicolorata* Pallister, Aquatic weed killer, *Cyrtobagous salviniae* Calder, Preparation of culture media, culturing and spore counting of *Nomuraea rileyi* (Farl.) *Samsonand Beauveria bassiana* (Bals.) / *Metarhizium anisopliae* (Met.) and *Lecanicillium lecanii* (Zimmerman), Mas production of Ha NPV/Sl NPV, Estimation of spore load from microbial pesticides, Preparation of Neem Seed Kernel Extract (NSKE), Preparation and use of Biodigester, Panchagavvya, GCK, cow urine and cow dung, Conservation measures for Natural Enemies and visit to Biocontrol Laboratories.

Suggested Readings

- Koul O, Dhaliwal GS and Khokhar S. Biopesticides in Sustainable Agriculture Progress and Potential. Hardcover – 1 January 2014.
- Veeresh GK, Shivashankar K and Suiglachar MA. 1997. Organic Farming and Sustainable Agriculture. Association for Promotion of Organic Farming, Bengaluru.
- WHO. 1990. Public Health Impact of Pesticides Used in Agriculture.WHO.
- Woolmer PL and Swift MJ. 1994. The Biological Management of Tropical Soil Fertility. TSBF and Wiley.

C. Plant Pathology: Introduction about bio-pesticides/global scenario/advantages, disadvantages and mechanisms of action; Isolation and enumeration of fungal biocontrol agents from soil; Isolation and enumeration of bacterial biocontrol agents from soil; Purification of biocontrol agents; Hands on skills on mass production of *Trichoderma harzianum* and *Pacelomyces lilacinus* (isolation, preparation of mother culture, sterilisation, fermentation, quality analysis, mixing, packing and labeling); Characterization of fungal (*Trichoderma harzianum* and *Pacelomyces lilacinus*) antagonistic organisms (Morphological); Studies on antagonistic ability of fungal biocontrol agents through dual plate technique; Hands on skills on mass production of *Pseudomonas fluorescens* and *Bacillus subtilis* (isolation, preparation of mother culture, sterilisation, fermentation, quality analysis, mixing, packing and labeling); Characterization of bacterial (*Pseudomonas fluorescens* and *Bacillus subtilis*) antagonistic organisms (Morphological); Studies on antagonistic ability of bacterial biocontrol agents through dual plate technique; Field evaluation of biocontrol agents; Evaluation of biocontrol agents against diseases of vegetables under protected cultivation; Evaluation of plant extracts (neem, tulsi, pongamia, etc) and liquid organic manures (panchagavya, beejamruta, Jeevamruta) against plant diseases; Registration

procedures for biocontrol agents; Cost of production of various biocontrol agents.

Suggested Readings

- Advances in Plant Biopesticides - Dwijendra Singh.
- Biopesticides: Use and Delivery - Franklin R. Hall and Julius J. Menn.
- Biopesticides - Pranab Dutta.

SENT111 Management of Insect Pests of Crops and Stored Grains 2 *(1+1)*

Objectives

1. To understand the biology, ecology, and behavior of insect pests affecting crops and stored grains.
2. To learn effective strategies for monitoring, prevention, and control of insect pests in agricultural settings.
3. To explore integrated pest management (IPM) approaches, including biological, cultural, and chemical control methods.
4. To develop skills to assess and minimize economic losses caused by insect pests while promoting sustainable agriculture practices.

Theory

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage and management of major pests of various field and horticulture crops. Factors affecting losses of stored grain. Insect pests, mites, rodents and birds associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

Practical

Identification of different types of damage. Identification of various insect pests attacking different crops. Identification of insect pests associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grains in store / godown. Identification of rodents and rodent control operations. Identification of birds and bird control operations. Methods of grain sampling under storage condition. Visit to nearest FCI godowns and ware houses.

Note: Each student should submit 25 insect pests representing different crops and stored products.

Suggested Readings

1. Bhargava and Kumawati. Pest of stored grains and their management.
2. Dhaliwal G. S. and Koul Opender. Bio pesticides and pest management.
3. Dhaliwal G.S. and Arora Ramesh. 1998. Principles of insect pest management. Kalyani Publisher, 297p.
4. Dhaliwal G.S. and Heinrichs E. A. 1998. Critical issues in pest management. Common Wealth Publisher, New Delhi, 287p.
5. Hameed S. F. and Singh S. P. Handbook of pest management.
6. Marwaha K. K., Siddiqui K. H. and Singh J. P. Hand. book of crop pest control.
7. Panwar V. P. S. Agricultural insect pests of crops and their management.
8. Ranjith A. M. Identification and management of horticultural pest.
9. Sharma Ramnivas. Identification and management of horticulture pest.
10. Srivastav K. P. and Ahlawat Y. S. Pest management in citrus.

SFES111 **Basic Botany** **2 (2+0)**

Objective

1. To introduces the basic taxonomy and classification of plants

Theory

Plant kingdom and features of each group; Morphology, modifications and functions of root, stem, leaf, flower and inflorescence; Pollination and fertilization; Fruit types; Structure of dicot and monocot seed, seed germination.

Cell structure; DNA, chromosome and genes; Cell and tissue types; Internal structure of root, stem and leaf.

Plant taxonomy, systems of classification; Characteristics and economic importance of Poaceae, Brassicaceae, Fabaceae, Malvaceae, Rutaceae, Rosaceae, Asteraceae and Solanaceae families.

Suggested Readings

1. Bendre AM and Kumar A, 1999, Textbook of practical botany. Vol. 2, 7th Ed, Rastogi Publications.
2. Bendre AM and Pande PC, 2009, Introduction to botany. Rastogi publications.
3. Bhatia KN and Tyagi MP, 2020, Elementary biology. Truemen Publication.
4. David M Hillis; H Craig Heller; Sally D Hacker; David W Hall and David E Sadava, 2020, Life: The science of biology. 12th ed. Sunderland Publication. eBook.
5. Dutta AC, 1995, A Class Book of Botany, 16th Ed. Oxford University Press.
6. NCERT, 2021. Biology of Class XI. NCERT, India.
7. Pande PC and Jain DK, 2022, A textbook of Botany Angiosperm. S. Chand Publications.

SMAT112 **Basic Mathematics** **2 (2+0)**

Objective

To introduce the basic principles and functions in mathematics

Theory

Algebra: Progressions - Arithmetic, Geometric and Harmonic Progressions. Matrices- Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3^{rd} order by adjoint method, Properties of determinants up to 3^{rd} order and their evaluation.

Differential Calculus: Definition - Differentiation of function using first principle, Derivatives of sum, difference, product and quotient of two functions, Methods, Increasing and Decreasing Functions. Application of Differentiation-Growth rate, Average Cost, Marginal Cost, Marginal Revenue. Partial differentiation: Homogeneous function, Euler's theorem, Maxima and Minima of the functions of the form $y = f(x)$ and $y = f(x1, x2)$.

Integral Calculus: Integration - Definite and Indefinite Integrals, Methods- Integration by substitution, Integration by parts. Area under simple well-known curves.

Mathematical Models: Agricultural systems - Mathematical models - classification of mathematical models- Fitting of Linear, quadratic and exponential models to experimental data.

Suggested Readings

1. NCERT, 2012, Mathematics of Class XII, NCERT India.
2. Sharma RD, 2014, Mathematics of Class XII, Dhanpat Rai Publisher.

SKAN111 **Kannada** **1 (0+1)**

೧. ಪರಿಸರ

ಅ. ಚಿಗರಿಗಂಗಳ ಚೆಲುವಿ – ದ.ರಾ.ಬೇಂದ್ರೆ

ಆ. ಮೂಲಿಕೆ ಬಳ್ಳಿಯ ಸುತ್ತ – ಪೂರ್ಣ ಚಂದ್ರ ತೇಜಸ್ವಿ

೨. ಸಂತೆ

ಅ. ಅಮೀನಪುರದ ಸಂತೆ – ಮಲ್ಲಿಕಾರ್ಜುನ ಹಿರೇಮಠ

ಆ. ಬಿದ್ದೀಯಬೆ ಮುದುಕಿ – ಶಿಶುವಿನಾಳ ಶರೀಫ್

ಇ. ಬೆಟ್ಟದ ಮೇಲೊಂದು ಮನೆಯ ಮಾಡಿ – ಅಕ್ಕ ಮಹಾದೇವಿ

೩. ಹಬ್ಬ

ಅ. ಹಬ್ಬ ಮತ್ತು ಬಲಿ – ಬಿ.ಟಿ. ಲಲಿತಾ ನಾಯ್ಕ

ಆ. ಹಬ್ಬಕ್ಕೆ ತಂದ ಹರಕೆಯ ಕುರಿ – ಬಸವಣ್ಣ

೪. ಭಾಷಾ ಕೌಶಲ

೧. ಸೂಚಿತ ವಿಸಯ ಕುರಿತು ಮೌಖಿಕ ಮಂಡಣೆ. ೨. ಆಯ್ದ ಪಠ್ಯವನ್ನು ರಾಗಾತ್ಮಕ ಅಂಶಗಳನ್ನು ಆಧರಿಸಿ ವಾಚಿಸುವುದು. ೩. ಮೆಚ್ಚಿನ ವ್ಯಕ್ತಿಯ ಕುರಿತು ನಿರ್ದಿಷ್ಟ ತಲೆಬರಹ ದೊಂದಿಗೆ ಬರಹವನ್ನು ಸಾಧಿಸುವುದು. ೪. ಸೂಚಿಸಿರುವ ಚಿತ್ರವನ್ನು ಆಧರಿಸಿ ನಿರ್ದಿಷ್ಟ ತಲೆಬರಹದೊಂದಿಗೆ ಬರಹವನ್ನು ಸಾಧಿಸುವುದು. ೫. ವಿದ್ಯಾರ್ಥಿಗಳು ಗುಂಪಾಗಿ ಒಂದು ಬರಹವನ್ನು ಸಾಧಿಸಿ ನಿರ್ದಿಷ್ಟ ತಲೆಬರಹವನ್ನು ಸೂಚಿಸುವುದು.

SKAN112 **Kannada** **(0+1)**

Development of listening and speaking skills with Kannada structure pattern - Introducing each other - Conversation between friends - Enquiring about family - Plan to go for a movie - Routine activities of a student - In a book shop - Introducing College/University - Conversation between a farmer and a Scientist - Data collection in a village – Conversation on going on a tour.

Development of writing and reading skills with Kannada structure pattern - Kannada Script practice and reading.

SMDC111 **Farming Based Livelihood System** **3 (2+1)**

Objectives

1. To make the students aware about farming based livelihood systems in agriculture
2. To disseminate the knowledge and skill how farming based systems can be a source of livelihood

Theory

Status of agriculture in India and different states. Income of farmers and rural people in India. Livelihood-definition, concept and livelihood pattern in urban and rural areas. Different indicators to study livelihood systems. Agricultural livelihood systems (ALS); meaning, approach, approaches and framework. Definition of farming systems and farming based livelihood systems, prevalent farming systems in India contributing to livelihood. Types of traditional and modern farming systems. Components of farming system/ farming-based livelihood systems- crops and cropping systems,

livestock (dairy, piggery, goatry, poultry, duckry etc.), horticultural crops, agroforestry systems, aquaculture, duck/poultry-cum-fish, dairy-cum-fish, piggery-cum-fish etc. Evaluation indices for cropping system and farming systems. Small, medium and large enterprises including value chains and secondary enterprises as livelihood components for farmers. Factors affecting integration of various enterprises of farming for livelihood. Feasibility of different farming systems for different agro-climatic zones. Commercial farming-based livelihood models by NABARD, ICAR and other organizations across the country. Case studies on different livelihood enterprises associated with the farming. Risk and success factors in farming-based livelihood systems. Schemes and program s by central and state government, public and private organizations involved in promotion of farming-based livelihood opportunities. Role of farming-based livelihood enterprises in 21st century in view of circular economy, green economy, climate change, digitalization and changing life style.

Practical

Survey of farming systems and agriculture-based livelihood enterprises. Study of components of important farming-based livelihood models/ systems in different agro-climatic zones. Study of production and profitability of crop-based, livestock-based, processing-based and integrated farming-based livelihood models. Field visit of innovative farming system models. Visit of agri-based enterprises and their functional aspects for integration of production, processing and distribution sectors and study of agri-enterprises involved in industry and service sectors (value chain models). Learning about concept of project formulation on farming-based livelihood systems along with cost and profit analysis. Evaluation indices for cropping system and farming systems. Case study of start-ups in agri-sectors.

Suggested Readings

1. Agarwal A and Narain S, 1989, Towards Green Villages: A Strategy for Environmentally, Sound and Participatory Rural Development, Center for Science and Environment, New Delhi, India.
2. Ashley C and Carney D, 1999, Sustainable Livelihoods: Lessons from Early Experience. Department for International Development: London, UK, Volume 7.
3. Bhatt BP, Abhay Kumar, Thakur PK, RS, Amitava Dey UK, Sanjeev Kumar BK, Jha, LK, Pathak KN, Hassan A, Singh SK, Singh KK and Singh KM, 2014, Livelihood Improvement of Underprivileged Farming Community: Some Experiences from Vaishali, Samastipur, Darbhanga and Munger Districts of Bihar. ICAR Research Complex for Eastern Region, ICAR Parisar, P.O. Bihar Veterinary College, Patna, Bihar.
4. Carloni A, 2001, Global Farming Systems Study: Challenges and Priorities to 2030 – Regional Analysis: Sub-Saharan Africa. Consultation Document, FAO, Rome, Italy.
5. Dixon J, Gulliver A and Gibbon D, 2001, Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World. FAO and World Bank: Rome, Italy and Washington, DC, USA.
6. Evenson RE, 2000, Agricultural Productivity and Production in Developing Countries'. The State of Food and Agriculture, FAO, Rome, Italy.
7. Panwar AS, Ravisankar N, Prusty AK, Shamim M, Singh R, Bhaskar S, Malik SK, Tomar RK, Arunachalam A and Alagusundaram K, 2019, Integrated Farming System models for Agricultural Diversification, Enhanced Income and Employment. Indian Council of Agricultural Research, New Delhi.
8. Reddy SR, 2016, Farming System and Sustainable Agriculture. Kalyani Publishers, New Delhi.
9. Singh JP, Ravisankar N, Prusty AK, Sikka AK and Gangwar B, 2016, Region Specific Synthesized Integrated Farming System Models for Improved Production, Profitability and Nutrition (Series

1). IIFSR Bulletin No. 2016-1, AICRP on Integrated Farming Systems, ICAR-Indian Institute of Farming Systems Research, Modipuram, Meerut, pp. 1-88.

10. Walia SS and Walia US, 2020, Farming System and Sustainable Agriculture. Scientific Publishers, Jodhpur, Rajasthan.

SNCC111 **National Cadet Corps (NCC-I)** **1 (0+1)**

National Cadet Corps- As per government guidelines, for getting B and C certificate in NCC, minimum years of requirement is 2 and 3 years along with 1-2 annual camps

- Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.
- Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
- Sizing, numbering, forming in three ranks, open and close order march, and dressing.
- Saluting at the halt, getting on parade, dismissing, and falling out.
- Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear. Turning on the march and wheeling. Saluting on the march.
- Marking time, forward march, and halt. Changing step, formation of squad and squad drill.
- Command and control, organization, badges of rank, honors, and awards

SNSS111 **National Service Scheme (NSS-I)** **1 (0+1)**

Evoking social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skillful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

All the activities related to the National Service Scheme are distributed under four different courses viz., National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV; each having one credit load.

The entire four courses should be offered continuously for two years. A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than five regular one-day camp in a year and one special camp for duration of 7 days at any semester break period in the two years. Different activities will include orientation lectures and practical works. Activities directed by the Central and State Government have to be performed by all the volunteers of NSS as per direction.

- Introduction and basic components of NSS: Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS,
- Organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health.
- NSS programmes and activities: Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary.
- Understanding youth: Definition, profile, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change Community mobilization:
- Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilization involving youth-adult partnership Social harmony and national integration:

- Indian history and culture, role of youth in nation building, conflict resolution and peace-building Volunteerism and shramdan: Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism Citizenship, constitution, human rights, human values and ethics: Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information, human values and ethics. Family and society: Concept of family, community (PRIs and other community based organisations) and society

SPAT111 **Management of Plant Diseases** **2 (1+1)**

Objectives

1. To understand the biology, epidemiology, and ecology of plant diseases.
2. To learn effective strategies for disease prevention, diagnosis, and management in agricultural systems.
3. To explore integrated disease management approaches, including cultural, chemical, and biological control methods.
4. To develop skills to mitigate the impact of plant diseases on crop yield, quality, and sustainability.

Theory

Objectives, historical development and economic significance of post-harvest diseases and seed-borne diseases. Study of important post-harvest diseases (transport, storage and market) of perishables and grains etc. Production of mycotoxins and their effects. Diagnosis and detection of plant pathogens carried through seeds, vegetatively propagated material. Harvesting, transportation, processing and methods of storage. Seed contamination, seed-borne infections and seed transmission. Packing and packaging, requirement of packing materials. Principles of plant disease management, viz., avoidance, exclusion, eradication, protection, immunization-HPR and biological control. Pesticides, Classification of fungicides. Mode of application. Biotechnological approaches of diseases management. IPR and related issues. IDM concepts and importance. Management of post-harvest diseases. IDM module for important post-harvest diseases.

Practical

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

Suggested Readings

1. Butani, D.K. 1984. Insects and fruits. Periodical Expert Book Agency, New Delhi.
2. Jonathan, E.I., Cannayane, I., Devrajan, K., Kumar, S. and Ramakrishan, S. Agricultural nematology. TNAU, Coimbatore.
3. Metcalf, R.L. and Luckman, W.H. 1982. Introduction to insect pest management. Wiley Inter Science Publishing, New York.
4. Nair, M.R.G.K. 1975. Insects and mites of crops in India. ICAR, New Delhi.

5. Swaroop, Gopal and Das, Gupta. 1986. Plant parasitic nematodes of India: Problems and progress. ICAR, New Delhi.
6. Upadhyay, K.D. and Dwivedi, K. 1997. A textbook of plant nematology. Aman publishing house, Meerut
7. Vasanth Raju David, B. 2001. Elements of economic entomology. Popular Book Depot, Chennai.

I YEAR II SEMESTER

SABM121 **Marketing of Agricultural Inputs and Outputs** **2 (1+1)**

Objectives

1. To understand the principles of agricultural marketing, including input and output markets
2. To learn about marketing strategies and techniques for agricultural inputs and products
3. To explore pricing mechanisms, market structures, and distribution channels in the agricultural sector
4. To develop skills to effectively market agricultural inputs and outputs, maximizing profitability for farmers and stakeholders

Theory

Agricultural Marketing- Definition, scope and classification of agricultural marketing. Agricultural input marketing – meaning and importance; Agricultural Inputs and their types – farm and non-farm, role of cooperative, public and private sectors in agri input marketing. Seed Marketing: Importance, Types of seeds, Demand and supply of seeds; agencies involved in Seed marketing; distribution, export import of seeds; Role of NSC and State Seed Corporation. Government policy on seed marketing. Fertilizer Marketing: Production, export-import, supply of chemical fertilizers. Demand/consumption, regional disparity in consumption, pricing policy; subsidy on fertilizers; marketing system – marketing channels, Agencies involved in fertilizer marketing- Public, Private, Co-operative sectors. Problems in distribution. Plant Protection Chemicals: Production, export/import, consumption, marketing channels. Electricity/Diesel Oil- distribution, pricing of electricity for agriculture use; subsidy on electricity. Farm Machinery and Implement: Production, supply, demand, distribution channels of farm machines; Agencies involved in distribution of agro-machineries and implements. Meaning and importance of Land reforms and tenancy in agriculture, ceiling, elasticity, pricing. Labour markets - productivity, heterogeneity, wage differentials – skill differentials. Credit: importance, types and sources. IT applications in agri- input marketing.

Practical

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

Suggested ***Readings***

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

SABM122 **Agricultural Finance and Insurance** **2 (1+1)**

Objective

1. To understand the principles of agricultural finance, including credit, investment, and risk management.
2. To learn about financial tools and services available to farmers, including loans, grants, and insurance.
3. To explore the role of insurance in mitigating agricultural risks such as crop failure, weather events, and market fluctuations.
4. To develop skills to analyze financial statements, assess investment opportunities, and make informed financial decisions in agriculture.

Theory

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

Credit Analysis - 3 Rs of Credit; 5 Cs of Credit; and 7 Ps of Credit; Repayment Plans. Financial Statements – meaning, types and uses. Time Value of Money / Principle of Time Comparison – meaning and importance. Compounding and Discounting.

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

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

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

e-Payment systems - The Banking Ombudsman Scheme-Non-Banking Financial Institutions (NBFI) – meaning and structure, types of activities of NBFIs -Merchant banking in India - Functions
- Mutual Funds – Features and structure - Credit rating agencies in India, Process - Factoring mechanism - Forfeiting services.

Insurance – meaning and definition. Crop Insurance Scheme – origin, meaning, importance and advantages of crop insurance, Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS), Modified National Agricultural Insurance

Scheme (MNAIS), and Weather based Crop Insurance and *Fasal Bhima Yojana* and Unified Package Insurance Scheme (UPIS). Assessment of crop losses, determination of compensation, limitations in application and estimation of crop yields. Livestock insurance – origin, meaning and importance.

Practical

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

Suggested Readings

1. Agarwal, R.N., 1996, Financial Liberalization in India- A study of Banking System and Stock markets.
2. Bagchi, A.K., 1987, The Evolution of the State Bank of India (Part I and II).
3. Bhasin, Niti, 2007, Banking and Financial Markets in India 1947 to 2007.
4. Desai, D.K. and Tambad, S.B., 1973, Farm Finance by a Commercial Bank.
5. Gulati, Ashok and Seema, Bathla, 2002, Institutional Credit to Indian Agriculture: Defaults and Policy Options. NABARD Occasional Paper- 23.
6. Karthykeyan, T.K., 1990, Long-term Financing of Agriculture Land Development Banks in a Multi-Agency System.
7. Mathur, B.L., 1989, Indian Banking- Performance, Problems and Challenges.
8. Mishra, R.K., 2005, Banking Sector Reforms and Agricultural Finance.
9. Murray, William, G., 1947, Agricultural Finance- Principles and Practices of Farm Credit.
10. Nakkiran, S., 1980, Agricultural Financing and Rural Banking in India- An evaluation.
11. Pandey, U.K., 1990, An Introduction to Agricultural Finance.
12. Subba Reddy, S. and Raghuram P., 2005, Agricultural Finance and Management.

SAEC121 Farm Management, Production and Resource Economics 3 (2+1)

Objectives

1. To understand the principles of farm management and resource allocation in agriculture
2. To analyze production economics to optimize resource use and maximize profitability on farms
3. To learn about farm-level decision-making processes, including crop selection, input use, and technology adoption
4. To explore the economic aspects of resource management, including land, labor, capital, and risk, in agricultural enterprises

Theory

Farm management: meaning, definitions and concepts; Nature and scope, objectives and relationship with other sciences; Decisions making process; Meaning and definition of farms sizes based on holding and ownership; Types of farming and their characteristics; factors determining types and size of farms; production economics and farm management principles; Meaning definition of production economics, concept of production function and its types, use of production function in decision making on a farm, factor-product, factor-factor and product-

product relationship. Law of equi-marginal returns or principles of opportunity cost and law of comparative advantage; Cost principle: meaning and concept of costs, types of costs-seven costs and applied cost concepts, and their interrelationship, importance of cost in managing farm business; Farm records: types and importance of farm records and accounts in managing a farm; Farm planning and budgeting: meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting, linear programming; Risk and uncertainty: concept of risk and uncertainty in agriculture production, types/sources of risks and their management strategies. Crop/livestock/machinery insurance: Weather based crop insurance (WBCIS) and *Pradan Mantri Fasal Bhima Yojana* (PMFBY), their features; Resource economics: Meaning of resource economics difference between NRE and agricultural economics, unique properties of natural resources, positive and negative externalities in agriculture, inefficiency and welfare loss, solutions, management of common property resources of land, water, pasture, fishery and forest resource.

Practical

Basic concepts in production economics and farm management; study and visit to different farm layouts and appraisals of farm resources; Analysis of costs and revenue concepts; Computation of depreciation cost of farm assets; Determination of most profitable level of input use in a farm production process; Determination of least cost combination of inputs; Selection of most profitable enterprise combination; Application of equi-marginal returns/opportunity cost principle in allocation of farm resources; Application of the principle of comparative advantage; Estimation of cost and returns using CACP cost concepts for crop, horticulture and livestock enterprises; Farm inventory analysis; Preparation of optimum farm plan using budgeting technique using partial and complete budgeting; visit to farms to study farm records and accounts; preparation of profit and loss accounts compensation for crop loss; Collection and analysis of data on various resources in India; Practical Examination.

Suggested Readings

1. Chinna, S.S., Agricultural Economics and Indian Agriculture.
2. Heady, E.O. and Dhillon, J.L., Agricultural Production Functions.
3. Jhon, P. Doll and Frank. Orezen, Production Economics: Theory with Applications.
4. Johl, S.S. and Kapoor, T.R., Fundamentals of Farm Business Management.
5. Memoria, C.B., Agricultural Problems of India.
6. Raju, V.T. and Vishwashankar Rao, Economics of Farm Production and Management.
7. Sadhu and Singh, Fundamentals of Agricultural Economics.
8. Sankhyan, P.L., Introduction to Economics of Agricultural Production.
9. Spinger, Natural Resource Management and Policy.
10. Subba Reddy *et al.*, Agricultural Economics.

SAEX122 **Personality Development** **2 (1+1)**

Objective

To make students realize their potential strengths, cultivate their inter-personal skills and improve employability.

Theory

Personality definition, Nature of personality, theories of personality and its types. The

humanistic approach - Maslow's self-actualization theory, shaping of personality, determinants of personality, Myers-Briggs Typology Indicator, Locus of control and performance, Type A and Type B behaviours, Personality and organizational behaviour.

Foundations of individual behaviour and factors influencing individual behaviour, Models of individual behaviour, Perception and attributes and factors affecting perception, Attribution theory and case studies on perception and attribution. Learning: Meaning and definition, theories and principles of learning, Learning and organizational behaviour, Learning and training, Learning feedback. Attitude and values, Intelligence- types of Intelligence, theories of intelligence, measurements of intelligence, factors influencing intelligence, intelligence and Organizational behaviour, emotional intelligence. Motivation - theories and principles, teamwork and group dynamics.

Practical

MBTI personality analysis, Learning styles and strategies, Motivational needs, Firo-B, Interpersonal communication, Teamwork and team building, Group dynamics, Win-win game, Conflict management, Leadership styles, Case studies on personality and organizational behaviour.

Suggested Readings

1. Andrews, Sudhir, 1988, How to Succeed at Interviews. 21st (rep.) New Delhi.Tata McGraw- Hill.
2. Heller, Robert, 2002, Effective Leadership. Essential Manager Series. Dk Publishing.
3. Hindle, Tim, 2003, Reducing Stress. Essential Manager Series. Dk Publishing.
4. Lucas, Stephen, 2001, Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
5. Mile, D.J, 2004, Power of Positive Thinking. Delhi. Rohan Book Company.
6. Pravesh Kumar, 2005, All about Self- Motivation. New Delhi. Goodwill Publishing House.
7. Smith, B, 2004, Body Language. Delhi: Rohan Book Company.
8. Shaffer, D. R., 2009, Social and Personality Development (6th Edition). Belmont, CA: Wadswor.

SASC122 Livestock, Poultry and Fish Production Management 2 (1+1)

Objectives

1. To understand the principles of livestock, poultry, and fish production management
2. To learn about breeding, nutrition, health, and housing practices for optimizing animal productivity and welfare
3. To explore sustainable management strategies to improve efficiency, profitability, and environmental sustainability in animal production systems
4. To develop skills to address challenges related to disease prevention, feed efficiency, and market demands in livestock, poultry, and fish production

Theory

Role of livestock, poultry and fisheries in the national economy. Classification of breeds of cattle, buffalo, sheep, goat and poultry. Principles of housing system for different species of livestock and poultry. Classification of feeds and fodder for livestock and poultry. Preparation of

concentrate mixture. Conservation and enrichment of fodder. Signs of Estrus. Artificial insemination and its importance Feeding and management of calves, heifers, pregnant, milch animals and bullocks. Brooding management in poultry. Management of broilers, growers, layers and backyard birds. Management of sheep and goats. Prevention and control of important diseases of livestock and poultry. Marketing and economics of livestock and poultry. Introduction to fish and fisheries in India. Fisheries resources of India and importance of inland aquaculture. Important cultivable fishes and their production

Practical

Introduction to University Livestock Farms and Common Terminologies of Animal Sciences. Study of external body parts of livestock. Study of different breeds of Indian and Exotic Livestock. Study of housing for Livestock. Estimation of age of animals. Methods of identification of animals. Judging and culling of animals and poultry. Physical and chemical properties of milk, Clean milk production. Estimation of specific gravity of milk. Estimation of fat of milk. Estimation of total solids and SNF of milk. Detection of milk adulterants and Preservatives. Egg structure, chemical composition and grading. Study of common feeds and fodder. Conservation of Fodder and computation of ration for livestock. Common equipment used in livestock farms. Economics of Livestock Units. Visit to aquaculture and seed production fish ponds.

Suggested Readings

1. Banarjee, D.C., Textbook of Animal Husbandry.
2. Felix, S., T.V. Anna Mercy and S.K. Sawain, Ornamental Aquaculture Technology and Trade in India.
3. Handbook of Animal Husbandry, ICAR.
4. Jadhav, N.V. and M.F. Siddiqui, Handbook of Poultry Production and Management.
5. Jagadish, Prasad, Animal Husbandry and Dairy Science.
6. Jagadish, Prasad, Principles and Practices of Dairy Farm Management.
7. Jagadish, Prasad, Sheep, Goat and Swine Production.
8. Jagadish, Prasad, Poultry and Rabbit Production.
9. Shreenivashaiah, P.V., Scientific Poultry Production.
10. Sastry, N.S.R. and C.K., Thomas, Livestock Production Management.
11. Satiyadas, R., Narayankumar, R., and Aswathy, N., Marine Fish Marketing in India.
12. Srivastava, U.K., Inland Fish Marketing in India.
13. Sukumar, De, Outline of Dairy Technology

SECM121 SEC-III: Seed Production and Seed Testing 2 (0+2)

Objectives

1. To understand the principles and techniques of seed production for various crops
2. To learn about seed testing methods to ensure seed quality and viability
3. To explore the regulations and standards governing seed production and testing
4. To develop skills to manage seed production processes effectively, from planting to harvesting and testing, to ensure the availability of high-quality seeds for farmers

Practical

Book keeping of records and accounts of Seed Production. Assessment of market demand and selection of varieties/ hybrids including their parents of the chosen crops grown in the region. Acquaintance of seed classes, seed sources, labels, purchase norms, field and seed standards, quality tests required under certification scheme. Planning and layout of seed production plot under field conditions. Application and amplication of land and isolation requirements as per certification standards. Preparation of land and application of manures and fertilizers, etc. Preparation and raising of nursery beds/seedling raising in polythene bags, etc. Acquaintance of different methods of sowing / transplanting - use of pre-sowing seed treatments-growth regulators/chemicals / rhizobium /other microbial inoculants, etc. Application of planting ratios and border rows and marking of parental rows, Block method of planting in hybrid seed production plot. Application of staggered sowings and manipulation of fertilizers/ growth regulators/micronutrients, etc. on synchrony of parental flowering in hybrid seed production. Application of cultural and nutrient managements for control of physiological shredding of floral buds/fruits/ pods, etc. Timely management of after care operations at various growth stages. Diagnostic identification and management of pest and disease attacks at various growth stages. Diagnostic identification and characterization of A, B, R lines in hybrids of different crops viz. sorghum / sunflower / bajra / red gram / okra / chilli, etc. and their maintenance. Carrying out detasseling operation in maize hybrid seed production. Carrying out hand emasculation and hand pollination operations in hybrid seed production of cotton /tomato /brinjal /chilli /okra, etc. Application of supplementary pollination methods at flowering time to enhance hybrid seed setting and yield, Provision of honey bee colonies, etc. in sunflower, etc.-Observations on seed setting on female parental line. Acquaintance and application of roguing index based on diagnostic morphological characters at pre- and post-harvest stages. Acquaintance of different methods of conducting field inspections by taking field counts to conform to prescribed field standards at different growth stages. Acquaintance of manual apical bud pinching in okra - nipping of vegetative branches of female plants after crossing period in cotton, etc. Determination of physiological maturity and application of different methods of harvesting/ picking in varietal and hybrid seed production. Acquaintance of manual method of sorting and grading in cobs /pods /fruits, etc as per minimum certification standards and procedures. Acquaintance of different methods of shelling /seed ginning / seed extraction and recovery, etc. Management of different methods of threshing/ drying/ processing/ treating/ packaging/ labeling/ sealing/ storing, etc., as per minimum certification standards and procedures. Acquaintance of working designs of threshers, cleaners, driers, processing and packaging machineries, etc. Management of storage pests by different seed treatment methods – fungicides/ insecticides/ botanicals, etc.

Management of seed store sanitation. Visit to farmer's seed production plots undertaken by NSC /KSSC / Private Sector Seed Companies/ UAS Seed Unit, etc. Visit to UAS Seed plots /ARS Farms / Crop schemes/ Poly houses/ High tech Hort., etc. Visit to GOT farms of KSSC /KSSCA/ Seed Unit, etc. Visit to NSC /KSSC/KSSCA/ Seed Dealer, etc. Visit to Seed Processing Units/ Seed Testing Laboratory /Seed ware houses/ Cold storage units, etc.

Estimation of cost and returns/ Economics of Seed Production /cost benefit ratio. Estimation of Investment Capital requirements and operational costs. Preparation of Balance Sheet Income and Cash flow statements. Market Survey for estimation of demand and sources of supply. Identification of market channels and the estimation marketing costs and margins. Report writing and submission, Examination.

Suggested Readings

1. Agarwal, P.K. and M. Dadlani, 1987, Techniques in Seed Science and Technology, South Asian Publishers, New Delhi.
2. Agrawal, R.L., 1996, Seed Technology, Oxford and IBH Publicity Company, New Delhi.
3. Agarwal, V.K., 2003, Seed Health, International Book Distributing Co.
4. Bhale, M.S., 2013, A handbook of Seed Certification, Vardhman Books and Periodicals.
5. Joshi, A.K. and Singh, B.D., 2003, Seed Science and Technology, Kalyani Publishers, Ludhiana.
6. Khare, D.P., 1994, Stored Grain Pests and their Management, Kalyani Publishers, Ludhiana.
7. Kulkarni, G.N., 2002, Principles of Seed Technology, Kalyani Publishers, Ludhiana.
8. Nema, N.P., 1986, Principles of Seed Certification and Seed Testing, Allied Publishers Private limited, New Delhi.
9. Paul Neergaard, 1977, Seed Pathology, Vol.-I and II, McMillan Press, London.
10. Sen Subip and Ghosh Nabinanda, 2002, Seed Science and Technology, Kalyani Publishers, Ludhiana.
11. Singhal, N.C., 2002, Hybrid Seed Production, Kalyani Publishers, Ludhiana.
12. Tunwar, N.S., and Singh, S.V., 1988, Indian Minimum Seed Certification Standards. Central Seed Certification Board, New Delhi.

SECM122 SEC-IV: Livestock Production and Management 2 (0+2)

Objectives

1. To understand the principles of livestock production, including breeding, nutrition, and health management.
2. To learn about efficient management practices to optimize animal welfare, productivity, and profitability.
3. To explore sustainable livestock production systems to minimize environmental impact and ensure long-term viability.
4. To develop skills to address challenges such as disease control, feed management and breeding strategies in livestock farming.

Practical

Orientation. Maintenance of 10 dairy animals (5 cattle and 5 buffaloes). Routine management practices such as cleaning, grooming, colostrum feeding, deworming, vaccination schedule, dehorning/disbudding; methods of identification; dentition; selection and culling of livestock; Record maintenance; assisting during calving; care of pregnant animals. Clean Milk Production: Milking, Different milking methods, Machine milking, Milk packaging. Feeding management; Feeding of calves, heifers, lactating dairy cows and buffaloes, and bulls. Preparation of concentrate mixture, maintenance of equipment required for feed mixing; Feed ingredients; Fodder production: Preserving fodder: Silage preparation: Dry fodder enrichment; Azolla Production; Hydroponics; Feed additives. Use of different farm equipment and their maintenance, e.g., Chaff Cutter, milking machine. Identification of animals in heat and presenting for artificial insemination. Farm waste Management; composting; vermicomposting; biogas production. Sheep and Goat Rearing. Routine management practices for rearing of sheep and goat: cleaning of sheds, watering, feeding, preparation of feed supplements, Deworming, monitoring growth by measurements of regular body parts and weights. Laboratory analysis of milk for quality, feed and fodder samples. Economics of dairy and Sheep/goat farming. Maintaining the register for income and expenditure on the animals allotted to work out the economics. Health Management of Livestock; First Aid.

Suggested Readings

1. Banarjee, D.C., Textbook of Animal Husbandry. Kalyani Publishers, New Delhi.
2. De, Sukumar, Outline of Dairy Technology. Kalyani Publishers, New Delhi.
3. ICAR. Handbook of Animal Husbandry. ICAR.
4. Jadhav N.V. and Siddiqui M.F. Handbook of Poultry Production and Management. Kalyani Publishers, New Delhi.
5. Prasad Jagadish, Animal Husbandry and Dairy Science. Kalyani Publishers, New Delhi.
6. Prasad Jagadish, Poultry and Rabbit Production. Kalyani Publishers, New Delhi.
7. Prasad Jagadish, Sheep, Goat and Swine Production. Kalyani Publishers, New Delhi.
8. Prasad, Jagadish, Principles and Practices of Dairy Farm Management. Kalyani Publishers, New Delhi.
9. Sastry, N.S.R. and Thomas, C.K., Livestock Production Management. Kalyani Publishers, New Delhi.
10. Shreenivashaiah P.V., Scientific Poultry Production. IBH.

SFES121 Environmental Studies and Disaster Management 3 (2+1)

Objective

To expose and acquire knowledge on the environment and to gain the state-of-the-art-skill and expertise on management of disasters.

Theory

Introduction to environment; environmental studies. Definition, scope and importance, multidisciplinary nature of environmental studies. Segments of environment, spheres of earth; lithosphere, hydrosphere, atmosphere. Different layers of atmosphere. Natural resources; classification. Forest resources. Water resources. Mineral resources. Food resources. Energy resources. Land resources. Soil resources. Ecosystems. Concept of an ecosystem; structure and function of an ecosystem. Energy flow in the ecosystem. Types of ecosystems. Biodiversity and its conservation: Introduction, definition, types. Biogeographical classification of India. Importance and value of biodiversity. Biodiversity hot spots. Threats and conservation of biodiversity.

Environmental pollution. Definition, cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, light pollution. Solid waste management; classification of solid wastes and management methods, composting, incineration, pyrolysis, biogas production, causes, effects and control measures of urban and industrial wastes. Social issues and the environment. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics; issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environment protection act. Air (prevention and control of pollution) act. Water (prevention and control of pollution) act. Wildlife Protection Act. Forest Conservation act. Human population and the environment; environment and human health. Human rights, value education. Women and child welfare. Role of information technology in environment and human health.

Disaster management; disaster definition, types, natural disasters, floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, heat and cold waves. Man-made disasters, nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, road accidents, rail accidents, air accidents, sea accidents. International and national strategy for disaster reduction. Concept of disaster management, national disaster management framework, financial arrangements, role of NGOs, community-based organizations and media in disaster management. Central, state, district and local administration in disaster control. Armed

forces in disaster response. Police and other organizations in disaster management.

Practical

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

Suggested Readings

1. De A.K., 2010. Environmental chemistry. Published by New Age International Publishers, New Delhi. ISBN:13–978 81 224 2617 5. 384 pp
2. Dhar Chakrabarti P.G., 2011. Disaster management - India's Risk Management Policy Frameworks and Key Challenges. Published by Centre for Social Markets (India), Bengaluru. 36 pp.
3. Erach Bharucha. Textbook for Environmental Studies. University Grants Commission, New Delhi.
4. Parthiban K.T., Vennila S., Prasanthrajan M., Umesh Kanna S. 2003. Forest, Environment, Biodiversity and Sustainable Development. Narendra Publishing House, New Delhi (In Press).
5. Prasanthrajan M, P.P. Mahendran., 2008. A textbook on Ecology and Environmental Science. Agrotech Publishing Academy, Udaipur. ISBN 81-8321-104-6. First Edition: 2008.
6. Prasanthrajan M, 2018. Objective Environmental Studies and Disaster Management. Scientific Publishers, Jodhpur, India. ISBN 9789387893825. Pp. 146.
7. Sharma, P.D. 2009. Ecology and Environment. Rastogi Publications, Meerut, India.
8. Tyler Miller and Scot Spoolman. 2009. Living in the Environment (Concepts, Connections, and Solutions). Brooks/cole, Cengage Learning Publication, Belmont, USA.

SGPB122 **Introduction to Genetics and Plant Breeding** **2 (1+1)**

Objectives

1. To understand the principles of genetics and their application in plant breeding
2. To learn about breeding techniques used to improve crop traits such as yield, disease resistance, and quality
3. To explore the importance of genetic diversity and its role in crop improvement and adaptation to changing environments
4. To develop skills to evaluate and select superior plant genotypes for breeding programs aimed at enhancing agricultural productivity and sustainability

Theory

History of Genetics and Plant Breeding, Study of Chromosome- Structure, functions, cell division. Mendel's laws of inheritance, Mode of inheritance- monogenic, polygenic, cytoplasmic. Modes of reproduction in plants: sexual and asexual, differences between self- and

cross-pollinated crops. Male sterility and their significance in plant breeding. Breeding for self-pollinated (Mass, pure line, pedigree and bulk methods), cross-pollinated (Ear to row, Backcross, Development of synthetics, composites and hybrids), vegetatively propagated crops (Clonal selection).

Practical

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

Suggested Readings

1. An Introduction to Genetic Analysis by Suzuki *et al.*
2. Breeding Field Crops by JM Poehlman.
3. Genetics by Strickberger.
4. Plant Breeding: Principles and Practices by JR Sharma.
5. Principles of Plant Breeding (1st and 2nd Edition) by RW Allard.

SKAN121 **Kannada** **1 (0+1)**

ಅ. ಒಂದು ಖಾಸಗಿ ಪತ್ರ – ವಿನಯಾ ಒಕ್ಕುಂದ
ಆ. ತಿಳಿದವರೇ ಹೇಳಿ – ವೈದೇಹಿ
ಎ. ನಾಡು ನುಡಿ ಕಲ್ಪನೆ
ಅ. ಶಿಲಾಭೇರಿ – ಕುವೆಂಪು
ಆ. ಕನ್ನಡಾಭಿಮಾನದ ತಾತ್ವಿಕತೆ – ಬರಗೂರು ರಾಮಚಂದ್ರಪ್ಪ
ಇ. ಕನ್ನಡಗಳು ನಮಗಿರುವ ಆಯ್ಕೆಗಳೇನು – ಕೆ.ವಿ.ನಾರಾಯಣ
ಸಿ. ಕನ್ನಡ ಕೃಷಿ ಸಾಹಿತ್ಯ
ಅ. ಆಧುನಿಕಪೂರ್ವ ಕನ್ನಡ ಕೃಷಿಶಾಸ್ತ್ರ ಸಾಹಿತ್ಯ – ಜಿ. ವೀರಭದ್ರಗೌಡ
ಆ. ಕನ್ನಡದಲ್ಲಿ ಕೃಷಿ ವಿಜ್ಞಾನ ಸಾಹಿತ್ಯ ಪರಿಚಯ – ಜೆ. ಬಾಲಕೃಷ್ಣ
ಳ. ಭಾಷಾ ಕೌಶಲ 1. ಸೂಚಿತ ವಿಷಯ ಕುರಿತು ಮೌಖಿಕ ಮಂಡಣೆ. 2. ಆಯು ಪತ್ಯವನ್ನು ರಾಗಾತ್ಮಕ ಅಂಶಗಳನ್ನು ಆಧರಿಸಿ ವಾಚಿಸುವುದು. 3. ಕಛೇರಿ ಪತ್ರಗಳ ಬರಹ 4. ಕಾರ್ಯಕ್ರಮದ ವರದಿ ತಯಾರಿಕೆ. 3, ಅನುವಾದ

SKAN122 **Kannada** **1 (0+1)**

Development of listening and speaking skills with Kannada structure pattern - Conversation between a Doctor and a Patient; About Children's Education; Halebid-Belur; Discussing about Examination and Future Plan.

Development of writing and reading skills with Kannada structure pattern : Translation of simple sentences English into Kannada, Selected lesson for reading (Nada Geete, Kannada Habbagalu, Prekshaniya Sthalagalu, Kannada Kavi, Kannada Vijnani)

SNCC121 **National Cadet Corps (NCC-II)** **1 (0+1)**

- Nation Building- cultural heritage, religions, traditions, and customs of India. National integration. Values and ethics, perception, communication, motivation, decision making,

discipline and duties of good citizens. Leadership traits, types of leadership. Character/ personality development. Civil defense organization, types of emergencies, firefighting, protection. Maintenance of essential services, disaster management, aid during development projects.

- Social Service and Community Activities
- Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning.
- Structure and function of human body, diet and exercise, hygiene and sanitation. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health. Adventure activities. Basic principles of ecology, environmental conservation, pollution and its control.

SNSS 121 National Service Scheme (NSS-II) 1 (0+1)

- Importance and role of youth leadership: Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership
- Life competencies: Definition and importance of life competencies, problem-solving and decision-making, inter personal communication
- Youth development programmes: Development of youth programmes and policy at the national level, state level and voluntary sector; youth-focused and youth-led organisations Health, hygiene and sanitation:
- Definition needs and scope of health education; role of food, nutrition, safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programmes and reproductive health. Youth health, lifestyle, HIV AIDS and first aid: Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid Youth and yoga:
- History, philosophy, concept, myths and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method.

SSST121 Principles and Practices of Seed Science and Technology 2 (1+1)

Objectives

1. To understand the principles of seed science, including seed development, physiology, and quality
2. To learn about seed processing, storage, and testing techniques used to maintain seed viability and vigour
3. To explore the role of seed technology in ensuring the availability of high-quality seeds for sustainable crop production
4. To develop skills to manage seed resources effectively, ensuring the successful establishment and productivity of crops

Theory

Introduction: Importance of improved seed in Indian Agriculture, quality seeds and its characteristics. History: Development of seed industry in India. Seed Program: Types of seed program, development of seed program, basic strategy for organizing seed production, different classes of seeds, generation system of seed multiplication, seed replacement rate (SRR), varietal replacement rate (VRR), agencies involved in seed program. Principles of seed production: Factors affecting genetic purity and varietal deterioration, methods / safeguards to

maintain genetic purity during seed production, study of improved production practices for higher seed yield and quality. Economic principles: Study of SMR, importance of SMR, SMR in different crops. Hybrid seed production: Requirements of hybrid seed production, methods of hybrid seed production and types of hybrids. Varietal and hybrid seed production (Foundation and Certified seed classes) in maize, rice, sorghum, bajra, sunflower, red gram, cotton, castor, chilli, tomato and okra. Varietal seed production in wheat, soybean, chickpea, black gram. Seed processing and packaging: Seed processing-its importance and methods seed packaging and seed branding. Seed testing: Seed testing procedures in different crops, minimum seed standards for certification. Seed storage, different types of storage conditions. Seed legislation: Seeds Act 1966, Seed Rules 1968, Seed (Control) order 1983, New policy on seed development 1988, PPVFRA 2001, Seeds Bill 2004, OECD Seed certification and its importance. Seed marketing: Seed demand forecasting, factor affecting seed marketing, seed supply systems, sale promotional activities for seed marketing, seed marketing organizational structures. International seed trade, developing seed entrepreneurship. Importance of account keeping in seed business. Cost estimation and pricing of seed.

Practical

Identification of seeds of field and horticultural crops, study of seed structure in monocot and dicot seeds. Study of floral biology of important self, cross and often cross pollinated agriculture and horticulture crops. Working of SRR, VRR and SMR Types of isolation, determination of isolation distance, requirements, study of isolation requirements in different crops for foundation and certified seeds. Study of hand emasculation, hand pollination and detasseling techniques. Study of distinguishing morphological characters in varieties and parents of hybrids. Study of synchronization

Suggested readings

1. Agarwal, P.K. and M., Dadlani, 1987, Techniques in Seed Science and Technology. South Asian Publishers, New Delhi.
2. Agarwal, V.K., 2003, Seed Health. International Book Distributing Co.
3. Agrawal, R.L., 1996, Seed Technology. Oxford and IBH Publicity Company, New Delhi.
4. Bhale, M.S., 2013, A Handbook of Seed Certification. Vardhman Books and Periodicals.
5. Joshi, A.K. and Singh, B.D., 2003. Seed Science and Technology. Kalyani Publishers. Ludhiana.
6. Khare, D.P., 1994. Stored Grain Pests and their Management. Kalyani Publishers. Ludhiana.
7. Kulkarni, G.N., 2002, Principles of Seed Technology. Kalyani Publishers. Ludhiana.
8. Nema, N.P., 1986, Principles of Seed Certification and Seed Testing. Pub. Allied Publishers Private limited, New Delhi.
9. Paul, Neergaard, 1977, Seed Pathology, Vol. - I and II. McMillan Press, London.
10. Sen, Subip and Ghosh, Nabinanda, 2002. Seed Science and Technology. Kalyani Publishers. Ludhiana.
11. Singhal, N.C., 2002. Hybrid Seed Production. Kalyani Publishers, Ludhiana.
12. Tunwar, N.S. and Singh, S.V., 1988. Indian Minimum Seed Certification Standards. Central Seed Certification Board, New Delhi.

II Year I Semester

SABM211 **Food Business Management** **2 (2+0)**

Objectives

1. Understand the principles of food business management, including production, distribution, and marketing
2. Learn about food safety regulations, quality control, and supply chain management
3. Explore strategies for developing and launching food products, managing operations, and meeting consumer demands
4. Develop skills to analyze market trends, develop business plans, and manage resources effectively in the food industry

Theory

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

Suggested Reading

1. Mahtab. S, (1996) Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
2. Srilakshmi. B, (2006) Food Science, New Age International (Ltd) Publishers, New Delhi.
3. Srilakshmi. B, (2007) Nutrition Science, New Age International (Ltd) Publishers, New Delhi.
4. Swaminathan. M, (1997) An advanced textbook on Food and Nutrition, Volume I, The Bengaluru Printing and Publishing Co. Ltd., Bengaluru.
5. Swaminathan. M, (1997) An advanced textbook on Food and Nutrition, Volume II, The Bengaluru Printing and Publishing Co. Ltd., Bengaluru.

SABM212 **Value Chain and Retail Management in Agribusiness** **2 (1+1)**

Objectives

1. Understand the dynamics of value chains in agribusiness, from production to retail
2. Learn about supply chain management, distribution, and logistics in agricultural products
3. Explore retail management strategies, including branding, marketing, and customer relationship management
4. Develop skills to optimize value chain efficiency, reduce costs, and meet consumer preferences in agribusiness retail

Theory

Meaning of value and value chain. Concept of value chain. Difference between supply chain and value chain. Components of value chain. Value chain governance. Value chain methodology. Economics of value chain. Financing of agricultural chain. Market linkages in value chain. Mapping of value chain. Potters value chain. Introduction to Retail Management. Retailing in India. Types of retailers. Retail formats. Online and offiine retailing. Organised and unorganized retailing. Retail location and layout. Retail strategies. Store management. Merchandise and inventory management. Retail marketing mix, role of IT in retail management. E-tailing.

Practical

Presentation and Discussion on above topics. Visit to retail formats. Visits to processing units. Visit to logistics, godowns, warehouses etc.

Suggested Readings

1. Retail Supply Chain Management: Quantitative Models and Empirical Studies (International Series in Operations Research and Management Science, 122). Softcover reprint of hardcover 1st ed. 2009 Edition by Narendra Agrawal (Editor), Stephen A. Smith (Editor).
2. Retail Supply Chain Management. Hardcover – 5 October 2017. James B. Ayers (Author) and Mary Ann Odegaard (Author).
3. The Retail Value Chain: How to Gain Competitive Advantage through Efficient Consumer Response (ECR) Strategies. Sami Finne, Hanna Sivonen. Kogan Page Publishers, 03-Dec-2008 - Business and Economics - 384 pages

SABM213 Introduction to Accountancy 3 (2+1)

Objectives

1. Understand the basic principles and concepts of accounting
2. Learn the fundamentals of financial statements preparation and analysis
3. Explore the role of accounting in business decision-making and financial management
4. Develop skills to record, classify, and interpret financial transactions accurately and effectively

Theory

Introduction to accountancy: Meaning and importance of accounting. Meaning and definition of book keeping. Accountancy objectives of book keeping: branches of accounting. Accounting cycle. Generally Accepted Accounting Principles (GAAP)-concepts and conventions. System of book keeping: Single entry and Double entry system of keeping, Classification of accounts. Golden rules of accounting; Books of accounts: Journal and Ledger –journalizing, ledger posting, and preparation of ledger accounts. Subsidiary books-Kinds of subsidiary books-Day books: purchase book, sales book, returns book, Bill books, journal proper, Cash books - nature and objectives of cash book, types of cash book, petty cash book; Bank reconciliation statement; Preparation of Trial balance- Methods of trial balance; Final accounts - Trading account, Profit and loss account and Balance sheet; Single entry system of accounts - preparation of statement of affairs, profit or loss statement, advantages and disadvantages. Non-trading organizations. Preparation of accounts relating to non-trading organization. Concepts of revenue and capital expenditure and income, Receipts and payment account, Income and expenditure account, and Balance sheet.

Practical

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

Suggested Readings

1. Jain, S.P., Advanced Accountancy.
2. Kadakol, M.B., Accountancy for PUC-I and II.
3. Raman, B.S., Accountancy.

SAEG211 Protected Cultivation and Secondary Agriculture 2 (1+1)

Objectives

1. Understand the principles and techniques of protected cultivation, such as greenhouse and polyhouse farming
2. Learn about secondary agriculture practices like value addition, processing, and post-harvest management
3. Explore methods to optimize production, quality, and profitability in controlled environments
4. Develop skills to integrate protected cultivation and secondary agriculture techniques to enhance yield, quality, and market value of agricultural products

Theory

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

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

Practical

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of greenhouse equipments. Visit to various Post-Harvest Laboratories. Determination of Moisture content of various grains by oven drying and infrared moisture methods. Determination of engineering properties (shape and size, bulk density

and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

Suggested Readings

1. Green house technology - Aruprathan Ghosh, Kalyani Publishers, New Delhi.
2. Green House Technology and Management - K. Radha Manohar and C. Igathinathane, BS Publications, Gujarathi Galli, Sultan Bazar, Koti, Hyderabad, A.P.
3. Greenhouse Management for Horticultural Crops - S. Prasad and U. Kumar, Agrobios, Agro house, Jodhpur.
4. Principles and Practices of PostHarvest Technology - P. H. Pandey, Kalyani Publishing, Ludhiana.
5. Unit Operations of Agricultural Processing - K. M. Sahay and K.K. Singh, Vikas Publishing House Pvt Limited, New Delhi.

SECM211 SEC-V: Poultry Production Technology 2 (0+2)

Objectives

1. Understand the principles of poultry production, including breed selection, nutrition, and housing
2. Learn about disease prevention, biosecurity measures, and vaccination protocols in poultry farming
3. Explore efficient management practices to optimize growth, egg production, and overall flock health
4. Develop skills to address challenges such as market fluctuations, welfare concerns, and environmental sustainability in poultry production

Practical

Orientation. Rearing of backyard poultry chicks (local and Improved e.g., Giriraja). Setting and management of broiler poultry farm. Management of poultry for egg production (layers). Brooding and Management of Chicks; Setting up of brooder house, handling of chicks, vaccination. Feeding and Watering and lighting management. Management of Poultry birds; light management, vaccination, debeaking, feeding and watering. Egg collection and storage. Quality egg production. Factors affecting egg quality. Assessment of egg quality. Preparation of poultry feed. Factors affecting feed quality. Storage of feed ingredients. Record Maintenance. Management of farm equipment. Farm waste management; composting; vermicomposting; biogas production Economic analysis of poultry production. Maintaining the register for income and expenditure on the animals allotted to work out the economics. First Aid and flock health management.

Suggested Readings

1. Forrest, J.C., Aberle E.D., Harlod B.H., Max D.J., Robert A.M. (1975). Principles of Meat Science, W.H. Freeman and Company, San Francisco.
2. Sharma B.D. (2005). Meat and Meat Production Technology (including poultry production technology). Jaypee Brothers Medical Publishers (Pvt.) Ltd., New Delhi.

SHRT211 **General Horticulture** **2 (1+1)**

Objectives

1. Understand the basic principles of horticulture, including plant biology, propagation, and cultivation
2. Learn about the cultivation techniques and management practices for various horticultural crops
3. Explore the importance of pest and disease management, as well as environmental factors affecting horticultural production
4. Develop skills to apply horticultural knowledge in the production of fruits, vegetables, ornamental plants, and herbs for both commercial and personal use

Theory

Horticulture- Definition, branches, importance and scope. Methods of plant propagation - sexual and asexual. General principles and practices of cultivation of important fruits-mango, banana, citrus, grape, guava, sapota. Importance of vegetables, kitchen garden, etc. General principles and practices involved in cultivation of important vegetables solanaceous crops, cole crops, cucurbits, peas and beans. Importance of floriculture and different components of ornamental garden and cultivation of important flower crops. Medicinal and aromatic plants: active principle, medicinal properties and aromatic principles.

Practical

Visit to orchards and gardens; Plant propagation methods; Study of varieties, cultural practices, plant protection of important fruits; Study of varieties, cultural practices, plant protection of important vegetables; Study of culture of medicinal plants; Study of culture of aromatic plants; Study of different components of ornamental garden - annuals, shrubs, trees, climbers, hedges and edges; Study of culture of flower crops.

Suggested Readings

1. ICAR. 2002. Handbook of Horticulture. ICAR.
2. Peter KV. 2008. (Ed.) Basics of Horticulture. New India Publ. Agency.
3. Pradeepkumar T, Suma B, Jyothibhaskar and Satheesan KN. 2008. Management of Horticultural Crops. New India Publ. Agency.
4. Rajan S and Baby LM. 2007. Propagation of Horticultural Crops. New India Publ. Agency.

SMDC212 **Agricultural Marketing and Trade** **3 (2+1)**

Objectives

1. To understand the fundamentals of agricultural marketing and trade
2. To analyze the factors influencing supply and demand in agricultural markets
3. To explore different marketing channels and strategies in agriculture
4. To examine the role of government policies and regulations in agricultural markets

Theory

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri

commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits and demerits; marketing process and functions: Marketing process concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- NAFED, TRIFED, NCDC, APEDA, CWC, SWC, FCI, CACP, DMI, Commodity Corporations and Boards – their objectives and functions; cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation and hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR. Role of government in agricultural marketing. Role of APMC and its relevance in the present day context.

Practical

Plotting and study of demand and supply curves and calculation of elasticities; Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning; Application of principles of comparative advantage of international trade.

Suggested Readings

1. Acharya, S.S. and Agarwal, N.L., 2006, Agricultural Marketing in India, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Chinna, S.S., 2005, Agricultural Economics and Indian Agriculture. Kalyani Publishers, New Delhi.
3. Dominic Salvatore, Micro Economic Theory.
4. Kohls Richard, L. and Uhl Josheph, N., 2002, Marketing of Agricultural Products, Prentice-Hall of India Private Ltd., New Delhi.
5. Kotler and Armstrong, 2005, Principles of Marketing, Pearson Prentice-Hall.
6. Lekhi, R.K. and Jogindr Singh, 2006, Agricultural Economics. Kalyani Publishers, Delhi.
7. Memoria, C.B., Joshi, R.L. and Mulla, N.I., 2003, Principles and Practice of Marketing in India, Kitab Mahal, New Delhi.
8. Pandey Mukesh and Tewari, Deepali, 2004, Rural and Agricultural Marketing, International Book Distributing Co. Ltd, New Delhi.
9. Sharma, R., 2005, Export Management, Laxmi Narain Agarwal, Agra

SNCC211 **National Cadet Corps (NCC-III)** **1 (0+1)**

- Arms Drill-Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms. Shoulder from the order and vice-versa, present from the order and vice-versa. Saluting at the shoulder at the halt and on the march. Short/ long trail from the order and vice- versa. Guard mounting, guard of honor, Platoon/Coy Drill.
- Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning, and sight setting. Loading, cocking, and unloading. The lying position and holding.
- Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing. Characteristics of Carbine and LMG.

SNSS 211 **National Service Scheme (NSS-III)** **1 (0+1)**

- Vocational skill development: To enhance the employment potential and to set up small business enterprises skills of volunteers, a list of 12 to 15 vocational skills will be drawn up based on the local conditions and opportunities.
- Each volunteer will have the option to select two skill- areas out of this list.
- Issues related environment: Environmental conservation, enrichment and sustainability, climatic change, natural resource management (rain water harvesting, energy conservation, forestation, waste land development and soil conservations) and waste management.
- Disaster management: Introduction and classification of disaster, rehabilitation and management after disaster; role of NSS volunteers in disaster management.
- Entrepreneurship development: Definition, meaning and quality of entrepreneur; steps in opening of an enterprise and role of financial and support service institution. Formulation of production oriented project:
- Planning implementation, management and impact assessment of project Documentation and data reporting: Collection and analysis of data, documentation and dissemination of project reports.

SPED211 **Physical Education, First Aid, Yoga Practice & Meditation** **2 (0+2)**

Objectives

1. To make the students aware about Physical Education, First Aid and Yoga Practices
2. To disseminate the knowledge and skill how to perform physical training, perform first aid and increase stamina and general wellbeing through yoga

Practical

Physical education. Training and Coaching, meaning and concept. Methods of training; aerobic and aerobic exercises. Calisthenics, weight training, circuit training, interval training, Fartlek training. Effects of exercise on muscular, respiratory, circulatory and digestive systems. Balanced diet and nutrition; effects of diet on performance. Physiological changes due to ageing and role of regular exercise on ageing process. Personality, its dimensions and types. Role of sports in personality development. Motivation and achievements in sports. Learning and theories of learning. Adolescent problems and its management. Posture, postural deformities. Exercises for good posture.

Yoga; history of yoga, types of yoga, introduction to yoga. Asanas, definition and importance, Padmasan, Gaumukhasan, Bhadrasan, Vajrajasan, Shashankasan, Pashchimotasan, Ushtrasan, Tadasan, Padhastasan, Ardhchandrasan, Bhujangasan, Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan – left leg-right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhdhanurasan, Sawasan. Suryanamaskar, Pranayama (Definition and Importance), Omkar, Suryabhedan, Chandrabhedan, Anulom Vilom, Shitali, Shitkari, Bhastrika, Bhramari. Meditation, definition and importance, Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh. Mudras, definition and importance, Gyanmudra, Dhyanmudra, Vayumudra, Akashmudra, Pruthvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra. Role of yoga in sports. Teaching of asanas, demonstration, practice, correction and practice.

History of sports and ancient games. Governance of sports in India. Important national sporting events. Awards in sports. History, latest rules, measurements of playfield, specifications of equipment, skill, technique, style and coaching of major games (Cricket, Football, Table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho) and Athletics.

Need and requirement of first aid. First aid equipment and upkeep. First aid techniques. First aid related with respiratory system. First aid related with heart, blood and circulation. First aid related with wounds and injuries. First aid related with bones, joints, muscle related injuries. First aid related with nervous system and unconsciousness. First aid related with gastrointestinal tract. First aid related with skin, burns. First aid related with poisoning. First aid related with bites and stings. First aid related with sense organs. Handling and transport of injured traumatized persons. Sports injuries and their treatments.

Suggested Readings

1. Anatomy of Hatha Yoga by David H. Coulter: This book delves into the anatomical aspects of yoga practice, helping students understand the physiological effects of various yoga poses and sequences.
2. Essentials of Athletic Injury Management by William E. Prentice: This textbook covers the basics of sports injuries, their prevention, assessment, and management, including first aid techniques.
3. First Aid, CPR, and AED by American Red Cross: This manual provides comprehensive guidance on first aid procedures, cardiopulmonary resuscitation (CPR), and automated external defibrillator (AED) use.
4. Physical Education for Lifelong Fitness: The Physical Best Teacher's Guide by SHAPE America - Society of Health and Physical Educators: This resource provides lesson plans, assessment tools, and strategies for teaching physical education with a focus on lifelong fitness.
5. Teaching Yoga: Essential Foundations and Techniques by Mark Stephens: For instructors, this book offers insights into teaching yoga effectively, including sequencing, cueing, and adjusting postures

SSAC212 **Soil and Water Management** **2 (1+1)**

Objectives

1. Understand the principles of soil and water management in agriculture
2. Develop skills to sustainably manage soil and water resources to enhance agricultural productivity and environmental sustainability

Theory

Concept of soil, meaning and definition; soil components and important soil physical (soil texture, structure density, porosity, soil water; soil air, soil temperature and soil colour) and chemical (pH, EC, CEC and base saturation) properties in brief, Organic matter, Land capability classification and suitability. Soils of India and respective state, Soil quality and soil health, Distribution of waste land/degraded lands and problem soils in India, problems associated and management of salt affected soils, calcareous soils, acid soils, acid sulphate soils, eroded and compacted soils, flooded/water logged soils, physically constrained soils, polluted soils. Alternate land use strategies for management of problematic soils including bioremediation/phytoremidation. Irrigation water- quality and standards, utilization of poor quality water in agriculture.

Practical

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

Suggested Readings

1. Brady Nyle C and Ray R Well, 2014. Nature and Properties of Soils. Pearson Education Inc., New Delhi.
2. Indian Society of Soil Science, 2002. Fundamentals of Soil Science. IARI, New Delhi.
3. Thiyageshwari, S., M.V. Sriramachandrasekharan and D. Selvi., 2015. Fundamentals of Soil Inventory, Problem Soils and Irrigation water. Jaya Publishing House, New Delhi (ISBN: 978- 9384337-438).

II Year II Semester

SABM221 **Business Laws and Ethics** **2 (2+0)**

Objectives

1. Understand the legal framework governing business operations and transactions
2. Learn about ethical principles and practices in business decision-making and conduct
3. Explore the implications of business laws and ethics on organizational behaviour, corporate governance, and social responsibility
4. Develop skills to navigate legal and ethical challenges, ensuring compliance and fostering trust in business relationships

Theory

Introduction to Indian legal system: Legislative Powers of the States and the Union. Scope and importance of Business laws. Contracts – meaning, significance, types and essentials of a valid contract. The Indian Contract Act-1872. The Indian Partnership Act, 1932 - General Nature, Registration of Partnership, Partnership Deed, Types of Partners, Rights and Duties of Partners. The Companies Act, 1956 and 2013 - General Nature, types of companies, incorporation of a Company, Memorandum of Association and Articles of Association, management of a company. Provisions of important Acts enacted over time related to business environment: Industries (Regulation and Development) Act, 1951; Income tax Act, 1961. Central Excise Act, 1944; Foreign Exchange Regulation Act (FERA), 1973; Foreign Exchange Management Act (FEMA), 1999; Monopolistic and Restrictive Trade Practices (MRTP), Act, 1969; Competition Act, 2002; Food safety and standards Act, 2006; Customs Act, 1962 and Goods and Service Tax, 2011. FDI Policy of GoI. Business Ethics - Nature and importance of ethics and moral standards. Scope of business ethics in business functional area. Governance mechanism. Companies Act Amendment 2023, OPC, FPC, Section 8.

Suggested Readings

1. Business Law and Ethics- Concepts, Methodologies, Tools, and Applications 2015. Editor: Information Resources Management Association.
2. Business Law and Ethics: Concepts, Methodologies, Tools, and Applications.
3. Business Law and Ethics: Concepts, Methodologies, Tools, and Applications. Volume 1. Business Science Reference, 2015.

SABM222 **International Trade and Policy in Agriculture** **2 (2+0)**

Objectives

1. Understand the principles and mechanisms of international trade in agricultural commodities
2. Learn about agricultural trade policies, agreements, and their impacts on global markets
3. Explore strategies for market access, trade negotiations, and resolving trade disputes in agriculture
4. Develop skills to analyze international trade trends, assess market opportunities, and navigate regulatory frameworks to facilitate agricultural exports and imports

Theory

International Trade - meaning, definition, nature and scope. Salient features of international trade, differences between internal trade and international trade, advantages and disadvantages of international trade.

Theories of international trade - mercantilism, theory of absolute cost advantage, theory of comparative cost advantage and modern theory of international trade. Terms of trade - meaning and types. Free trade - meaning, advantages and disadvantages, free trade agreements.

Protectionism - meaning, advantages and disadvantages of protectionism, types of protection- tariffs, quotas, subsidies, dumping, cartels and commodity agreements. Balance of Trade (BoT) and Balance of Payments (BoP) - meaning, differences between BoT and BoP, India's BoT and BoP position. Foreign exchange – meaning, foreign exchange rate, types of foreign exchange rate, mechanisms of determining foreign exchange rate. Foreign exchange market – meaning and functions, instruments of international payments, foreign exchange control and foreign exchange reserves.

WTO – origin, structure, objectives and functions. Agreement on Agriculture - domestic support, market access and export subsidies. FAO / WHO Codex Alimentarious and SPS measures.

Export procedures and documentations, types of export - direct export and indirect export, export houses – objectives and types. Agricultural export promotion organizations - APEDA, MPEDA, Commodity Boards and State Export Promoting Agencies. India's agricultural exports and imports – composition and trading countries. India's foreign trade policy – meaning and objectives.

Suggested Readings

1. Ajami, Riad A. - International Business- Theory and Practices.
2. Cherunilam and Dominick Salvatore - International Economics.
3. Cherunilam, Prancis - International Trade and Export Management.
4. Haberler, G. - Theory of International Trade.
5. Jain, Arun Kumar - International Business.
6. Jhingan, M.L. - International Economics.
7. Justin Paul - International Business.
8. Mithani, D.M. - Money, Banking, International Trade and Public Finance.
9. Tappa, Ashwa - International Business.
10. Vaish, M.C. and Singh, Sudham– International Economics.
11. Venkateshwaran, N. - International Business Management.

SABM223 Agricultural Marketing Regulations 3 (2+1)

Objectives

1. Understand the regulatory framework governing agricultural marketing at local, national, and international levels
2. Learn about marketing laws, policies, and regulations affecting the sale and distribution of agricultural products

3. Explore the role of government agencies and industry organizations in enforcing marketing regulations and ensuring fair trade practices
4. Develop skills to navigate compliance requirements, understand market access regulations, and mitigate legal risks in agricultural marketing activities

Theory

Evolution of market legislation. Need and scope for market legislation. Review of Agricultural Produce Market Acts in India and Karnataka. Distribution of legislative powers between parliament and state assemblies. Salient features of essential commodities Act-Food Safety and Standards Act 2006, Consumer Protection Bill 2019, Patent Act 2002, Monopolies and Restrictive Trade Practices Act/ Competition Act 2002, Forward Markets Act 1952, Standards of Weights and Measures Act 1976, The Central Warehousing Corporation Act. Provisions of Karnataka Agricultural Marketing (Development Regulation) Act 2007 – Establishment of Market, Constitution of Market Committee (APMC), Special Market, Conduct of Business of the Market Committee, Powers and Duties of Market Committee, Staff of the Market Committee, Regulation of the Contract Farming Trade, Karnataka State Agricultural Marketing Board - Constitution and Functions. Role of state department of Agricultural Marketing and Directorate of Agricultural Marketing and Inspection. Agricultural Marketing Policies of the Government – Administered Price Policies – Commission for Agricultural Costs and Prices (CACP) and its Working. Policies of Procurement, Levy and Public Distribution System. Minimum Support Prices, Ceiling Price and Parity Prices. Floor Price Scheme. Food Security Policy - Procurement, Buffer Stock, Distribution, Subsidies. Food Zone. Agri Export Zones (AEZS)/ Export Oriented Units (EOUS). Introduction and Meaning of Intellectual Property, Brief Introduction to GATT, WTO, Trips and WIPO, Treaties for IPR Protection: Madrid Protocol, Berne Convention, Budapest Treaty, etc. Types of Intellectual Property and Legislations Covering IPR in India: Patents, Copyrights, Trademark, Industrial Design, Geographical Indications, Integrated Circuits, Trade Secrets. Patents Act 1970 and Patent System in India, Patentability, Process and Product Patent, Filing of Patent, Patent Specification, Patent Claims, Patent Opposition and Revocation, Infringement, Compulsory Licensing, Patent Cooperation Treaty, Patent Search and Patent Database.

Practical

Evolution and Historical Perspectives of Agricultural Marketing Legislation, Marketing Tax and Fees, Different Agents Involved in Marketing Practices, Study on Different Agricultural Marketing Models, Review of Agricultural Marketing Policies. Study on Reform in Agricultural Marketing Sectors in India. Presentation and group discussions on above topics, Visits to different APMC's.

Suggested Readings

1. Acharya, S.S. and Agarwal, N.L., 1994, Agricultural Prices- Analysis and Policy, Oxford and IBH, New Delhi.
2. Encyclopaedia of Agricultural Marketing- Market Regulation and Development (Vol. 3) by Jagdish Prasad. 1999.
3. Kahlon, A.S. and George, M.V., 1965, Agricultural Marketing and Price Policies, Allied Publishers Private Limited, New Delhi.
4. The Karnataka Agricultural Produce Marketing (Regulation and Development) Act 1966 by Sathpal Puliani. 2020.

SAEX223 Principles of Management & Organizational Behaviour 2 (1+1)

Objectives

1. Understand the fundamental principles of management theory and practice.
2. Explore the dynamics of organizational behaviour, including individual and group dynamics, communication, and motivation
3. Learn to apply management concepts and behavioral theories to solve organizational challenges and improve effectiveness
4. Develop skills in leadership, decision-making, and conflict resolution to enhance organizational performance and employee satisfaction

Theory

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

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

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

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

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

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

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

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

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

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

Practical

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

Suggested Readings

1. Aaker, David, Kumar, V. and George Day, 1995, Marketing Research, 8th edn, John Wiley and Sons.
2. Andrew J. Dubrin, 2012, Essentials of Management, Thomson Southwestern, 9th edition.

3. Charles W.L. Hill and Steven L. McShane, 2007, Principles of Management, McGraw Hill Education, Special Indian Edition.
4. Harold Koontz and Heinz Weihrich, 2012, Essentials of Management: An International and Leadership Perspective, 9th edn, Tata McGraw- Hill Education.
5. Kerlinger, Fred N., 1986, Foundations of Behavioural Research, 3rd edn.
6. Kotler P., 2001, Marketing Management. Grada, Praha, 10th edn.
7. Koudelka J., 1997, Consumer Behaviour and Marketing. Grada, Praha.
8. Michael A. Kamins, 1993, Secondary Research: Information, Sources and Methods, Applied Social Research Methods, Volume 4, Sage Publications.
9. Samuel C. Certo and Tervis Certo, 2012, Modern Management: Concepts and Skills, Pearson education, 12th edn.

SAEG222 Farm Machinery and Power and Custom Hiring Services 2 (1+1)

Objectives

1. Understand the principles and operation of farm machinery and power equipment
2. Learn about the selection, maintenance, and efficient use of agricultural machinery for various farm operations
3. Explore the concept and benefits of custom hiring services in agriculture
4. Develop skills to optimize farm machinery usage, reduce operational costs, and improve overall farm productivity through efficient machinery management and custom hiring services

Theory

Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of I.C. engines, comparison of two stroke and four stroke cycle engines. Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practical

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

Suggested Readings

1. Jagadishwar Sahay, Elements of Agricultural Engineering, Standard Publishers Distributors, New Delhi.
2. Michael A.M. and T.P. Ojha, Principles of Agricultural Engineering (Vol-I), Tata McGraw Hill Publishing Co Ltd, New Delhi.
3. Nakra, C.P. Farm Machinery and Equipments, Dhanpat Rai and Sons, New Dehli.
4. Singhal O.P., Elements of Agricultural Engineering, Merath Aman Public House, Meerut.

SCSC221 Agricultural Informatics and Artificial Intelligenc 3 (2+1)

Objectives

1. To acquaint students with the basics of computer applications in agriculture, multimedia, database management, application of mobile app and decision-making processes,etc.
2. To provide basic knowledge of computer with applications in agriculture
3. To make the students familiar with Agricultural-Informatics, its components and applications in agriculture

Theory

Introduction to computers, anatomy of computers, memory concepts, units of memory, operating system. Definition and types, applications of MS-Office for creating, editing and formatting a document, data presentation, tabulation and graph creation, statistical analysis, mathematical expressions, database, concepts and types, creating database. Uses of DBMS in agriculture, internet and World Wide Web (WWW); concepts and components.

Computer programming: General concepts. e-Agriculture, Concepts, design and development, application of innovative ways to use information and communication technologies (IT) in agriculture, computer models in agriculture. Statistical, weather analysis and crop simulation models, concepts, structure, inputs-outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation, IT applications for computation of water and nutrient requirement of crops. Computer-controlled devices (automated systems) for agri-input management, smart phone mobile apps in agriculture for farm advice. Market price, postharvest management, etc. Geospatial technology; concepts, techniques, components and uses for generating valuable agri-information. Decision support systems; concepts, components and applications in agriculture. Agriculture expert system, soil information systems, etc. for supporting farm decisions. Preparation of contingent crop-planning and crop calendars using IT tools, Digital India and schemes to promote digitalization of agriculture in India.

Introduction to artificial intelligence, background and applications, Turing test. Control strategies, Breadth-first search, Depth-first search, Heuristics search techniques: Best-first search, A* algorithm, IoT and Big Data; Use of AI in agriculture for autonomous crop management, and health, monitoring livestock health, intelligent pesticide application, yield mapping and predictive analysis, automatic weeding and harvesting, sorting of produce, and other food processing applications; Concepts of smart agriculture, use of AI in food and nutrition science etc.

Practical

Study of computer components, accessories, practice of important DoS Commands, Introduction of different operating systems such as Windows, Unix/Linux, creating files and

folders, File management. Use of MS-Word and MS Power-point for creating, editing and presenting a scientific document, MS-EXCEL-Creating a spreadsheet. Use of statistical tools. Writing expressions, Creating graphs, Analysis of scientific data. MS-ACCESS, creating database, preparing queries and reports, demonstration of agri-information system, Introduction to World Wide Web (WWW) and its components, Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/ Wofost, Preparation of inputs file for CSM and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT tools, Use of smart phones and other devices in agro-advisory and dissemination of market information, Introduction of Geospatial Technology, Preparation of contingent crop planning, India Digital Ecosystem of Agriculture (IDEA), AR/VR Demonstration.

Suggested Readings

1. Date CJ, 2007, An Introduction to Database Systems, Addison-Wesley.
2. Dhabal PS and Manoranjan P, 2017, Concepts and Techniques of Programming in C, I.K. International Publishing House Pvt. Limited.
3. ITL Education Solutions Ltd, 2006, Introduction to Information Technology, Pearson Education.
4. Mahapatra SK, Mishra P and Pradhan J, 2022, Introductory Agri Informatics, Jain Brothers.
5. Rajaroman V and Adabala N, 2015, Fundamentals of Computer, PHI Learning Private Ltd, New Delhi.

SECM221 SEC-VI: Development of Agribusiness Proposal 2 (0+2)

Objectives

1. Learn to identify viable agribusiness opportunities and formulate innovative project proposals.
2. Understand the components and structure of a comprehensive agribusiness proposal, including market analysis, financial projections, and risk assessment.
3. Develop skills to effectively communicate business ideas, secure funding, and implement successful agribusiness ventures.
4. Gain practical experience in preparing and presenting agribusiness proposals that meet the needs of stakeholders and investors.

Practical

A. **Project Planning, Monitoring and Evaluation:** Orientation. Hands on experience on preparation of project proposals for horticulture crops, dairy, poultry and agro-processing units. Interaction with staff/experts for midterm corrections and submission of interim report. Hands on experience on preparation of project proposal for bio-fertilizer and bio-pesticides units, irrigation, equipments and machineries, forest plantations, fishery and land development activities. Interaction with staff/ experts for midterm corrections and submission of interim report. Hands on experience on ex- ante, concurrent and ex-post appraisal. Hands on experience on discounting procedures like NPV, IRR and BCR, preparation of techno-economic feasibility reports of project. Report writing and examination.

B. **Marketing Management**: Orientation. Hands on experience on conducting market survey to gain experience on working out consumer profile, competitors, substitutes and their price and features. Designing market strategy. Interaction with staff/experts for midterm corrections and submission of interim report. Hands on experience on forecasting market demand. Pricing methods, creating and organizing an advertising campaign. Various packaging materials used for

agro-based products. Product distribution network, marketing cost, marketing planning process. Interaction with staff/ expert for midterm corrections and submission of interim report. Hands on experience on marketing research and information system for new product development and options for extending product life cycle. Spot and online marketing. Export- import policies for agriculture sector. Report writing and examination.

C. **Financial Management**: Orientation. Estimation of funds required – capital investment and operational expenses. Share of owned and borrowed funds in the business. Sources of borrowed funds, terms and conditions of borrowings, repayment schedule, cash inflow and cash outflows of business. Interaction with staff/ experts for midterm corrections and submission of interim report. Hands on experience on accounting methods and procedures. Commonly used account systems, the single and double entry system, recording transactions, journals, figures, trial balance, assets and liabilities. Revenue cost of sales and net profit operating and incidental expenses and inventory. Interaction with staff / experts for midterm corrections and submission of interim report. Preparation of financial statements like balance sheet, income statement, profit and loss statement for the business. Exercise on financial ratio analysis. Report writing and examination.

Suggested Readings

1. David D. Van Fleet and George J. Seperich. 2013. Agribusiness: Principles of Management. Delmar, New York.
2. Elizabeth Yeager, Frank J. Dooley, Freddie L. Barnard, Jay T. Akridge and John Charles Foltz. 2012. Agribusiness Management. Routledge, London.
3. Hegde P. 2012. Agribusiness Management. Discovery Publishing House, New Delhi.
4. Karthikeyan M. and Nakkiran S. 2012. Co-operatives and Agri-Business. Discovery Publishing House, New Delhi.
5. Walter David Downey. 1987. Agribusiness Management. Tata McGraw-Hill, New Delhi.

SHRT222 Post-harvest Management & Value Addition of Fruits & Vegetables 2 (1+1)

Objectives

1. Understand the principles and techniques of post-harvest management for fruits and vegetables
2. Learn about value addition processes such as sorting, grading, packaging, and processing
3. Explore methods to minimize post-harvest losses and extend the shelf life of fruits and vegetables
4. Develop skills to add value to agricultural produce, increase marketability, and enhance profitability for farmers and stakeholders

Theory

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

Practical

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

Suggested Reading

1. Bhutani, R.C., 2003, Fruit and Vegetable Preservation, Biotech Books.
2. Mitra, S.K., 1997, Post Harvest Physiology and Storage of Tropical and Sub-Tropical Fruits, CABI.
3. Ranganna, S., 1997, Handbook of Analysis and Quality Control for Fruit and Vegetable Products, Tata McGraw-Hill.
4. Sudheer, K.P., and Indira, V., 2007, Post Harvest Technology of Horticultural Crops, New India Publ. Agency.
5. Willis, R., McGlassen, W.B., Graham, D. and Joyce, D., 1998, Post Harvest: An Introduction to the Physiology and Handling of Fruits, Vegetables and Ornamentals, CABI.

SMDC221 Entrepreneurship Development & Business Management 3 (2+1)

Objective

1. To provide student an insight into the concept and scope of entrepreneurship
2. To expose the student to various aspects of establishment and management of a small business unit
3. To enable the student to develop financially viable agribusiness proposal

Theory

Development of entrepreneurship, motivational factors, social factors, environmental factors, characteristics of entrepreneurs, entrepreneurial attributes/competencies. Concept, need for and importance of entrepreneurial development. Evolution of entrepreneurship, objectives of entrepreneurial activities, types of entrepreneurs, functions of entrepreneurs, importance of entrepreneurial development, and process of entrepreneurship development. Environment scanning and opportunity identification need for scanning–spotting of opportunity-scanning of environment– identification of product / service – starting a project; factors influencing sensing the opportunities. Infrastructure and support systems- good policies, schemes for entrepreneurship development; role of financial institutions, and other agencies in entrepreneurship development. Steps involved in functioning of an enterprise. Selection of the product / services, selection of form of ownership; registration, selection of site, capital sources, acquisition of manufacturing know how, packaging and distribution. Planning of an enterprise, project identification, selection, and formulation of project; project report preparation, Enterprise Management. Production management – product, levels of products, product mix, quality control, cost of production, production controls, Material management. Production management – raw material costing, inventory control. Personal management – manpower planning, labour turn over, wages / salaries. Financial management / accounting – funds, fixed capital and working capital, costing and pricing, long term planning and short-term planning, book keeping, journal, ledger, subsidiary books, annual financial statement, taxation. Marketing management- market, types, marketing assistance, market strategies. Crisis management- raw material, production, leadership, market, finance, natural etc.

Practical

Visit to small scale industries/agro-industries, Interaction with successful entrepreneurs/ agric- entrepreneurs. Visit to financial institutions and support agencies. Preparation of project proposal for funding by different agencies.

Suggested Readings

1. Charantimath P.M., 2009, Entrepreneurship Development and Small Business Enterprises. Pearson Publications, New Delhi.
2. Desai V., 2015, Entrepreneurship: Development and Management. Himalaya Publishing House.
3. Desai, Vasant, 1997, Small Scale Industries and Entrepreneurship. Himalaya Publ. House.
4. Grover, Indu, 2008, Handbook on Empowerment and Entrepreneurship. Agrotech Public Academy.
5. Gupta C.B., 2001, Management Theory and Practice. Sultan Chand and Sons.
6. Khanka S.S., 1999, Entrepreneurial Development. S. Chand and Co.
7. Mehra P., 2016, Business Communication for Managers. Pearson India, New Delhi.
8. Pandey M. and Tewari D., 2010, The Agribusiness Book. IBDC Publishers, Lucknow.
9. Singh D., 1995. Effective Managerial Leadership. Deep and Deep Publ.
10. Singhal R.K., 2013, Entrepreneurship Development and Management. Katson Books.
11. Tripathi P.C. and Reddy P.N., 1991, Principles of Management. Tata McGraw Hill.

SNCC221 National Cadet Corps (NCC-IV) 1 (0+1)

- Introduction to map, scales, and conventional signs. Topographical forms and technical terms.
- The grid system. Relief, contours, and gradients. Cardinal points and finding north. Types of bearings and use of service protractor. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map. Knots and lashings, Camouflage and concealment, Explosives and IEDs.
- Field defenses obstacles, mines and mine lying. Bridging, waterman ship. Field water supplies, tracks and their construction. Judging distance. Description of ground and indication of landmarks. Recognition and description of target. Observation and concealment. Field signals. Section formations. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill. Types of communication, media, latest trends and developments.

SNSS 221 National Service Scheme (NSS-IV) 1 (0+1)

- Youth and crime: Sociological and psychological factors influencing youth crime,
- Cybercrime, pear mentoring in preventing crime and awareness for juvenile justice. Civil/self-defence:
- Civil defence services, aims and objectives of civil defence; needs and training of self-defence Resource mobilization:
- Writing a project proposal of self-fund units (SFUs) and its establishment
- Additional life skills: Positive thinking, self-confidence and esteem, setting life goals and working to achieve them, management of stress including time management.

III Year I SEMESTER

SABM311 **Grading, Standardization and Quality Management in Agri-food Products** **2 (1+1)**

Objectives

1. Understand the principles and methods of grading and standardization for agri-food products
2. Learn techniques to ensure product quality and consistency in the agricultural supply chain
3. Explore quality management systems and certifications applicable to agri-food products
4. Develop skills to implement grading, standardization, and quality management practices to meet market requirements and consumer expectations

Theory

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

Practical

Study of laboratory equipment, Sampling equipment, scientific grading, instruments and other apparatus, Visit to vegetable and fruit markets, Jaggery market and other food processing units. Visit to Bureau of Indian Standards. Presentations and Group discussions for the above topics.

Suggested Readings

1. Acharya, S.S. and Agarwal, N.L., 2000, Agricultural Marketing in India.
2. Chakravarty, A. and De, D.S., 1981, Post harvest technology of cereals and pulses, Oxford and IBH, Calcutta.
3. Jambunathan, L.R., 1984, Grading of cotton for quality: A scoring system of instrumental evaluation for Cotton Hybrid-4.
4. Mamoria, C.B., 1976, Agricultural Problems of India, Kitab Mahal, Allahabad.
5. Manual on Grading and Standardization, Directorate of Marketing and Inspection (DMI), Nagpur.
6. Manual on Standards, Bureau of Indian Standards (BIS), New Delhi.
7. Wader, L.K. and C., Murthy, 2003, Textbook of agricultural marketing and cooperation, ICAR, New Delhi.

SABM312 Market Information and Intelligence 3 (2+1)

Objectives

1. Understand the importance of market information and intelligence in making informed business decisions
2. Learn methods for collecting, analyzing, and interpreting market data and trends
3. Explore strategies to use market information to identify opportunities, mitigate risks, and gain competitive advantage
4. Develop skills to effectively utilize market intelligence to optimize marketing strategies, pricing, and product positioning in agribusiness

Theory

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

Practical

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

Suggested Readings

1. Acharya, S.S., 1988, Agricultural Production, Marketing and price policy- A study of Pulses, Mittal Publications, Delhi.

2. Acharya, S.S., and Agarwal, N.L., 1994, Agricultural prices- Analysis and policy, Oxford and IBH, New Delhi.
3. Alexander, Market Intelligence.
4. Fox, Market Information system.
5. Gupta, A.P., 1975, Marketing of agricultural production in India, Voro and Co-Publishers Pvt. Limited, Bombay.
6. Jagadish Prasad, 1966, Encyclopedia of Agricultural Marketing, Mittal Publishers Pvt. Limited, Bombay.
7. Kahlon, A.S. and George, M.V., 1965, Agricultural marketing and Price Policies, Allied Publishers Private Limited, New Delhi.
8. Nayyar, H. and Ramaswamy, P., 1995, Globalization and Agricultural Marketing, Rawat Publications, Jaipur.
9. Prasad, A. Shivarama, Agricultural Marketing in India, Mittal Publications, Delhi.
10. Singhal, A.K., 1989, Agricultural Marketing in India, Anmol Publications, New Delhi.

SABM313 **Capital and Commodity Markets** **2 (1+1)**

Objectives

1. Understand the functioning and dynamics of commodity markets in agriculture
2. Learn about price discovery mechanisms, trading strategies, and risk management techniques
3. Explore the factors influencing supply and demand dynamics in commodity markets
4. Develop skills to analyze commodity market trends, assess market opportunities, and make informed trading decisions in agricultural commodities

Theory

Capital market instruments – corporate stock and corporate bonds - Capital market instruments – commercial paper, certificate of deposits - Equities - Common Stocks, Restricted Shares- Preferred Stocks - Fixed income capital market instruments – Bonds, debentures, swap and Mortgage-backed securities-Managing Interest Rate Risk - The Yield Curve - Process and procedures of raising equity capital - Types of investors in capital market - Depository services – meaning and functions - Insider trading - Transaction procedures and settlement- Stock Valuation.

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

Practical

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

Suggested Readings

1. Carter Colin A. 2003. Futures and Options Markets: An Introduction, Prentice-Hall: Upper Saddle River, NJ.
2. Chatnani, Niti Nandini. Commodity Markets, Tata McGraw Hill Education Private Limited, New Delhi.
3. Hull John C. 2005. Fundamentals of Futures and Options Markets, 5th edn, Prentice Hall: Upper Saddle River, NJ.
4. Kulkarni, Bharat. Commodity Markets and Derivatives, Excel Books, A-45, Naraina, Phase I, New Delhi.
5. McDonald and Robert L. 2006. Derivatives Markets, 2nd edn, Addison Wesley: Boston.
6. Wayne Purcell and Stephen Koontz. 1999. Agricultural Futures and Options, Principles and Strategies (2nd edn), Prentice-Hall (ISBN 0-13-779943-8).

SABM314 Cooperatives and Producers' Organizations 3 (2+1)

Objectives

1. Understand the principles and structures of cooperatives and producers' organizations in agriculture
2. Learn about the benefits and challenges of cooperative business models for smallholder farmers and producers
3. Explore strategies for organizing, managing, and governing agricultural cooperatives and producers' organizations effectively
4. Develop skills to foster collaboration, collective marketing, and value addition through cooperative and producer-led initiatives in agriculture

Theory

Management of cooperative enterprises: Concept, Meaning, definition, unique features–Issues in cooperative management–Cooperative Governance-Human resource development in cooperatives- Professionalization of cooperatives. Co-operative management structure: Role and responsibilities of General Body, Board of Directors, President and Chief Executive Officer. Decision making in cooperatives- Performance evaluation parameters for co-operatives. Capital and cooperatives–Meaning-Purpose of Equity-Equity Management and cooperatives -The Importance of Financial Planning -Equity Types -Equity Management Considerations. Producer Organizations: concept, meaning, types, characteristics and scope. Process guidelines for promotion of FPOs. Steps in Registration of PCs. Management of Producer Companies: Membership, Powers of General Body, powers of Executive Committee, Funds, accounts and audit, appropriation of net profit. Role of central and state governments in supporting FPOs, Role of NABARD in promoting Producer Organizations.

Practical

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

Suggested Readings

1. A Guide Book for Producer Organization (PO) and Producer Group (PG), 2018 by Prabir Datta.
2. Farmer Producer Organisations, 2015, National Bank for Agriculture and Rural Development.
3. Making Farmer Producer Organizations Achieve Viability: A Practical Guide, 2021 by Sanjiv Phansalkar and Avinash Paranjape.
4. State of Sector Report - Farmer Producer Organizations in India, 2021 by Sanjiv Phansalkar, Vedprakash, Aneesha Bali and Anish Kumar.

SABM315 **Business Research Methods** **3 (2+1)**

Objectives

1. Understand various research methodologies and their application in business settings
2. Learn how to formulate research questions, design studies, and collect data for business analysis
3. Develop skills to critically evaluate research findings and apply them to business decision- making
4. Gain proficiency in using statistical tools and software for data analysis in business research

Theory

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

Practical

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

Suggested Readings

1. Cooper D.R. and P. S. Schindler, 2007, Business Research Methods, Tata McGraw Hill Company Ltd.

2. Kothari C.R., 2007, Research Methodology, New Age International Publishers.
3. Andrea Ahlemeyer-Stubbe and Shirley Coleman, A Practical Guide to Data Mining for Business and Industry, John Wiley and Sons Limited, United Kingdom (e book).
4. Ledolter, Johannes, Data Mining and Business Analytics with R, John Wiley and Sons, New Jersey (e - Book).

SABM316 **Social Entrepreneurship** **1 (1+0)**

Objectives

1. Understand the concept and principles of social entrepreneurship
2. Learn about innovative business models that address social and environmental challenges
3. Explore strategies for creating sustainable social impact while ensuring financial viability
4. Develop skills to identify social problems, design solutions, and implement projects that benefit communities

Theory

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

Suggested Readings

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

SAGR312 **Sustainable Farming Systems and Precision Agriculture** **2 (1+1)**

Objectives

1. Understand the principles and practices of sustainable farming systems aimed at environmental stewardship and resource conservation
2. Learn about precision agriculture technologies and their applications for optimizing inputs, minimizing waste, and increasing farm efficiency

3. Explore strategies to integrate sustainable practices and precision agriculture techniques for improved crop productivity, profitability, and environmental sustainability
4. Develop skills to implement and manage sustainable farming systems and precision agriculture technologies to address challenges such as climate change, soil degradation, and water scarcity in agriculture

Theory

Farming System-scope, importance, concept and types. Farming systems components, Indicators of Sustainability, adaptation and mitigation, determining production and efficiencies in cropping and farming systems; Sustainable agriculture- problems and its impact on agriculture. Evaluation indices for cropping system. Integrated Farming System- historical background, objectives and characteristics, components of IFS and its advantages, resource use efficiency and optimization techniques. Operational structure of NPOP. Organic certification process and economic considerations. Marketing export potential of organic products.

Precision agriculture: components, concepts and principles, techniques, their issues and concern for Indian agriculture. Global Positioning System (GPS) and Geographical Information System (GIS), Site Specific Nutrient Management (SSNM) for nutrient and irrigation management practices. Comparative yield, quality and farm profits under SSNM practices v/s Variable Rate Technology (VRT) practices. Yield monitoring and mapping.

Practical

Tools for determining production and efficiencies in cropping and farming system, Visit cropping systems and IFS models. Evaluation indices for cropping system. Organic farming guidelines and alternative philosophies. Organic nutrient resources and their fortification, Restrictions on nutrient use, enriched compost, vermi-compost, liquid organic manures, green manuring, crop residue management, biofertilizers/bio inoculants and their quality. ITKs in organic farming. NPOP: certification process and standards of organic farming; processing, labelling, marketing and export of organic products. Economic of Organic production systems. Visit to organic farmer's fields.

Use of GPS for agricultural survey and recording the observations with GPS. Area estimation, navigation and recording elevation points. Conversion of GPS readings, Study of maps, top sheets, cartography, GPS software's, Spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. VRT, Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Use of UAV in agriculture.

Suggested Readings

1. Joshi M and Prabhakarashetty TK. 2005. Sustainability through Organic Farming, Kalyani Publishers.
2. Palaniappan SP and Anandurai K. 1999. Organic Farming - Theory and Practice, Scientific Publishers.
3. Panda SC, 2014, Cropping and Farming System. Agrobios (India) Publishers.
4. Reddy, S. R., 2017. Geoinformatics and Nanotechnology for Precision Farming. Kalyani Publishers. pp.140.
5. Thomas Lillesand, Ralph W. Kiefer and Jonathan Chipman. 2015. Remote Sensing and Image Interpretation, 7th Edition, Wiley Publications. Pp 736
6. Wright, Richard T. and Bernard J. Nebel Environmental science: toward a sustainable agriculture

SAST312 **Applied Business Statistics** **2 (1+1)**

Objectives

1. Understand the fundamental concepts and techniques of statistical analysis in business contexts
2. Learn how to collect, organize, and interpret data to make informed business decisions
3. Explore the application of statistical tools and methods in various business functions such as marketing, finance, and operations
4. Develop skills to use statistical software packages effectively for data analysis and visualization in business settings

Theory

Introduction to Sampling Theory, Sampling versus Complete Enumeration, Methods of Sampling: Probability sampling design –Simple Random Sampling (WR and WOR), Use of Random Number Tables for selection of Simple Random Sample. Concept of Stratified Sampling, Determining sample size for Simple Random and Stratified Sampling under Equal, Proportional, Neyman's and Optimal allocations. Concept of Systematic sampling, Cluster, Multistage and Probability Proportional to Size (PPS) sampling along with their advantage and disadvantages. Non- probability sampling scheme: Judgment, convenience, quota and accident sampling scheme. Time series analysis: Introduction, Spatial, temporal and conditional series, Objectives of time series, components of time series: Trend, Seasonal, Cyclical and Irregular components. Measurement of trend: Graphical, Semi-Average, Moving Averages and Central Moving Averages, Isolation of trend by moving averages, Ordinary Least Squares (OLS), and fitting of trend. Index numbers: Concept and Definition, objectives of index numbers, advantages and limitations. Prerequisites of index numbers, Types of Index numbers: Price index number (retail and whole sale), Quantity index numbers, Value index numbers. Construction of Simple index numbers under simple aggregative and simple average of relatives (fixed and chain based) method. Construction of weighted index numbers under weighted aggregative method. Chain index number, conversion of chain base index number to fixed base index number, fixed base index number to chain base index number. Statistical Quality Control: Definition of control charts, uses of control charts, chance and assignable causes, parts of control charts (central line and control limits). Control charts for variables X-bar and R charts, control charts for fraction defective (p) and control charts for number of defects per unit. Operating characteristic curves for control charts.

Practical

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

Suggested Readings

1. A Textbook of Agril. Statistics. R. Rangaswamy.

2. Advanced Practical Statistics. S.P. Gupta.
3. Fundamentals of Mathematical Statistics. S.C. Gupta and V.K. Kapoor.
4. Introduction to Time Series and Forecasting. Brockwell P.J and Davis RA.
5. Quality Control and Industrial Statistics. John Wiley. Duncan A.J.
6. Sampling Inspection Tables. Dodge H.F. and Romig H.G.
7. Sampling Techniques. Cochran W.G.
8. Statistical Methods in Quality Control. Cowden D.J.
9. Statistical Quality Control. Grant E.L. and Leavenworth R.S.
10. Survey Sampling Theory and Methods. Chaudhari A and Stenger H.
11. Time Series Analysis: Forecasting and Control. Box G.E.P., Jenkins G.M. and Reinsel G.C

SEDT311 **Educational Tour** **(0+2)* Non Gradial**

SGPB312 **Intellectual Property Rights** **1 (1+0)**

Objectives

1. Understand the principles and significance of intellectual property rights (IPRs) in agriculture
2. Learn about different types of IPRs such as patents, trademarks, and plant breeders' rights
3. Explore the legal and ethical implications of IPRs in agricultural innovation, research, and commercialization
4. Develop skills to protect, manage, and utilize intellectual property assets effectively in agricultural enterprises

Theory

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

Suggested Readings

1. Intellectual Property Rights - Unleashing the knowledge economy, 2001, Ganguly P., Tata McGraw Hill.
2. Intellectual Property Rights in Agricultural Biotechnology, 1998, Erbisch, F.H. and Maredia, K., CABI.
3. Intellectual Property Rights in Animal Breeding and Genetics, 2003, Rothschild M. and Scott N. (Ed.), CABI.

4. Intellectual Property Rights in NAM and other Developing Countries: A Compendium on Law and Policies, 2006, Saha, R. (Ed.). Daya Publ. House.
5. Ministry of Agriculture, Government of India 2004. State of Indian Farmer. Vol V. Technology Generation and IPR issues. Academic Foundation.
6. The Indian Acts - Patents Act, 1970 and amendments; Design Act, 2000; Trademarks Act, 1999; The Copyright Act, 1957 and amendments; Layout Design Act, 2000; PPV and FR Act 2001, and Rules 2003; National Biological Diversity Act,2003.
7. WIPO Intellectual Property Handbook: Policy Law and Use. Fields of Intellectual Property Protection, WIPO, 2008

SPBT314 **Fundamentals of Plant Biotechnology** **2 (2+0)**

Objectives

1. Understand the principles and techniques of plant biotechnology
2. Learn about genetic engineering, gene editing, and other biotechnological methods used in plant breeding
3. Explore the applications of plant biotechnology in crop improvement, pest resistance, and stress tolerance
4. Develop skills to critically evaluate the ethical, environmental, and regulatory aspects of plant biotechnology

Theory

Introduction, history, concepts and applications of plant biotechnology, cell, DNA structure and function, gene cloning steps, common enzymes used as molecular tools, vectors, transformation and selection of recombinants, construction of genomic libraries, isolation and cloning of coding parts of eukaryotic genes-cDNA cloning. Gene transfer methods, transgenics and its importance, gene editing, biosafety measures and intellectual property rights. Molecular markers, RAPD, RFLP, SSR, SNP etc, and their applications. Concept of tissue culture, organogenesis and embryogenesis, embryo rescue and its significance, micropropagation, somaclonal variation and its use in crop improvement, synthetic seeds and their significance, somatic hybridization and cybrids and cryo-preservation. Use of tissue culture in biotechnology (transgenics and gene editing).

Suggested Readings

1. Brown, T.A., 2006, Gene cloning and DNA analysis: An introduction, Blackwell Publishing, Oxford, UK.
2. Chawla, H.S., 2002, Introduction to Plant Biotechnology, Science Publishers.
3. Gardener, E.J., Simmons, M.J. and Snustad, D.P., 1991, Principles of Genetics, John Singh, B.D., 2013, Biotechnology, Kalyani Publishers.
4. Wiley and Sons, Inc, New York, USA.

SABM321 **Corporate Social Responsibility and Managerial Ethics 3 (2+1)**

Objectives

1. Understand the concept and significance of corporate social responsibility (CSR) in business
2. Learn about ethical theories and principles guiding managerial decision-making

3. Explore strategies for integrating CSR practices into business operations and stakeholder engagement
4. Develop skills to analyze ethical dilemmas, make responsible decisions, and promote ethical behavior within organizations

Theory

Introduction to Corporate Social Responsibility (CSR): Meaning and Definition of CSR, History and evolution of CSR. Concept of Charity, Corporate philanthropy, Corporate Citizenship, CSR- overlapping concept. Concept of sustainability. Stakeholder Management. CSR through triple bottom line and Sustainable Business; relation between CSR and Corporate governance; environmental aspect of CSR; Chronological evolution of CSR in India; models of CSR in India, Carroll's model; drivers of CSR; major codes on CSR; Initiatives in India. International framework for corporate social Responsibility, Millennium Development goals, Sustainable development goals, Relationship between CSR and Millennium Development Goals (MDGs). United Nations (UN) Global Compact 2011. UN guiding principles on business and human rights. Organisation for Economic Co-operation and Development (OECD) CSR policy tool, International Labour Organization (ILO) tri-partite declaration of principles on multinational enterprises and social policy. CSR-Legislation in India and the world. Section 135 of Companies Act 2013. Scope for CSR Activities under Schedule VII, Appointment of Independent Directors on the Board, and Computation of Net Profit's Implementing Process in India. The Drivers of CSR in India, Market based pressure and incentives, civil society pressure, the regulatory environment in India. Counter trends. Performance in major business and Programs. Voluntarism Judicial activism. Identifying key stakeholders of CSR and their roles. Role of Public Sector in Corporate, government Program s that encourage voluntary responsible action of corporations. Role of Non-profit and Local Self- Governance in implementing CSR; Contemporary issues in CSR and MDGs. Global Compact Self-Assessment Tool, National Voluntary Guidelines by Govt. of India. Understanding roles and responsibilities of corporate foundations.

Practical

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

Suggested Readings

1. Bharat's Corporate Social Responsibility by Kamal Garg. Edition 2023
2. Business Ethics and Corporate Social Responsibilities, 1st Edition 2017, by Mathur, SP, Mathur, Nishu, New Age International (P) Ltd. Publishers.
3. Corporate Social Responsibility, Jun 2019, by Andrea Giordani.
4. Corporate Governance Values and Ethics Book for MBA by Dr Neeru Vasishth and Dr Namita Rajput.

SABM322 **Introduction to Managerial Economics** **3 (2+1)**

Objectives

1. Understand the application of economic principles in managerial decision-making
2. Learn how to analyze market conditions, demand, and cost structures to optimize business strategies

3. Explore the role of managerial economics in pricing, production, and resource allocation within firms
4. Develop skills to make informed decisions that maximize profitability and efficiency in various business contexts

Theory

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

Practical

Computation of different types of demand function. Computation of elasticity of demand-price, income, cross and promotional. Computation of total, average and marginal revenue under different market conditions. Demand estimation through regression analysis. Demand forecasting using non-quantitative and quantitative techniques - trend method, regression method, leading indicator method, simultaneous equations method. Analysis of important demand forecasting methods. Computation of average product, marginal product and elasticity of output with respect to one variable input. Analysis of optimal factor combination using C-D production function. Computation of elasticity of substitution using C-D and CES production functions. Calculation of optimal output combination of multi-product firms. Derivation of cost functions from production functions and break-even analysis. Determination of market price, market price and normal price. Price determination in perfect competition. Computation of break-even point, learning curve and economies of scope. Calculation of equilibrium price and output under conditions of monopoly and oligopoly. Calculation of market concentration under oligopoly. Price and output determination. Computation of macro-economic equilibrium models.

Suggested Readings

1. Ahuja, H.L. (2008). Managerial Economics – Analysis of Managerial Decision Making. S. Chand and Company Ltd.
2. Chaturvedi, D.D. and S.L. Gupta. (2012). Business Economics Theory and Application. International Book House.
3. Dewett, K.K. 2002. Modern Economic Theory. Syamlal Charitable Trust, New Delhi.
4. Seth, M.L. (2000). Principles of Economics. Lakshmi NarainAgarwal Co., New Delhi.

SABM323 **Marketing Management** **3 (3+0)**

Objectives

1. Understand the principles and theories of marketing management
2. Learn strategies for product development, pricing, promotion, and distribution
3. Explore market research techniques to understand consumer behavior and preferences

4. Develop skills to create and implement effective marketing plans to achieve organizational objectives

Theory

Marketing– meaning, importance, functions. Marketing Management- definition, difference between marketing and selling. Guiding philosophy of Marketing. Marketing planning: importance, steps, nature. Market Segmentation – meaning, bases and advantages; Market Targeting– Approaches. Positioning – meaning and strategies. Marketing environment analysis. Marketing Mix – 4 Ps and 7 Ps; Product. Product classifications and new product development and launching. Product life cycle – stages; Branding – meaning, selecting a brand, advantages and disadvantages of branding, types of brands; Packaging: meaning, importance, and functions of packaging. Pricing Methods and strategies. Marketing channel–meaning, market intermediaries, types of channels and functions of marketing channel; channel management strategies, channels of distribution, channel management decisions, management of retailing and wholesaling. Direct marketing–methods and advantages and disadvantages; Promotional mix: meaning, elements and objectives. Services Marketing– introduction, meaning, characteristics and Service Marketing Mix.

Suggested Readings

1. Andrew J. Dubrin, 2012, Essentials of Management, Thomson Southwestern, 9th edition.
2. Chabra and Grover, 2012, Marketing Management, Dhanpatrai and Co, New Delhi.
3. Chandrasekar, K.S., 2010, Marketing Management-Text and Cases, Tata McGraw Hill-Vijaynicole.
4. Charles W.L Hill and Steven L McShane, 2007, Principles of Management, McGraw Hill Education, Special Indian Edition.
5. Harold Koontz and Heinz Weihrich, 2012, Essentials of Management: An International and Leadership Perspective, 9th edition, Tata McGraw-Hill Education
6. Philip Kortler and Kevin Lane Keller, 2012, Marketing Management, PHI 14th Edition.
7. Rajan Sexena, 2005, Marketing Management, Tata McGraw-Hill Education.
8. Samuel C. Certo and Tervis Certo, 2012, Modern Management: Concepts and Skills, Pearson education, 12th edition.
9. Sherlekar, 2013, Marketing Management, Himalaya Publishing House, New Delhi.
10. Sontakki, 2005, Marketing Management, Kalyani Publishers, New Delhi.

SABM324 **Agribusiness Project Management** **3 (2+1)**

Objectives

1. Understand the principles and practices of project management specific to the agribusiness sector
2. Learn to plan, execute, and monitor agribusiness projects effectively, considering factors such as time, cost, and resources
3. Explore risk assessment and mitigation strategies to ensure successful project outcomes in agricultural settings
4. Develop skills to lead teams, coordinate activities, and communicate effectively to stakeholders in agribusiness projects

Theory

Meaning and definition of project, general features of projects, importance and objectives of project analysis. Categories of projects based on various criteria. Project cycle, stages of project cycle – conception, formulation, appraisal, implementation, monitoring and evaluation.

Criteria for appraising projects – ex-ante and ex-post evaluation. Differences between economic and financial analysis in project evaluation. Costs and benefits of agribusiness projects, comparing costs and benefits of agribusiness projects. Externalities – meaning and definition, positive externalities, negative externalities and internalization of externalities, divergence between social costs and benefits of a project. Undiscounted measures of project worth – Accounting Rate of Return (ARR), ranking by inspection, payback period, proceeds per rupee of outlay and average annual proceeds per rupee of outlay. Time value of money - compounding and discounting, choice of discount rate. Discounted cash flow measures of project appraisal – Net Present Worth (NPW), Benefit-Cost Ratio (BCR) and Internal Rate of Return (IRR). Risk and uncertainty. Sensitivity analysis, general kinds of sensitivity analyses, social cost benefit analysis, and rationale for social cost benefit analysis. Project management– meaning, importance and triple constraint. Project management structures functional organization, project organization and matrix organization - meaning, advantages and disadvantages. Project Rating Index (PRI), Work Breakdown Structure (WBS) and Responsibility Assignment Matrix (RAM / RACI). Network analysis – CPM and PERT. Project financing - sources of financing a project. Business incubators - definition, types and their benefits. Project control- monitoring time performance (Gantt Charts, Control Charts), performance index and per cent complete index. Project audit and project closure.

Practical

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

Suggested Readings

1. Austin James .1992. Agro Industrial Project Analysis Critical Factors. John Hopkin University Press, London
2. Joseph Phillip Hella and Daniel Wilson Ndyetabula. 2012. Agribusiness Project Appraisal: Theory and Applications, Intersperses – Tanzania.
3. Prasanna Chandra, 2014. Projects: Preparation. Appraisal, Budgeting and Implementation, Tata McGraw Hill.
4. Price Gittinger, J. 1982. Economic Analysis of Agricultural Projects. John Hopkins University Press.
5. UNIDO. 1978. Manual for Preparation of Industry Feasibility Studies. United Nations.

SABM325 Strategic Business Management 3 (2+1)

Objectives

1. Understand the concepts and frameworks of strategic management
2. Learn to analyze internal and external factors influencing business strategy
3. Develop skills to formulate, implement, and evaluate strategic plans to achieve organizational objectives
4. Explore strategies for sustainable growth, competitive advantage, and adaptation to dynamic business environments

Theory

Introduction to Strategies: Introduction, Fundamentals of Strategy, Conceptual Evolution of Strategy, Scope and Importance of Strategies. Strategic Management: Introduction, Need, scope, key features and importance of strategic management. Strategists at various management

levels, Types of Strategies, Limitations of Strategic Management. Strategy Analysis and its Importance. The External Environment-The General, Industry, and Competitor Environments-External Environmental Analysis -Scanning–Monitoring-Forecasting–Assessing. Segments of the General Environment-The Demographic Segment-The Economic Segment-The Political/Legal Segment - The Socio-cultural Segment - The Technological Segment - The Global Segment-Industry Environment Analysis- Competitor Analysis-Ethical Considerations. The Internal Environment-The Nature of Internal Environmental Analysis -The Context of Internal Analysis-Creating Value -The Challenge of Internal Analysis-Resources, Capabilities, and Core Competencies-Building Core Competencies - Value Chain Analysis –Outsourcing-Competencies, Strengths, Weaknesses, and Strategic Decisions. Business-Level Strategy -The Purpose of a Business-Level Strategy -Types of Business-Level Strategies -Cost Leadership Strategy -Differentiation Strategy - Focus Strategies -Integrated Cost Leadership/Differentiation Strategy. Competitive Rivalry and Competitive Dynamics-Competitor Analysis-Market Commonality -Resource Similarity -Drivers of Competitive Actions and Responses - strategic and Tactical Actions type of Competitive Action.

Corporate-Level Strategy-Levels of Diversification-Value-Creating Diversification: Related Constrained and Related Linked Diversification -Unrelated Diversification - Value-Neutral Diversification: Incentives and Resources -Value-Reducing Diversification: Managerial Motives to Diversify. Acquisition and Restructuring Strategies -Merger and Acquisition Strategies - Reasons for Acquisitions -Restructuring -Downsizing -Downs coping. International Strategy -Identifying International Opportunities: Incentives to Use an International Strategy-International Business-Level Strategy -International Corporate-Level Strategy-Environmental Trends-Risks in an International Environment -Political Risks -Economic Risks. Cooperative Strategy -Strategic Alliances as a Primary Type of Cooperative Strategy-Business-Level Cooperative Strategy Corporate-Level Cooperative Strategy- International Cooperative Strategy -Network Cooperative.

Practical

Case studies of agribusiness units with respect to their objectives and evaluation of their business strategies, strategic alliances, strategy implementation, implications and challenges.

Suggested Readings

1. Global Strategic Management, 2015 by Jedrzej George Frynas and Kamel Mellahi.
2. Strategic Management: Planning for Domestic and Global Competition, 2018, by John A. Pearce, Richard B. Robinson, and Amita Mital.
3. Strategic Management and Business Policy: Globalization, Innovation and Sustainability, 2018, by Thomas L. Wheelen, J. David Hunger and Alan N. Hoffman.
4. The Secrets of Strategic Management: The Ansoffian Approach, 2006 by Igor H. Ansoff and Peter H. Antoniou.

SABM326 **Rural Marketing** **3 (2+1)**

Objectives

1. Understand the unique characteristics and challenges of marketing in rural areas
2. Learn strategies for reaching and engaging rural consumers effectively
3. Explore methods for adapting marketing tactics to suit rural market dynamics and preferences

4. Develop skills to identify market opportunities, create tailored marketing campaigns, and enhance rural market penetration for agricultural products and services

Theory

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

Practical

Studying rural marketing environment, Rural Marketing Research, Process of research in Rural Markets, Sources and Methods of Data Collection, Data Collection Approaches in Rural Markets. Corporate Sector in rural marketing, Rural Specific Promotion Media and Methods. Field visits / case studies: Understanding the Rural Market – A Practical Approach Case Studies.

Suggested Readings

1. Acharya S.S. and N.L. Agrawal. Agricultural Marketing in India. Oxford and IBH Publishing Company Pvt. Ltd., New Delhi.
2. Memoria C.B. and R.L. Joshi. Principles and Practice of Marketing in India. Kitab Mahal, 15, Thorn hill Road, Allahabad.
3. Pradeep Kashyap (2012). Rural Marketing, Published by Dorling Kindersley (India) Pvt. Ltd.
4. Ramtishen, Y. Rural and Agricultural Marketing. VES College of Arts, Science and Commerce, Mumbai. Jacob Publishing House.

SABM327 **Commodity Futures Trading** **2 (2+0)**

Objectives

1. Understand the fundamentals of commodity futures markets and their role in price discovery and risk management
2. Learn about trading strategies, including hedging and speculation, to manage price volatility

3. Explore the regulatory framework and operational aspects of commodity futures trading
4. Develop skills to analyze market trends, assess risk-reward scenarios, and make informed trading decisions in commodity futures markets

Theory

History and Evolution of commodity markets – Terms and concepts: spot, forward and futures, Markets – factors influencing spot and future markets. Speculatory mechanism in commodity futures. Transaction and settlement – delivery mechanism - role of different agents - trading strategies - potential impact of interest rate, Foreign Exchange, FDI in Commodity Markets. Risk in commodity trading, importance and need for risk management measures - managing market price risk: hedging, speculation, arbitrage, swaps - pricing and their features. Important global and Indian commodity exchanges - contracts traded – special features - Regulation of Indian commodity exchanges – SEBI and its role. Fundamental vs Technical analysis – construction and interpretation of charts and chart patterns for analyzing the market trend – Market indicators – back testing. Introduction to technical analysis software – analyzing trading pattern of different commodity groups.

Suggested Readings

1. Acharya, S.S., 1988, Agricultural Production, Marketing and price policy- A study of Pulses, Mittal Publications, Delhi.
2. Jagadish Prasad, 1966, Encyclopedia of Agricultural Marketing, Mittal Publishers Pvt. Limited, Bombay.
3. Kahlon, A.S. and George, M.V., 1965, Agricultural Marketing and Price Policies, Allied Publishers Private Limited, New Delhi.
4. Nayyar, H. and Ramaswamy, P., 1995, Globalization and Agricultural Marketing, Rawat Publications, Jaipur
5. Prasad, A. Shivarama, Agricultural Marketing in India, Mittal Publications, Delhi.
6. Singhal, A.K., 1989, Agricultural Marketing in India, Anmol Publications, New Delhi.

IV YEAR I SEMESTER

SABM412 **Food Retail Business Management** **4 (0+4)**

Objectives

1. Understand the principles of food retail management, including product assortment, merchandising, and customer service
2. Learn about inventory management, supply chain logistics, and pricing strategies in food retail operations
3. Explore marketing techniques to attract and retain customers, including promotions, branding, and store layout optimization
4. Develop skills to effectively manage food retail businesses, ensure food safety, and meet consumer demands in a competitive market environment

Practical

Introduction to International Food market, India's Competitive Position in World Food Trade, Foreign Investment in Global Food Industry, Retail management and Food Retailing, The Nature of Change in Retailing, Organized Retailing in India, E-tailing and Understanding Food Preference of Indian Consumer, Food Consumption and Expenditure pattern, Demographic and Psychographic Factors Affecting Food Pattern of Indian Consumer. Value Chain in Food Retailing, Principal trends in food wholesaling and retailing, food wholesaling, food retailing, the changing nature of food stores, various retailing formats, competition and pricing in food retailing, market implications of new retail developments, value chain and value additions across the chain in food retail, food service marketing. 4 P's in Food Retail Management, Brand Management in Retailing, Merchandise pricing, Pricing Strategies used in conventional and non-conventional food retailing, Public distribution system, Promotion mix for food retailing, Management of sales promotion and Publicity, Advertisement Strategies for food retailers. Managing Retail Operations, Managing Retailers' Finances, Merchandise buying and handling, Merchandise Pricing, Logistics, procurement of Food products and Handling Transportation of Food Products. Retail Sales Management Types of Retail Selling, Salesperson selection, Salesperson training, Evaluation and Monitoring, Customer Relationship Management, Managing Human Resources in retailing, Legal and Ethical issues in Retailing.

Suggested Readings

1. Berman, B. and Evans, J.R. 2009. Retail management. Pearson Education, New Delhi, 343p.
2. CII Global Retail Report, Confederation of Indian Industry, New Delhi.
3. Hasty, R. and Reardon, R.1997. Retail management. McGraw Hills Education, New Delhi, 339p.
4. Journal of Retailing. Elsevier, Netherlands.
5. Singh, H. 2014. Retail Management: A global perspective: Text and Cases. S. Chand and Co Ltd, New Delhi, 871p.
6. Journal of Business and Retail Management Research, Academy of Business and Retail Management, UK.

SABM413 Supply Chain Management of Agricultural Commodities 4 (0+4)

Objectives

1. Understand the principles and practices of supply chain management specific to agricultural commodities
2. Learn to optimize the flow of agricultural products from farm to consumer, including procurement, transportation, and distribution
3. Explore strategies for inventory management, storage, and quality control to minimize waste and ensure product integrity
4. Develop skills to coordinate and integrate activities along the agricultural supply chain to enhance efficiency, reduce costs, and meet customer demands

Practical

Supply Chain: Changing Business Environment; SCM: Present Need; Conceptual Model of Supply Chain Management; Evolution of SCM; SCM Approach; Traditional Agri. Supply Chain Management Approach; Modern Supply Chain Management Approach; Elements in SCM. Demand Management in Supply Chain: Types of Demand, Demand Planning and Forecasting; Operations Management in Supply Chain, Basic Principles of Manufacturing Management. Procurement Management in Agri. Supply chain: Purchasing Cycle, Types of Purchases, Contract/Corporate Farming, Classification of Purchases Goods or Services, Traditional Inventory Management, Material Requirements Planning, Just in Time (JIT), Vendor Managed Inventory Logistics Management: History and Evolution of Logistics; Elements of Logistics; Management; Distribution Management, Distribution Strategies; Pool Distribution; Transportation Management; Fleet Management; Service Innovation; Warehousing; Packaging for Logistics, Third-Party Logistics (TPL/3PL); GPS Technology. Concept of Information Technology: IT Application in SCM; Advanced Planning and Scheduling; SCM in Electronic Business; Role of Knowledge in SCM; Performance Measurement and Controls in Agri. Supply Chain Management- Benchmarking: introduction, concept and forms of Benchmarking.

Suggested Readings

1. Groznik, A. and Xiong, Y. 2014. Pathways to Supply Chain Excellence. CC BY Intech Publishers, USA, 342p.
2. Kaplinsky, R. and Morris, M. 2014. A Handbook for Value Chain Analysis. IDRC, UK, 217p.
3. Miller, C. and Jones, L.M. 2010. Agricultural Value Chain Finance: Tools and Lessons Food and Agriculture Organization of United Organizations, Italy, 321p.
4. Springer, H.A. 2007. Value links: The methodology of value chain promotion. GIZ LRED, South Africa, 290p.
5. Vermeulen, S., Woodhill, J., Proctor, F. and Delnoye, R. 2014. Chain-wide learning for inclusive agri-food market development. IIED, 398p.

SABM414 **Agri-Export Management** **4 (0+4)**

Objectives

1. Understand the principles and practices of exporting agricultural products
2. Learn about international trade regulations, documentation, and logistics specific to agri- exports
3. Explore market analysis and market entry strategies to identify and capitalize on export opportunities
4. Develop skills to manage export operations effectively, negotiate contracts, and navigate global markets to maximize returns for agricultural products

Practical

International Trade - meaning, definition, nature and scope. Salient features of international trade, differences between internal trade and international trade, advantages and disadvantages of international trade.

Theories of international trade - mercantilism, theory of absolute cost advantage, theory of comparative cost advantage and modern theory of international trade. Terms of trade - meaning and types. Free trade - meaning, advantages and disadvantages, free trade agreements.

Protectionism - meaning, advantages and disadvantages of protectionism, types of protection - tariffs, quotas, subsidies, dumping, cartels and commodity agreements. Balance of Trade (BoT) and Balance of Payments (BoP) - meaning, differences between BoT and BoP, India's BoT and BoP position. Foreign exchange – meaning, foreign exchange rate, types of foreign exchange rate, mechanisms of determining foreign exchange rate. Foreign exchange market – meaning and functions, instruments of international payments, foreign exchange control and foreign exchange reserves.

WTO – origin, structure, objectives and functions. Agreement on Agriculture - domestic support, market access and export subsidies. FAO / WHO Codex Alimentarious and SPS measures.

Export procedures and documentations, types of export - direct export and indirect export, export houses – objectives and types. Agricultural export promotion organizations - APEDA, MPEDA, Commodity Boards and State Export Promoting Agencies. India's agricultural exports and imports – composition and trading countries. India's foreign trade policy – meaning and objectives.

Suggested Readings

1. Agricultural Exports of India, by Priya Kumari.
2. Export Import Management, 2nd edn by Justin Paul and Rajiv Aserkar, Oxford.
3. Innovations in Agri-Business Management, 2009, by Karnam Lokanadhan.
4. Management of Agribusiness and Agri Exports ,2022, by Rupali Bipin Sheth, Nutan Thoke and Asmita V. Kulkarni.

SABM415 **Packaging and Branding of Agricultural Commodities** **4 (0+4)**

Objectives

1. Understand the importance of packaging and branding in enhancing the marketability of agricultural commodities
2. Learn about effective packaging materials, designs, and techniques for preserving product quality and attracting consumers
3. Explore branding strategies to differentiate agricultural products, build brand equity, and create value for consumers
4. Develop skills to design, implement, and evaluate packaging and branding strategies that meet market demands and enhance competitiveness in the agricultural sector

Practical

Customer: How to Identify Customer Needs, How to Make Product Development as per the Customer need, Recent Trends in Marketing, Target Customer (Definition and general Info), Psychographics (lifestyle, Hobbies, behavior pattern), Demographics (Age, Education, gender.), Consumer segmentation.

Food Processing: What is Food Processing. Processing stages for Various products, Methods of Food Preservation

Food Packaging: Introduction to food packaging and opportunities for start-ups, Food packaging materials: (Paper, metal, glass, plastics and cardboard), Food Packaging: an important tool for nutrition, safety and effective marketing, Food Packaging Machinery, Selection Criteria for Food Packaging system, Types of Packaging, Advances in food packaging (or A peep into the future of food packaging).

Branding: What is Brand? Communication platform between customer and product, What are their characteristics? Why does the product need branding? How does branding help? What are the drivers? Branding ideas (case studies).

How To Promote Branding: How to get prominence? Visual Merchandising, Retail Merchandising, How does the Branding category help?

Suggested Readings

1. Agricultural Marketing in India by S.S. Acharya and N.L. Agarwal, 202.1
2. Cultures of Commodity Branding (UCL Institute of Archaeology Publications) by Andrew Bevan and David Wengrow, 2016 Kindle Edition.
3. From Commodity To Experience - Why Semiconductor Branding Is Important Now? by A Singh, 2011.
4. Modified and Controlled Atmospheres for the Storage, Transportation, and Packaging of Horticultural Commodities, by Elhadi M. Yahia, 2009.

SABM416 **e-Commerce in Agribusiness** **4 (0+4)**

Objectives

1. Understand the principles and dynamics of e-commerce within the context of agribusiness
2. Learn about e-commerce platforms, technologies, and strategies for marketing and selling agricultural products online
3. Explore the benefits and challenges of e-commerce adoption in agribusiness, including logistics, payment systems, and customer engagement
4. Develop skills to leverage e-commerce opportunities to reach wider markets, increase sales, and improve efficiency in agricultural trade

Theory

Introduction- meaning and forces behind E-commerce, industry framework, brief history of E-commerce, advantages of E-commerce, Inter-organizational E-commerce, Intra organizational E-commerce, Pure v/s Partial E-commerce. Network infrastructure for E-commerce, the internet, intranets and extranets as E-commerce infrastructure. Encryption-WWW and security encryption, transaction security, secret key encryption, public key encryption, virtual private network, implementation management issues; Electronic payments-overview of E-payments, digital token based electronic payment system, smart cards, credit cards / debit cards based electronic payment system, emerging financial instruments, home banking and online banking. Electronic Data Interchange (EDI), Development of EDI, Application of EDI in business, legal requirements in E-commerce. Introduction of Ecommerce in supply chain management (SCM) and customer relationship management (CRM). E-commerce standards- Introduction, types of standards, document translation standards. E-commerce law- introduction, E-commerce transaction, electronic fund transaction act and regulation, forms of agreement, legal issues in Indian scenario. Mobile commerce introduction to M-commerce, mobile computing application s, wireless application protocols, WAP technology. Web Security- Introduction to web security, firewalls and transaction security, client server network, emerging client server security threats, firewalls and network security.

Practical

E-commerce- case studies of which include six success stories like India times. com, Rediff. com, Baazee. com, SAIL, ITC- E-choupal, AMUL, Digital Marketing- Introduction, the effects of E-business technologies on marketing strategy, First generation marketing tools- Email marketing, online marketing, search marketing, affiliate marketing. Second generation digital marketing tools and viral marketing, Future challenges and opportunities of E-commerce.

Suggested Readings

1. Agribusiness Management Theory and Practices by Dr Shoji Lal Bairwa and Dr Ch and ra Sen and Dr L K Meena and Dr Meera Kumari, Write and Print Publications
2. Agribusiness Management, January 2019, by Biswas and Giri Mishra, Himalaya Books Pvt. Ltd.

3. Books from same Author: Dr Shoji Lal Bairwa and Dr Ch and ra Sen and Dr L K Meena and Dr Meera Kumar

4. E-Commerce Business: The Essential Guide to E-Commerce Success, Learn All the Valuable Information You Need in Starting a Successful E-Commerce Business S.P. Suarker, Oct 2020 · Author's Republic. Narrated by Marcus Mulenga

SABM417 Logistics Management of Agricultural Commodities 4 (0+4)

Objectives

1. Understand the principles of logistics management as applied to agricultural commodities

2. Learn about transportation, inventory management, and supply chain optimization techniques specific to agricultural logistics

3. Explore strategies for efficient handling, storage, and distribution of agricultural products to minimize costs and maximize value

4. Develop skills to plan, coordinate, and execute logistics operations effectively to ensure timely delivery and quality preservation of agricultural commodities

Practical

Introduction to physical distribution, Logistics management, Logistics Management and its elements, Modern Concepts in Logistics, Role of logistics in strategy, Inbound and outbound supply chain management, Container – types, Different types of cargo, Packaging and Material Handling, Introduction to supply Chain Management (SCM), Sourcing, Transportation, Indian supply chain architecture, Introduction to warehousing, Warehouse functions, Warehouse types, Warehouse providing value added services, Warehouse internal operations, Warehousing equipment, Inventory, Safety and security in warehouses, Future trends in warehousing, Introduction – recent developments in logistics, Transport and mobility technologies, Green logistics, Cold chain logistics, Block chain and big data analytics in logistics, 3 D printing and wearable devices in logistics, Transport Services, Costing and Performance, Administration and Control and use of IT.

Suggested Reading

1. Ballou, R.H. and Samir, K. 2012. Business logistics/Supply chain management. Pearson Education, New Delhi, 429p.

2. Groznik, A. and Xiong, Y. 2014.Pathways to Supply Chain Excellence. CC BY Intech Publishers, USA,342p.

3. Kaplinsky, R. and Morris, M. 2014.A Handbook for Value Chain Analysis. IDRC, UK, 217p.

4. Miller, C. and Jones, L. M. 2010. Agricultural Value Chain Finance: Tools and Lessons Food and Agriculture Organization of United Organizations, Italy,321p.

5. Springer, H. A. 2007. Value links: The methodology of value chain promotion. GIZ LRED, South Africa, 290p.

Vermeulen, S., Woodhill, J., and Proctor, F., and Delnoye, R.2014. Chain-wide learning for inclusive agri-food market development. IIED, 398p

SABM418 **Application of ICT in Agribusiness** **4 (0+4)**

Objectives

1. Understand the role and importance of Information and Communication Technology (ICT) in agribusiness
2. Learn about various ICT tools and applications for farm management, market analysis, and supply chain optimization
3. Explore strategies to leverage ICT to enhance productivity, efficiency, and competitiveness in agribusiness operations
4. Develop skills to implement and integrate ICT solutions effectively to address challenges and capitalize on opportunities in the agricultural sector

Practical

Introduction and scope of ICT in Agriculture, Need for ICT in Agricultural Extension. National Policies on ICT in Agricultural Extension. Role of communications in ICT: Concept, elements and their characteristics. Message: meaning, dimensions of a message characteristics of a good message, message treatment and effectiveness, distortion of message. Methods of communication: meaning and function. Forms of communication. Role of Mass Media in dissemination of farm technology. Modern communication media: electronic video, tele text, tele conference, computer assisted instruction. Telephone/Mobile Technology: Farmer Call Centre, SMS Broadcast Service, m-krishi. ICT initiatives of NGOs and Private Companies. ICT initiatives by ICAR and SAUs, Value Added Services, Fisher Friend Project, SMS Services to farmers by Department of Agriculture. Practices of ICT for Agricultural Extension: aAQUA, Digital Green, e-Agrik (e-Agriculture), e- Sagu (e-cultivation), KISSAN (Karshaka Information Systems Service and Networking), Solutions through Information, VASAT-Virtual Academy for the Semi-Arid Tropics, Touch Screen Kiosk, e-Extension (e-Soil Health Card Program). Village Knowledge Centre (VRC/VRC/CIC): Introduction, concept, process for setting VRC. Warana Wired Village Project, Web Portals: AGRISNET, DACNET, InDG, DEAL, i-KISAN, e- Krishi, ASHA, IFFCO- Agri-Portal, Agriwatch Portal, i-Shakti. ICTs for market information and Agri-Business: AGMARKNET, e-KRISHI VIPNAN, ICT-e-CHOPAL, EID Garry-Indiagriline.

Suggested Readings

1. Agribusiness and Technology: Revolutionizing the Future of Farming by Sujit Sahgal, 2021.
2. Agriculture 5.0: Artificial Intelligence, IoT and Machine Learning by Latief Ahmad and Firasath Nabi, 2021.

3. Drones and Geographical Information Technologies in Agroecology and Organic Farming: Contributions to Technological Sovereignty, by Alberto Diantini, Massimo De Marchi, et al., 2022.

4. Educational Technology and ICT by Dr. A.B. Bhatanagar and Dr. Anurag Bhatnagar, 2016,

SABM419 **Financial Management** **4 (0+4)**

Objectives

1. Understand the principles of financial management and its importance in business
2. Learn how to analyze financial statements, manage budgets, and make investment decisions
3. Explore strategies for financing operations, managing cash flow, and mitigating financial risks
4. Develop skills to optimize financial performance, enhance profitability, and ensure long-term sustainability in business operations

Practical

Estimation of project cash flows, Evaluation of proposals. Evaluation techniques Discounting and non-discounting techniques. Risk analysis in capital budgeting. Estimation of working capital requirements; Inventory Management; Appraisal of project proposals using capital budgeting techniques. Computation of costs of borrowed capital, preferred stock, equity capital and retained earnings. Calculation of Operating Leverage, Financial Leverage and Combined Leverage. Valuation of stocks and debentures. Estimation of operating cycle.

Suggested Readings

1. Khan and Jain 2014., Financial Management, Tata McGraw Hill.
2. Pandey, I.M., 2010. Financial Management (10th edn), Vikas Publishing House (P) Ltd, New Delhi.
3. Ravi M.K. 2015. Financial Management: Theory, Problems, Cases. Taxman Publications Prentice Hall of India Learning (8th edn).
4. Sharma, R. K., and Sasi Guptha K., Management Accounting, Kalyani Publishers.
5. Vyaptakesh, S. 2012. Fundamentals of Financial Management, Pearson Publishers.

SAEG411 **Storage and Warehousing of Agricultural Commodities** **4 (0+4)**

Objectives

1. Understand the principles of storage and warehousing for agricultural commodities

2. Learn about storage techniques, facilities, and equipment used to maintain product quality and minimize losses

3. Explore strategies for inventory management, handling, and distribution to optimize storage efficiency and reduce post-harvest losses

4. Develop skills to design, manage, and operate storage and warehousing facilities effectively to ensure the availability of high-quality agricultural commodities for market

Practical

Distribution management - storage and warehousing and transportation management for agricultural products; marketing agencies/intermediaries – roles and functions; distribution channels involved in agribusiness.

Suggested Reading

1. Agricultural Marketing in India by S.S. Acharya and N.L. Agarwal, 2021.

2. Emerging Trends in Agricultural Marketing in India by Ashok M. V, 2021.

3. Groznik, A. and Xiong, Y. 2014.Pathways to Supply Chain Excellence.CC BY Intech Publishers, USA,342 p.

4. Modified and Controlled Atmospheres for the Storage, Transportation, and Packaging of Horticultural Commodities, by Elhadi M. Yahia, 2019.

SELM412 **Custom Hiring of Agricultural Machinery** **4 (0+4)**

Objectives

1. Understand the principles and benefits of custom hiring services for agricultural machinery

2. Learn about the management and operation of custom hiring centers for efficient machinery utilization

3. Explore strategies for providing cost-effective machinery services to smallholder farmers and agricultural communities

4. Develop skills to assess demand, set pricing, and manage logistics effectively in custom hiring operations to support sustainable agricultural practices

Practical

Understand general discipline in the class room and workshop (Do's and Don'ts) Study the scope and importance of Farm Mechanization industry in India Familiarize with different farm machineries' manufacturers and their brands/models Understand the role of a Custom Hiring Service Provider and the progression pathways State the importance of entrepreneurship Select entrepreneurship as an alternate career option State customer hiring centre meaning and its role in promotion Explain the differences between entrepreneurship, self employment and wage

employment Discuss case studies, video presentation, group discussion, debates and exercise in entrepreneurship activities Discuss and interact with successful entrepreneurs and business people in a similar field to gain expertise State the role and reward of entrepreneurship Explain the need and importance of market assessment List components and techniques of market survey/ assessment Explain demand analysis and assessment of farmers needs Identify possible sources of finance/loan Identify potential customers and maintain customer database Conduct target market assessment and decide positioning of products/ services which is easily accessible to potential buyers List criteria for selection of location for conducting business Understand government laws, local state laws and other regulations for business activity Identify distribution and marketing channels considering the requirements and constraints associated with the same Estimate costing and pricing Calculate risk assessment in business Identify opportunities for scaling up the business Collect information related to various subsidies/funds/ schemes offered by the government, authorized state units and other financial institutions Track and maintain records, and monitor them on a regular basis Explain promotional strategies for the business based on the budget and target segment State minimizing costs and maximizing profits steps Select the machineries for Custom Hiring Centre.

Suggested Readings

1. Review of and recommendations for custom hiring centers for mechanization in Nepal and the Asian region: 2021, by Food and Agriculture Organization
2. Testing, Evaluation of Agricultural Machinery, Equipment, by Smith, 2020
3. Testing and Evaluation of Agricultural Machinery 2nd Revised and Enlarged Edn by M L Mehta
4. Unit Operations of Agricultural Processing by K.M. Sahay and K.K Singh, 2004

SAEX412 **Agro-Tourism** **4 (0+4)**

Objectives

1. Understand the concept and potential of agro-tourism as a form of rural development
2. Learn about the principles and practices of sustainable agro-tourism operations.
3. Explore strategies for integrating agriculture, tourism, and hospitality to create unique visitor experiences
4. Develop skills to plan, market, and manage agro-tourism enterprises that contribute to local economies and promote cultural exchange

Practical

Agro-tourism: Introduction, importance, scope, forms of agro-tourism, advantages and implementations, introduction to Indian culture. Govt. policies and legislations in respect of tourism and agro-tourism and environment protection laws. Requirements for Agro-tourism. Farm, forest, garden, fish tank/ponds, residential huts, etc. Constraints in operation and management of Agro-tourism activities. Management of resources – Human resources, Natural resources and Garbage management at Agro-tourism centre. Entrepreneurship development:

Role and functions, Hospitability: Food and beverages and accommodation services. Communication skill and service; Capital investment, sources and capital budgeting. Project proposal- Preparation and feasibility tests, Accounts and record keeping etc. Marketing strategies for Agro-tourism products and services. Publicity of tourism- Advertisement and use of media.

Suggested Readings

1. Agritourism, by M. Sznajder, L. Przezbórska and F. Scrimgeour.
2. Agrotourism Management: A Complete Practical Guide, 2020, by S. G. Walke, Atul Kumar and Vinaydeep Brar.
3. The New Agritourism, January 2008, by Barbara Berst Adams.

SAGR414 **Fertilizer Retailing** **4 (0+4)**

Objectives

1. Understand the principles of fertilizer retailing, including product knowledge, sales techniques, and customer service
2. Learn about inventory management, pricing strategies, and distribution logistics in fertilizer retail operations
3. Explore marketing strategies to attract and retain customers, including promotions and loyalty programs
4. Develop skills to effectively manage fertilizer retailing operations, optimize sales, and maximize profitability while meeting regulatory requirements and ensuring environmental stewardship

Practical

Fertilizer development – concept, scope, need, resource availability; import and export avenues for fertilizer; types of fertilizers, grading and chemical constituents, role of fertilizers in agricultural production, production and consumption of fertilizer in India. Raw material needed and principles of manufacturing of nitrogenous, phosphatic and potassic fertilizers, secondary nutrient sources and micronutrient formulations. Production efficiency and capacity utilization; quality control and legal aspects- fertilizer control order. Testing facilities; constraints in fertilizer use and emerging scenario of fertilizer use; assessment of demand and supply of different fertilizers, fertilizer distribution, fertilizer storage. Field trials and demonstration, fertilizer pricing policy; scope of biofertilizer; environmental pollution due to fertilizer use.

Suggested Readings

1. Growing Gardens, Building Power: Food Justice and Urban Agriculture (Nature, Society, and Culture), 2022, by Justin Sean Myers.
2. Retailing Management | 9th Edition, 2021, by Michael Levy, Barton Weitz and Dhruv Grewal.

3. Soil Fertility and Fertilizers: An Introduction to Nutrient Management, 2016, by Kindly Edition

4. The Retail Start-Up Book: Successfully Plan, Launch and Grow a Business, 2022, by Rowland Gee, Danny Sloan and Graham Symes.

SFSN414 **Value Addition to Agricultural Commodities** **4 (0+4)**

Objectives

1. Understand the importance of value addition in increasing the market value of agricultural commodities

2. Learn techniques for processing, packaging, and branding to enhance the quality and appeal of agricultural products

3. Explore strategies to diversify product lines and create new revenue streams through value- added products

4. Develop skills to identify value addition opportunities, optimize production processes, and meet consumer preferences for higher-quality agricultural commodities

Practical

Food processing and value addition basics, Hygiene and sanitation in food processing Standards for food processing, Sorting and grading of fruits and vegetables, Preparation of fruits and vegetables for processing, Production of fruit marmalade (jam), Production of peanut flour and peanut butter, Solar drying of fruits and vegetables, Milk value addition, Mushroom production, Packaging and packaging material, Branding and labelling.

Suggested Readings

1. A Comprehensive Manual for Food Technology and Agricultural Value Addition, by Stephen Wachira Kariuki | 13 April 2021.

2. Agricultural Marketing in India by S.S. Acharya and N.L. Agarwal, 2021.

3. Composting Agricultural Residues for Value Addition, by Seema Garcha, 25 July 2010.

4. Postharvest, Value Addition and Export: Agricultural Commodity Export and Processing by Adeniyi Oyegbile, 4 September 2022.

SHRT414 **Hi-Tech Horticulture/Protected Cultivation** **4 (0+4)**

Objectives

1. Understand the principles and techniques of hi-tech horticulture, including protected cultivation methods

2. Learn about advanced technologies such as greenhouse and hydroponic systems for optimized crop production

3. Explore strategies for climate control, irrigation, and nutrient management to maximize yield and quality in protected cultivation

4. Develop skills to implement and manage hi-tech horticulture practices for sustainable and profitable crop production

Practical

Introduction, importance and scope of hi-tech horticulture in India, Hi-tech nursery management and mechanization of horticultural crops, Micropropagation of horticultural crops, Hi-tech field preparation and planting methods, Protected cultivation: Advantage and constraints, Environmental control in green house- temperature, light, CO2, relative humidity and ventilation methods and techniques, Micro irrigation systems and its components, EC/pH based irrigation/ fertigation scheduling, Hi-tech canopy management of horticultural crops, High density orcharding in Mango, guava, papaya, citrus, pineapple etc, Remote sensing and geographical information system, Differential geo-positioning system (DGPS), Component of precision farming and application of precision farming in horticultural crops (fruit, vegetables and ornamental crops 2 crops each), Mechanized harvesting produce, Post-harvest management for export

Suggested Readings

1. Hi Tech Horticulture (Pb) by Prasad and S Et Al, Agrobios
2. Protected Cultivation by Pradhan, Adikant, Satish Serial Publishing House
3. Protected Cultivation of Horticulture Crops by Prabhakar, Itigi
4. Textbook of Protected Cultivation and Precision Farming for Horticultural Crops by Kumar, B Ashok et al, Jain Brothers

SSST412 **Seed Business Management** **4(0+4)**

Objectives

1. Understand the principles of seed business management, including production, marketing, and distribution
2. Learn strategies for quality control, seed certification, and regulatory compliance in seed industry operations
3. Explore market analysis and branding techniques to enhance seed sales and market share
4. Develop skills to develop and implement business plans that ensure profitability and sustainability in the seed industry

Practical

Seed Technology – Role of Seed Technology, Seed Industry in India, National Seed Corporation, State Seed Corporations, National Seed Project and State Farms and their role. Development and Management of Seed Program s – Seed Village Concept, Basic Strategy of Seed Production and Planning and Organization of Seed Program; Types of Seed Program – Nucleus seed, Breeders seed, Foundation seed and Certified seed etc. Maintenance of genetic purity – Minimum seed certification standard and Management of breeders and Nucleus seed;

Management of seed testing laboratory and research and development. Management of seed processing plant, seed storage management; seed packaging and handling. Seed Marketing; GM Crop seed, IPR, PBR, Patents and related issues and their impact on developing countries; Statutory intervention in the seed industry; Seed legislation and seed law enforcement, Seed act; Orientation and visit to seed production farms, seed processing Units, NSC, SSC and seed testing laboratories.

Suggested Readings

1. Agricultural Marketing in India, 2021, by S.S. Acharya and N.L. Agarwal.
2. Seed Technology and Management, 2021, by Dr. Bilal Ahmad Wani.
3. Seed Technology Processing Storage and Marketing by Kanwar H S et al., Jain Brothers.
5. Vegetable Hybrid Seed Production and Management, 2010, by K. Vanangamudi