



Course Curriculum

(As per V Deans' Committee's Recommendations)

B.Sc. (Agricultural Marketing & Co-operation) Degree Programme

**University of Agricultural Sciences
GKVK, Bengaluru-560 065**

2016

University of Agricultural Sciences, Bengaluru

B.Sc. (Agricultural Marketing & Co-operation)

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2.	AST. 222	Applied Business Statistics	1+1	3
3.	CSC. 121	Computer Science and Agri-Informatics	1+1	5
4.	ENG. 121	Comprehension & Communication Skills in English	1+1	5
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7.	NSS.111	National Service Scheme	0+1	8
8.	PED. 111	Physical Education & Yoga Practices	0+1	11
Total			4+8=12	

* Non-gradual courses

Note: 1. PED. 111 (0+1) Spread over for one year

2. NSS. 111 (0+1) Spread over two years

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1	2	3	4	5
AGRICULTURAL AND ALLIED SUBJECTS				
AGRICULTURAL ECONOMICS				
1	AEC. 111	Fundamentals of Agricultural Economics	2+0	13
2	AEC 321	Farm Management, Production & Resource Economics	1+1	14
Total			3+1=4	
AGRICULTURAL ENGINEERING				
1	AEG. 211	Farm Machinery and Power	1+1	16
2	AEG. 321	Protected Cultivation and Secondary Agriculture	1+1	17
Total			2+2=4	
AGRICULTURAL ENTOMOLOGY				
1.	AET. 121	Fundamentals of Entomology	2+1	18
2.	AET. 311	Insect Pests of Field Crops and Stored Grains and their Management	1+1	19
Total			3+2=5	
AGRICULTURAL EXTENSION				
1	AEX. 121	Fundamentals of Agricultural Extension Education and Rural Development	1+1	20
2	AEX. 122	Rural Sociology , Educational Psychology & Constitution of India	0+2	21

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1	2	3	4	5
3	AEX. 211	Communication and Diffusion of Agricultural Innovations	1+1	22
4	AEX. 321	Entrepreneurship Development and Business Communication	1+1	23
Total			3+5=8	

AGRICULTURAL MICROBIOLOGY

1	AMB. 222	General Microbiology	1+1	24
Total			1+1=2	

AGRONOMY

1.	AGR. 111	Fundamentals of Agronomy	2+1	25
2.	AGR. 213	Introduction to Crop Production Technology	2+1	26
3.	AGR. 321	Farming Systems, Organic Farming and Precision Agriculture	2+1	26
Total			6 +3=9	

ANIMAL SCIENCE

1.	ASC. 311	Livestock, Poultry and Fish Production Management	2+1	27
Total			2+1=3	

APICULTURE

1	API. 312	Introduction to Apiculture	0+1	28
Total			0+1=1	

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1	2	3	4	5
CROP PHYSIOLOGY				
1	CPH. 311	Post-harvest Physiology of Market Produce	2+1	29
Total			2+1=3	

FOOD SCIENCE AND NUTRITION

1	FSN. 321	Food Processing, Food Safety Standards and Value Addition	1+1	30
Total			1+1=2	

FORESTRY AND ENVIRONMENTAL SCIENCE

1	FES. 111	Introduction to Forestry	1+1	31
2	FES. 221	Environmental Studies & Disaster Management	2+0	32
Total			3+1=4	

GENETICS & PLANT BREEDING

1.	GPB. 212	Introduction to Genetics, Plant Breeding and Protection of Plant Varieties	1+1	34
Total			1+1=2	

HORTICULTURE

1	HRT. 122	Fundamentals and Production Technology of Horticulture Crops	2+1	35
2	HRT. 321	Post-harvest Management and Value Addition of Fruits and Vegetables	1+1	35
Total			3+2=5	

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1	2	3	4	5
PLANT BIOTECHNOLOGY				
1	PBT. 224	Introduction to Plant Biotechnology	2+0	36
Total			2+0=2	
PLANT PATHOLOGY				
1	PAT. 211	Fundamentals of Plant Pathology	2+1	37
2	PAT. 223	Post-Harvest diseases and their Management	1+1	39
Total			3+2=5	
SEED SCIENCE AND TECHNOLOGY				
1.	SST. 221	Principles and Practices of Seed Science and Technology	1+1	40
Total			1+1=2	
SERICULTURE				
1	SER. 311	Introduction to Sericulture	1+1	42
Total			1+1=2	
SOIL SCIENCE & AGRICULTURAL CHEMISTRY				
1.	SAC. 121	Fundamentals of Soil Science	2+1	43
2.	SAC. 321	Manures, Fertilizers and Soil Fertility Management	2+1	44
Total			4+2=6	

1	2	3	4	5
AGRICULTURAL MARKETING AND COOPERATION				
1.	AMC. 111	Introduction to Agricultural Marketing	1+1	45
2.	AMC. 112	Marketing Management	2+0	45
3.	AMC. 113	Micro and Macro Economics	2+1	46
4.	AMC. 114	Agricultural Input Marketing	1+1	47
5.	AMC. 115	Agricultural Finance and Insurance	1+1	49
6.	AMC. 116	Theory and Practice of Banking	2+1	50
7.	AMC. 121	Retailing Management	2+0	51
8.	AMC. 122	Theory and Practice of Cooperation	2+0	53
9.	AMC. 211	Agricultural Marketing Legislation and Policies	2+0	53
10.	AMC. 212	Agricultural Price Analysis	1+1	54
11.	AMC. 213	Principles of Management	2+0	56
12.	AMC. 214	Monetary Theory and Public Finance	2+0	57
13.	AMC. 215	Management of Cooperatives	2+0	57
14.	AMC. 221	Agribusiness Management	2+1	58
15.	AMC. 222	Value Chain in Agriculture	2+1	59
16.	AMC. 223	Agricultural Project Analysis	2+1	60
17.	AMC. 224	International Trade and Export Management	2+1	61
18.	AMC. 311	Market Information System and Futures Trading	2+0	62
19.	AMC. 312	Consumer Behaviour and Market Research	1+1	63

1	2	3	4	5
20.	AMC. 313	Recent advances in Agricultural Marketing	1+1	64
21.	AMC. 314	Standardization, Grading and Quality Control in Crop Produce	2+1	65
22.	AMC. 315	Accountancy	2+1	65
23.	AMC. 321	Agricultural Commodity & Livestock Marketing	1+1	67
24.	AMC. 322	Standardization, Grading & Quality Control in Livestock & Livestock Products	1+1	68
25.	AMC.s 323	Advanced Accounting & Auditing	2+1	69
Sub Total			42+17=59	

ABSTRACTS

Basic Sciences and Humanities		4+4	
Agricultural and Allied Subjects		41+28	
Courses in Agricultural Marketing & Co-operation		42+17	
Student “READY” Programme			71
•	RAWE - Rural Agricultural Work Experience	0+20	73
•	EL/HoT - Experiential Learning/Hands on Training	0+20	83
Non Gradial Courses:			
•	Physical Education	0+1	
•	NSS	0+1	
•	Kannada	0+2	
•	Educational Tour	0+1	84
•	Remedial Courses	2(1+1) / (2+0)	
Grand Total		(8+69+59+20+20+7*)=183	

* Non--gradial Courses

BASIC SCIENCES AND HUMANITIES

AST. 211

Business Statistics

1+1

Theory: Introduction to Statistics and its Applications in Agriculture, Concept of Data, Collection and Classification, Functions and Limitations of Statistics, Frequency Distributions of data, Diagrammatic Representation of Data: Bar & Pie diagrams, Graphical Representations of Data: Histogram, Frequency Polygon, Frequency curve and Cumulative frequency curve (Ogives). Measures of Central Tendency: Concepts & Definition, Characteristics of ideal Average, Arithmetic Mean, Median, Mode, Quartiles, Deciles & Percentiles (both for Ungrouped and Grouped data), Geometric Mean and Harmonic Mean (Ungrouped data). Measures of Dispersion: Concepts & Definition, Types of Measures of Dispersion: Range, Quartile deviation, Absolute Mean Deviation from mean and median, Standard Deviation and Variance, and Co-efficient of dispersion (both for Ungrouped and Grouped data). Measures of Moments, Skewness and Kurtosis (only for ungrouped data). Correlation Analysis: Definition, Measures of Correlation: Scatter diagram, Karl Pearson product moment and Spearman's rank correlation coefficients and their properties. Simple Linear Regression Analysis: Definition, Fitting of simple linear regression equations Y on X and X on Y, Properties of regression coefficient, interrelation between correlation and regression. Concept of Set Theory, Permutation & Combinations. Theory of Probability: Concept & Definitions, Addition and Multiplication rules of probability (without proof), conditional probability. Theoretical Probability distributions: Concept, conditions & characteristics of Binomial, Poisson, Normal Distribution and Standard Normal Distribution, their Properties & Applications. Sampling and Complete Enumeration, Parameter, Statistic, Concept of Sampling distribution of Statistic and Standard error, Sampling distribution of sample mean and Sample proportion, Sampling distribution of difference between two means and two proportions. Estimation: Point and interval estimation, standard error of the point

estimate, Construction of 95% & 99% confidential intervals for single mean & proportion, Construction of 95% & 99% confidential intervals for difference between two mean & proportions. Test of Significance: Introduction, Null & Alternative hypothesis, Types of Errors, Level of significance, degrees of freedom, Critical & Acceptance regions. Large sample tests: Z-Test for Means - One and Two Sample Means for known and unknown population variance. Small sample test: Student t-test for Means - One and Two sample means, Paired t-test and F-test for two population variances. Chi-Square test: Test for Goodness of Fit, Test for independence of attributes for $r \times c$ contingency table, 2×2 contingency table with Yates correction. Introduction to Analysis of Variance and its Assumptions, Analysis of Variance for One & Two Way Classification.

Practical: Construction of Frequency Distribution tables. Diagrammatic presentation of data: Bar diagrams & pie diagrams. Graphical Representation of Data: Histogram, Frequency polygon, Frequency curve and Cumulative frequency curve (Ogives). Computation of Measures of Central Tendency: Arithmetic Mean, Median, Mode, Quartiles, Deciles & Percentiles (both for Ungrouped and Grouped data), Geometric Mean and Harmonic Mean (Ungrouped data). Computation of Measures of Dispersion: Range, Quartile deviation, Absolute Mean Deviation, Standard Deviation and Variance and Co-efficient of dispersion (both for Ungrouped and Grouped data). Computation of Moments, Measures of Skewness and Kurtosis (only for ungrouped). Computation of Correlation Coefficient: Karl Pearson product moment and Spearman's rank correlation coefficients. Fitting of Simple Linear Regression Equations Y on X, & X on Y. Problems on permutation and combination, Problems on Simple Probability, Addition and Multiplication rules. Computation of probabilities using Binomial, Poisson and Normal Distributions, Area under Standard Normal Curve. Problems on Sampling distribution of sample mean and Sample proportion, Sampling distribution of difference between two means and two proportions. Construction of 95% & 99% confidential

intervals for single mean & proportion, difference between two mean & proportions. Construction of 95% & 99% confidential intervals for difference between two mean & proportions. Problems on Large sample tests: Z-Test for Means - One and Two sample means for known and unknown population variance. Problems on Small sample tests: Student t-test for Means - One and Two sample means, Paired t-test, and F-test two population variances. Problems on Chi-Square test: Test for Goodness of Fit, Test for independence of attributes for $r \times c$ contingency table, 2×2 contingency table with Yates correction. Problems on Analysis of Variance for One & Two Way Classified data.

AST. 222 Applied Business Statistics 1+1

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

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

Index numbers: Concept & Definition, objectives of index numbers, advantages and limitations. Prerequisites of index numbers, Types of Index numbers: Price index number (retail and whole sale), Quantity index numbers, Value index numbers. Construction of

Simple index numbers under simple aggregative & simple average of relatives (fixed and chain based) method. Construction of weighted index numbers under weighted aggregative method. Chain index number, conversion of chain base index number to fixed base index number, fixed base index number to chain base index number.

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

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

CSC. 121 Computer Science and Agri-Informatics 1+1

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

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

ENG. 121 Comprehension & Communication 1+1 Skills in English

Theory: Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to help

the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Writing Skills: Paragraph writing, Précis writing, Report writing, Proposal writing and Letter Writing. Interview Skills. Resume/CV Preparation and Job applications. Synopsis Writing.

Practical: Listening Comprehension: Listening to short talks, lectures, speeches (scientific, commercial and general in nature). Oral Communication: Phonetics, stress and intonation, Conversation practice. Presentation skills and Public speaking. Reading skills: Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; Group discussion.

PAÑÀVÀÙÀÀ

PAÑÀzÁàÛÀÙÉ

KAN. 111 0+1

C. PÀÀPÀÉ

dEMZAVÀVUMÀ-dEMZbà; ±bàt gÀ ZIEUMÀ-eÀqgZÀ¹àÀAIA S, PÀTÙ
DAIÀDI @PÀÀ ò È À Ì Á½EÀVÀVÉ PÀÀPÀÀ; w½ZPÀgÀ ò À½-àÉZÀ»;
fÀVÀ qÀ|| Ì ÒgPÀ Mì gÀÀtÙ MAZÀ SÀ M ¥MèÈÀIA MPÀAZÀ

D. PÀ SgÀÀ

DZÀEPÀ ¥MÉÀD PÈbqÀ PÀ|| Ì À»VÀ ¥J ZÀIA - qÀ||f.«ÁgÀ ÌZÈqÀ
ಕನ್ನಡದಲ್ಲಿ ಕೃಷಿವಿಜ್ಞಾನ ಸಾಹಿತ್ಯದ ಉಗಮ ಮತ್ತು ವಿಕಾಸ-ಡಾ|| ಜೆ. ಬಾಲಕೃಷ್ಣ,
J Ì ¥Ági ÌÈi C@è @PÀtAIA - qÀ||n.J Ì.ZEÀ±i, C°ÁgPÀS
DAIÀZÀ-ÉÀUÀ±À ò ÒqÉ

E. ¥ÀÀÈÁVPÀ

CEÀÀZÀ ¥Áj Ì ÁPÀ¥ÌZgZÈÀIA «ZÀÉUMÀ.

Citizenship, constitution and human rights

Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information

Family and society

Concept of family, community (PRIs and other community based organisations) and society

PART II

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.

PART III

Course Title : National Service Scheme III

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

PART IV

Youth and crime

Sociological and psychological factors influencing youth crime, cyber-crime, peer 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.

PED. 111 Physical Education and Yoga Practices 0+1

PART I

Teaching of skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)

Teaching of advance skills of Football – involvement of all the skills in game situation with teaching of rules of the game

Teaching of skills of Basketball – demonstration, practice of the skills, correction of skills, involvement in game situation – involvement of all the skills in game situation with teaching of rule of the game

Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation

Teaching of advance skills of Kabaddi – involvement of all the skills in game situation with teaching of rule of the game

Teaching of skills of Ball Badminton – demonstration, practice of the skills, correction of skills, involvement in game situation

Teaching of skills of Ball Badminton – involvement of all the skills in game situation with teaching of rule of the game

Teaching of some of Asanas – demonstration, practice, correction and practice

Teaching of some more Asanas – demonstration, practice, correction and practice

Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation

Teaching of skills of Table Tennis – involvement of all the skills in game situation with teaching of rule of the game

Teaching – Meaning, Scope and importance of Physical Education

Teaching – Definition, Type of Tournaments

Teaching – Physical Fitness and Health Education

Construction and laying out of the track and field (*The girls will have Tennikoit and Throw Ball).

PART II

Teaching of skills of Hockey – demonstration practice of the skills and correction and involvement of skills in games situation

Teaching of advance skills of Hockey – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game

Teaching of skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of the skills in games situation - Involvement of all the skills in games situation with teaching of rules of the game

Teaching of different track events – demonstration practice of the skills and correction with competition among them.

Teaching of different field events – demonstration practice of the skills and correction and competition among them.

Teaching of different asanas- demonstration practice and correction

Teaching of weight training – demonstration practice and correction.

Teaching of circuit training – demonstration practice and correction.

Teaching of calisthenics – demonstration practice and correction.

Note: 1) Compulsory Uniform: Half pants, Tee Shirts, Shoes and socks all white (Girls will have white Tee Shirt and Track pants)

2) The games mentioned in the practical may be inter changed depending on the season and facilities.

AGRICULTURE AND ALLIED SUBJECTS

AGRICULTURAL ECONOMICS

AEC. 111 Fundamentals of Agricultural Economics 2+0

Theory: Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macroeconomics, positive and normative analysis. Nature of economic Theory: rationality assumption, concept of equilibrium, economic laws as generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Technical change and types, Agricultural planning and development in the country. Land reforms: meaning of land tenure, land tenancy, land reform measures – abolition of intermediaries, tenancy reforms, fixation of ceiling on

land holdings, consolidation of holdings, development of cooperative farming. Agricultural labour and farm mechanization. Demand: meaning, law of demand, demand schedule and demand curve, determinants, utility Theory: law of diminishing marginal utility, equi-marginal utility principle. Consumer's equilibrium and derivation of demand curve, elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity. Supply: Stock v/s supply, law of supply, supply schedule, supply curve, determinants of supply, elasticity of supply. Production: process, creation of utility, factors of production, laws of returns and returns to scale. Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Distribution Theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit. National income: Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement. Population: Importance, Malthusian and Optimum population theories, natural and socio-economic determinants, current policies and programmes on population control. Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, money supply, general price index, inflation and deflation. Banking: Role in modern economy, Agricultural and public finance: meaning, micro v/s macro finance, need for agricultural finance, public revenue and public expenditure. Tax: meaning, direct and indirect taxes, agricultural taxation, VAT. Economic systems: Concepts of economy and its functions, important features of capitalistic, socialistic and mixed economies, elements of economic planning, NITI Ayoga.

AEC. 321 Farm Management, Production & Resource Economics 1+1

Theory: Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of

farms. Principles of farm management: Differences between farm management and production economics, concept of production function and its type - Linear, quadratic, Cobb Douglas models, meaning and interpretation. Uses of production function in decision-making, Laws of returns: Law of variable proportions (factor-product), factor-factor and product-product relationships, law of equi-marginal returns, principle of opportunity cost, law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship, fixed costs, sunken costs, valuation and depreciation of farm assets, total and average cost curves in the short and long run and farm management cost concepts (CACP), Concept and estimation- gross farm income, net farm income, family labour income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Discounted Cash Flow Measures and their role in financial evaluation, equipping farmer as decision maker – production, strategic decisions etc. Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, single entry and double entry book keeping, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting, linear programming, appraisal of farm resources, selection of crops and livestock's enterprises. Concept of risk and uncertainty in farming, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance schemes – weather based crop insurance, features, determinants of compensation, PMFBY.

Concepts of resource economics, Significance of NRE in farming, differences between NRE and agricultural economics, unique properties of natural resources - land, surface water, groundwater, environment, biodiversity, ecosystem services: uniqueness, indispensability, irreversibility, invisibility, remoteness, intricacy, synergy, ambiguous property rights, externalities, market failure, free

riding, property rights. Positive and negative externalities in agriculture, inefficiency and welfare loss, internalization of externalities, important issues in economics and management of common property resources of land, water, pasture, fishery and forest resources etc.

Practical:Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Illustration of loss minimization principle, Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Formulation of LP problems. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, partial budgeting exercises, Exercise on book keeping in farm, Amortization, Illustration of costing of groundwater irrigation. Visit to IFS farms, farm section office, cooperative farms, and other representative farms.

AGRICULTURAL ENGINEERING

AEG. 211

Farm Machinery and Power

1+1

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.

AEG. 321 Protected Cultivation and 1+1
Secondary Agriculture

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

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

dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

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

AGRICULTURAL ENTOMOLOGY

AET. 121 Fundamentals of Entomology 2+1

Theory: History of Entomology in India. Position of the insect in Animal kingdom. Factors for insect's abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda up to classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. General external structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptors.

Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta up to Orders, basic groups of present day insects with special emphasis to orders

and families of Agricultural importance like Orthoptera: Acrididae, Tettigoniidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Miridae, Reduviidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Aleyrodidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Hemiptera: Hemirobidae; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Nymphalidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturniidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Encyrtidae; Bethyloidea, Formicidae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae, Tabanidae, Syrphidae.

Practical: Methods of collection and preservation of insects including immature stages; External features of Cockroach/ Grasshopper/Blister beetle; study of close relatives of insects, phylum Arthropoda. Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper, Cockroach); Dissection of male and female reproductive systems in insects (Grasshopper, Cockroach); Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

Note: Students should submit 50 insect specimens representing different families and orders.

AET. 311 Insect Pests of Field Crops and Stored 1+1
Grains and their Management

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 and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crops, Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management. Important vectors of plant diseases of field crops.

Practical: Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; Identification of insect pests and Mites 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 grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. Visit to nearest FCI godowns. **Note:** Students should submit 50 insect specimens representing different crops and stored product insects.

AGRICULTURAL EXTENSION

AEX. 121 Fundamentals of Agricultural Extension 1+1
Education and Rural Development

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

Nilokheri Experiment); various extension/ agriculture development programmes launched by ICAR/ Govt. of India

(IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP). New trends in agriculture extension: privatization of extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems.Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Development-meaning, definition, concept & principles, Philosophy of C.D.

Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel.

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

AEX. 122 Rural Sociology, Educational Psychology & Constitution of India 0+2

Practical:Sociology and Rural sociology: Definition and scope, its significance in agriculture extension, Social Ecology, Rural society, Social Groups, Social Stratification, Culture concept, Social

Institution, Social Change & Development. Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence.

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

AEX. 211 Communication and Diffusion of Agricultural Innovations 1+1

Theory: Communication: meaning and definition; Principles and Functions of Communication. Models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption. Extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies. Diffusion and Adoption of Innovations – Meaning, Definition, Models and adoption Process, Innovation – Decision Process – Elements, Adopter categories and their characteristics, Factors influencing adoption process; Capacity building of Extension Personnel and Farmers - Meaning, Definition, Types of training, Training of farmers, farm women and Rural youth – FTC and KVK.

Practical: Simulated exercises on communication; Identifying the Problems, Fixing the Priorities and selecting the most important

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

AEX. 321 Entrepreneurship Development and Business Communication 1+1

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

Practical: Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity,

time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing. Visit to entrepreneurship development institute and entrepreneurs.

AGRICULTURAL MICROBIOLOGY

AMB. 222 General Microbiology 1+1

Theory: Occurrence and distribution of microorganisms in nature. Brief history of microbiology. Microscopes and microscopy. Overview of cell structure of prokaryotes and eukaryotes. General properties of viruses, Plant, Animal and Bacterial viruses, viroids and prions. Different groups of Microorganisms- Bacteria, Fungi, Algae and Protozoa. Microbial nutrition and culture media. Microbial metabolism: glycolysis, citric acid cycle, anaerobic respiration, photosynthesis and fermentation. Microbial growth - measurement of growth, Effect of environmental factors on growth. Qualitative and quantitative methods for the study of microorganisms. Industrial use of microorganisms – Wine making, brewing, antibiotic production, food additives, milk products etc. Role of microorganisms in biochemical transformation of raw and processed foods. Food spoilage, food poisoning and food borne infections. Principles and methods of Food preservation. Bioconversion of domestic, agricultural and industrial wastes: Biogas production, Mushroom cultivation, Composting etc. Microbiological standards for various raw and processed products and methods to monitor them.

Practical: Equipments used in a microbiology laboratory. Microscopy - principles and applications. Preparation of culture media and sterilization methods. Isolation, pure culture and preservation of microorganisms. Staining techniques- simple, negative, capsule, endospore, Gram's staining etc. Qualitative and quantitative methods for the study of microorganisms. Biochemical activities of microorganisms. Microscopic observation of bacteria, fungi, algae and protozoa. Microbiological examination of water and effluents. Micro-

organisms in bread and wine making. Microflora associated with vertebrates and invertebrates. Microbiological examination of raw and processed foods. Microbiological examination of milk and milk products. Bioconversion of domestic, agricultural and industrial wastes - Biogas production, Mushroom cultivation, Composting.

AGRONOMY

AGR. 111 Fundamentals of Agronomy 2+1

Theory: Agronomy and its scope, Agriculture as an art, science and business of crop production, Factors affecting crop production, History of agriculture development in India and Karnataka, Importance and scope of agriculture, classification of crops, Seeds and sowing, Soil and its components, properties, fertility and productivity and their management, Tillage and tith, Crop density and geometry, Crop nutrition - manures and fertilizers, nutrient use efficiency, Growth and development of crops, ideotypes, Cropping systems and its principles, Crop adaptation and distribution, crop management technologies in problematic areas, Harvesting and threshing of crops. Weeds- importance, classification, crop weed competition, concepts of weed management-principles and methods, herbicides- classification, selectivity and resistance, allelopathy.

Practical: Identification of crops, seeds and fertilizers, Classification of field crops, tillage implements, Study and practice of different methods of ploughing, Study of different methods of sowing, Study of seed drills, intercultural implements, Study of fertilizers, manures and green manures, Calculation of fertilizers and seed rates, Study on seed germination and plant population, Preparation of FYM and compost, Participation in ongoing field operations, Study of agro-climatic zones of Karnataka and India. Study and identification of dry land and waste land weeds. Study and identification of garden land, wet land and aquatic weeds. Calculation of herbicide doses and their spray.

AGR. 213 Introduction to Crop Production Technology 2+1

Theory: Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Cereals and millets – rice, maize, wheat and sorghum, pearl millet and finger millet, pulses-pigeon pea, chick pea, mungbean and urdbean; oilseeds- groundnut, sunflower, soybean rapeseed and mustard; sugar crops – sugarcane ; fibre crops- cotton & Jute; forage crops-sorghum, oat, napier, Lucerne, cowpea, and berseem.

Practical: Morphological description of crops, study of crop varieties, rice nursery preparation, transplanting of rice, Raising of crops in micro plots and study of germination, growth and yield components. Effect of sowing depth on germination , planting sugarcane, identification of weeds in crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation and important agronomic experiments at experimental farm. Fibre qualities of cotton, Silage making.

AGR. 321 Farming Systems, Organic Farming and Precision Agriculture 2+1

Theory: Farming System-scope, importance and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy

in different farming system, farming system and environment, Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products. Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture. Global Positioning System (GPS) Geographic Information System (GIS). Site Specific Nutrient Management (SSNM) for nutrient and irrigation management practices. Comparative yield, quality and farm profits under SSM practices v/ s Variable Rate Technology (VRT) practices.

Practical: Visit of organic farms and outlets to study the various components and their utilization. Visit to IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field to study the various components and their utilization; Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Post-harvest management; Quality aspect, grading, packaging and handling.

ANIMAL SCIENCE

ASC. 311 Livestock, Poultry and Fish Production Management 2+1

Theory: Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements

for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Broiler production. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Importance of Indigenous Live stock and poultry species. Feeding principles of livestock and poultry. Feed ingredients. Feed supplements and additives for livestock and poultry ration. Study of livestock and poultry diseases. Prevention, vaccination schedule and control of important diseases of livestock and poultry. Marketing and Economics of livestock and poultry. Fisheries resources of india. Importance of Inland fisheries. Commercial cultivation important fishes and their production.

Practical: External body parts of cattle, buffalo, sheep, goat, swine and poultry. Handling and restraining of livestock. Identification methods of farm animals and poultry. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records. Judging of cattle, buffalo and poultry. Culling of livestock and poultry. Planning and layout of housing for different types of livestock and poultry. Computation of rations for livestock. Clean milk production, milking methods. Hatchery operations, incubation and hatching equipments. Management of chicks, growers and layers. De-beaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production. Visit to inland fisheries unit.

APICULTURE

API. 312 Introduction to Apiculture 0+1

Practical: Importance of Bees and Beekeeping; Study of honeybee species their diversity and colony structure; Bee biology and caste identification; Study of nest architecture, bee hives and beekeeping equipments; Age related activities of workers; Study of different

morphological structures and internal structures like Digestive, reproductive, nervous, Circulatory and Glandular system in honey bees through dissection; Honey bee communication Knowing of How, when and where to start beekeeping; Handling and inspection of bee colonies; Identification of Bee flora; Hiving of feral colony; Seasonal management practices of honeybee colonies for honey flow season, dearth period, summer and rainy seasons; Mass queen rearing technique; Uniting and dividing of colonies; Study of Bees as pollinators and pollination management; Poisoning of bees and its prevention; Hive products – Honey, Bee pollen, Bee wax, Propolis, Bee venom, Royal jelly and their extraction, processing, properties and uses; Testing of honey for its purity; Bee pests and diseases and their management; Visit to important apiaries and beekeeping societies around the region; Working out economics of beekeeping

CROP PHYSIOLOGY

CPH. 311 Post-harvest Physiology of Market Produce 2+1

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

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

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

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

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

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

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

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

FOOD SCIENCE AND NUTRITION

FSN. 321 Food Processing, Food Safety Standards and Value Addition 1+1

Theory:Status of food processing in India. Food processing and distinctive features of food commodities. Primary, secondary and tertiary processing. Processing of -cereals, legumes, fats and oil-

seeds, fruits and vegetables, milk. Role of additives in value addition, packaging and labeling. Food Safety- Definition, Importance, scope and Factors affecting food safety, health risks, Types of hazards: Biological, Chemical, Physical hazards. Food storage, Hygiene and Sanitation. Sources of contamination and their control. Personal Hygiene. Food Safety management tools- basic concepts, PRPs, GHPs, GMPs, SSOPs etc. HACCP, ISO series and TQM. Food laws and Standards-Indian Food Regulatory Regime, FSSAI, Global Scenario- CAC, BIS, AGMARK

Practical: Processed and value added foods (cereals, pulses, fruits, vegetables). Planning and preparation of weaning and supplementary foods. Planning of balanced diet. Development of teaching models for community nutrition education –a) Protein energy malnutrition. b) Micronutrient deficiencies Preparation of different types of media. Microbiological examination of different food samples. Assessment of personal hygiene and surface sanitation. Preparation of plans for implementation HACCP.

FORESTRY AND ENVIRONMENTAL SCIENCE

FES. 111 Introduction to Forestry 1+1

Theory: Introduction–definitions of forest and forestry, branches of forestry, history and education of forestry in India. Objectives of silviculture, forest classification, salient features of Indian Forest Policies and Acts. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers; Artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations–weeding, cleaning, thinning– mechanical, ordinary, crown and advance thinning. Forest mensuration–objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method;

Instrumental methods of height measurement-geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees. Indian wild life and management. Social forestry and its branches. Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens. Cultivation practices of two important tree species of the region (Teak & Casurina).

Practical: Identification of tree-species, seedlings, seed and non-wood timber forest products. Diameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees. Height measurement of standing trees by shadow method, Pencil method, single pole method and hypsometer. Volume measurement of logs using various formulae. Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest based industries or National park/Agroforestry system/JFPM.

FES. 221 Environmental Studies & Disaster Management 2+0

Theory: Multidisciplinary nature of environmental studies Definition, scope and importance.

Natural Resources: Renewable and non-renewable resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, mining, and their effects on forest b) Water resources: Use and over-utilization of surface and ground water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. d) Energy resources: Growing energy needs, use of alternate energy sources. e) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Ecosystems: Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

Social Issues and the Environment: From Unsustainable to Sustainable development, urban problems related to energy, Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Human Population and the Environment: population growth, variation among nations, population explosion, Environment and human health: Role of Information Technology in Environment and human health.

Disaster Management

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, avalanches, volcanic eruptions. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, forest fire, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to mitigate natural disaster at national and global levels. International strategy for disaster reduction. Role of NGOs, and media. Central, state, district and local administration; Disaster response of Armed forces, Police and other organizations.

GENETICS AND PLANT BREEDING

GPB. 212 Introduction to Genetics, Plant Breeding 1+1 & Protection of Plant Varieties

Theory:History of Genetics and Plant Breeding, Introduction to Cell, Cell Division-Mitosis, Meiosis and their significance. Study of Chromosome (Structure, functions, changes in the structure and number of chromosome). Mendel's laws of inheritance, Gene interaction, Linkage and Multiple alleles. Mode of inheritance (monogenic, polygenic, cytoplasmic). DNA and Its structure. Modes of reproduction: sexual and asexual, differences between self and cross pollinated crops. Self-incompatibility, male sterility and their significance in plant breeding. Centres of origin of crop plants. Breeding for self-pollinated (Mass, pureline, pedigree and bulk methods), cross pollinated (Ear to row, Backcross, Development of synthetics, composites and hybrids) and vegetatively propagated crops (Clonal selection). Introduction to UPOV, PPV & FR Act of India, Registration of Plant varieties and Farmers variety. Breeders, researcher and farmers rights. EDV and Extant varieties.

Practical:Microscopy, study of mitosis and meiosis. Mendelian ratios- Monohybrid and dihybrid, and problems related to segregation

and gene interaction. Study of linkage, crossing over percentage, map distance. Study of floral biology and structure of a model flower, study of floral structure and biology of important cereals, pulses, oilseeds and commercial crops. Study of Plant breeders kits, selfing and crossing techniques. Methods of selection in self and cross pollinated crops. 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.

HORTICULTURE

HRT. 122 Fundamentals and Production 2+1 **Technology of Horticulture Crops**

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

Practical: Orchard layout and planting systems; Pruning and training methods; Growth regulators; Irrigation and nutrient management practices; Description and identification of varieties of the above crops.

HRT. 321 Post-harvest Management and Value 1+1 **Addition of Fruits and Vegetables**

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.

PLANT BIOTECHNOLOGY

PBT. 224 Introduction to Plant Biotechnology 2+0

Theory: Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Michaelis&Menten and Line Weaver Burk equation & plots; Introduction to allosteric enzymes. Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates:

Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and cybrids; Somaclonal variation and its use in crop improvement; cryo-preservation; Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

PLANT PATHOLOGY

PAT. 211 Fundamentals of Plant Pathology 2+1

Theory:Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Cause and classification of plant diseases. Important plant pathogenic organisms, fungi, bacteria, fastidious vascular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic agents.

Fungi: general characters, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Binomial system of nomenclature, rules of nomenclature. Classification of fungi, keys to phylum, classes, order and families.

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Keys to major plant pathogenic bacterial genera.

Viruses: nature, morphology, replication and transmission and classification of plant viruses. Keys to important plant virus families / genera.

Nematodes: General morphology and reproduction, classification, keys to important plant pathogenic nematode genera, symptoms and nature of damage caused by plant nematodes.

Phanerogamic plant parasites: Common characteristic of important parasites, disease development, survival and spread.

Growth and reproduction of plant pathogens. Liberation / dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens.

Pathogenicity: Phenomenon of Fungi, Bacteria, Viruses, mollicutes and nematodes. Pathogenesis: Penetration and colonization. Role of enzymes, toxins and growth regulators in disease development and their classification. Introduction to principles of plant disease management.

Practical: Acquaintance with various laboratory equipments and microscopy. Study of symptoms of various plant diseases caused by fungi, viruses, bacteria, nematodes and mollicutes. Field visit to get acquainted with plant disease symptom. Collection and preservation of plant disease specimens. Study of morphology of fungi, viruses, bacteria, nematodes and phytoplasma. Study of life cycle / disease cycle of major fungal, bacterial, viral, nematode and phanerogamic plant parasites diseases. Macroscopic and microscopic examination of plant pathogens including staining techniques for bacteria. Preparation of culture media and sterilization. Different methods of isolation and purification of fungi, bacteria, viruses and extraction of nematodes. Study of different methods of artificial inoculation / transmission and proving Koch's postulates for different plant pathogens. Study of liberation of fungal spore. Study of micrometry.

PAT. 223 Post-Harvest diseases and their Management 1+1

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

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

Practical: Study of post-harvest disease symptoms caused by fungi, bacteria, virus, nematodes etc., Methods of diagnosis of various post-harvest diseases. Methods of estimation of disease severity and losses; Seed health testing techniques. Methods of detection and identification of seed borne pathogens; Isolation of biocontrol agents; Testing the efficacy of biocontrol agents by dual culture technique. Mass multiplication and methods of application of bio agents; Study of fungicides, bactericides, nematicides and their formulations. Study of pesticide compatibility and their safe-use. Study of plant protection equipments. Bioassay of fungicides; Seed treatment techniques for

the control of seed borne diseases; Biocontrol of post-harvest diseases. Study of seed packaging & storage techniques. Visit to vegetable and fruit markets, bio-pesticide/ Pesticide firms. Visit to processing warehouse and testing laboratories.

SEED SCIENCE AND TECHNOLOGY

SST. 221 Principles and Practices of Seed Science and Technology 1+1

Theory: Quality seed and its importance in agriculture; difference between seed and grain, concept of seed quality; seed technology definitions, objectives and its role in increasing crop production; seed improvement programmes in India and Karnataka; general principles of seed production, seed replacement and multiplication rates, generation system of seed production-breeder seed, foundation seed. Certified seed and truthful seeds; maintenance of genetic purity, causes for varietal deterioration, male sterility concepts and its use in hybrid seed production; methods and techniques of seed production in some selected field crops etc. Planning for breeder, foundation and certified class seed production. Seed production- foundation and certified seed production in maize (varieties, hybrids, synthetics and composites); rice, sorghum and bajra (varieties and hybrids); greengram, blackgram, bengalgram, cowpea (varieties); soybean, groundnut (varieties); sunflower (varieties and hybrids); castor (varieties and hybrids); cotton (varieties and hybrids); tomato and brinjal (varieties and hybrids); chilli and *bhendi* (varieties and hybrids), onion and melons and gourds (varieties and hybrids) and potato (varieties and true potato seeds), seed crop harvesting methods and management.

Certification- its concepts, stages of seed certification, seed certification agency and its role in seed quality control, certified and truthfully labelled seed, minimum certification standards for self and cross pollinated and horticultural crops, field and seed inspection,

its objectives; Seed Act and Seed Rules; Seed Legislation and Seed Law Enforcement, Seed Control, Seed Policies, Seed Bills and recent developments in Indian Seed Industry; seed quality regulation. seed processing- cleaning, grading, seed treatment methods and ITK, bagging and storage-factors affecting seed quality in storage, pests and disease control; seed testing- principles and methods of sampling, purity analysis, seed moisture germination, viability and vigor; cultivars purity testing – ODV and grow- out tests for seed genetic purity, seed health etc; seed dormancy causes and breaking methods; organizations involved in seed production and distribution.

Practical: Identification of seeds of agricultural/ horticulture crops. Study of seed structure in monocot and dicot seeds in agricultural and horticulture crops. Study of floral biology in self, cross and often cross pollinated crops. Identification of different varieties based on seed morphological characters in agriculture and horticulture crops. Study of seed dormancy and breaking methods in problematic crops. Isolation types, measurement and determination in self and cross pollinated crops. Carrying out field inspection and taking field counts. Study of different contaminants and practicing rouging. Practicing hybrid seed production techniques – hand emasculation and pollination in cotton, *bhendi*, tomato and brinjal. Carrying out detasseling techniques in hybrid maize seed production. Diagnostic identification of A, B and R lines, planting ratio, border rows, synchronization and supplementary pollination techniques in hybrid seed production of sunflower, paddy, sorghum and bajra. Determination of physiological maturity in agri-horticultural crops. Visit to seed certification agency and grow out test farms. Visit to seed production plots (OPV and hybrids) of public and private organizations. Calculation of economics of seed production (OPV and Hybrids). Visit to seed production under protected cultivation. Visit to NSP and Breeder seed production plots

SERICULTURE

SER. 311

Introduction to Sericulture

1+1

Theory: Introduction, origin & history, statistics and distribution of sericulture, Mulberry varieties. Types of silks, Species of silkworms and their host plants. Raising of mulberry saplings, mulberry cultivation practices for irrigated and rainfed conditions, separate chawki garden. Integrated nutrient Management. Pests and diseases of mulberry and their management. Life cycle of silkworms. Morphology and anatomy of *Bombyx mori* L.

Commercially exploited breeds of silkworm. Steps in silkworm egg production at grainage, egg sheets and loose egg production technology. Tier system of silkworm seed multiplication, seed area concept. Preservation and handling of eggs, egg incubation. Disinfection and hygiene in silkworm rearing. Silkworm rearing plan, Rearing house plan and equipments. Importance of chawki rearing, chawki rearing centres. Harvesting, transportation and preservation of leaves. Methods of silkworm rearing, shoot feeding, shelf rearing, rearing operations, environmental conditions and their management. Importance of feeding, bed cleaning, spacing, care during moulting. Picking and mounting ripened silkworms. Harvesting of cocoons, grading, cocoon sorting, defective cocoons, and sale of cocoon in silk cocoon markets. Mechanization in sericulture. Pests and diseases of silkworms and their management. Post cocoon technology, Steps in reeling – storage- cocoon drying/ stifling, cocoon cooking, brushing, reeling and re- reeling. Different methods of silk reeling. Raw Silk Marketing- Silk Exchange- functions, Silk trade -import-export. Sericulture byproducts and their utilization for additional income. Economics of Sericulture.

Practical: Mulberry varieties, Host plants of non-mulberry silkworms. Preparation of land, preparation of planting material and planting of mulberry, pruning, harvesting and storage of mulberry leaves. Pests and diseases of mulberry. Species of silkworms – life cycle of *Bombyx mori* L. Mulberry pests and diseases. Identification of cocoons of important breeds. External morphology of life stages

– egg-larva- pupa and moth of *Bombyxmori* L. Study of silk gland and digestive system of *Bombyxmori* L. Disinfectants - rearing bed and general disinfectants. Grainage techniques. Study of rearing house plan and equipments for shoot feeding and shelf rearing. Methods Incubation of silkworm eggs and brushing. Identification of silkworms settling for moult, at moult, out of moult. Feeding, bed cleaning and spacing. Identification and picking of ripe worms, mounting, types of mountages, cocoon harvesting and grading. Pests and diseases of mulberry silkworm. Single cocoon reeling, study of reeling equipment.

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

SAC. 121 Fundamentals of Soil Science 2+1

Theory:Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil; Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification and soils of India; soil survey, types, methods of soil survey Soil water retention, movement and availability; Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature; source, amount and flow of heat in soil; effect on plant growth, soil organisms: macro and microorganisms, their beneficial and harmful effects.

Practical: Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Studies of capillary rise phenomenon of water in soil column and water movement in soil. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Study of soil map. Determination of soil colour. Demonstration of heat transfer in soil. Estimation of organic matter content of soil.

SAC. 321 Manures, Fertilizers and Soil 2+1 Fertility Management

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

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

AGRICULTURAL MARKETING AND CO-OPERATION

AMC. 111 Introduction to Agricultural Marketing 1+1

Theory : Meaning and definition of the terms-market and marketing. Evolution and development of agricultural marketing. Marketed and marketable surplus. Classification of markets-buyers and sellers markets, rural marketing and its importance. Approaches to the study of marketing. Marketing functions-Meaning and classifications. Packaging, transportation, grading and standardization, warehousing, processing, market information and intelligence, financing and risk management. Methods of sale. Perfect and imperfect markets and their characteristics. Price determination in perfect and imperfect markets. Price discovery. Marketing institutions, agencies and marketing channels. Marketing costs, margins, price spread and marketing efficiency. Regulation of agricultural marketing: objectives and importance. Green marketing concepts with respect to agricultural products.

Practical : Review of agricultural marketing concepts, visit to village Shandy; Visit to Regulated Markets; Visit to Taluka Agricultural Produce Co-operative Marketing Society (TAPCMS); Visit to State Warehousing Corporation(SWC); Visit to Central Warehousing Corporation(CWC); Estimation of returns to storage, Estimation of marketed and marketable surplus; Estimation of marketing costs, margins and price spread; Visit to Food Corporation of India (FCI); Visit to Cotton Corporation of India (CCI); Visit to Input dealers; Visit of Raitha Santhe; Identification of marketing channels and compromising of efficiency

AMC. 112 Marketing Management 2+0

Theory : Marketing – definitions, modern marketing- selling v/s marketing. Management- nature, characteristics. Functions of management – planning, organizing, influencing, controlling. Roles

of marketing managers. Decisions making. Future of management- Tasks and challenges.

Marketing Management-Management process, opportunities, and environment and external uncontrollable forces. Technological change and marketing. Trends in marketing environment. 4 P's of marketing mix. Customer demand. Personal characteristics- customer response. Market segmentation- basis, requisites for good segmentation. Market structure. Market conduct. Market performance. Market integration. Sales forecasting – role of forecasting, market potential, sales potential, steps in forecasting. Marketing planning – marketing strategies, branding, franchising, product positioning, packing, labeling.

Product development – product diversification, product cycle, market penetration. Product pricing – importance, role in marketing strategy, methods. Promotion-process, types, advertisement. Social aspects of marketing- ecological aspects of marketing, eco-marks. Marketing of services- classification, service marketing model. Global marketing- scope, importance, challenges.

AMC.113 Micro and Macro Economics 2+1

Theory: Nature and significance of Micro and Macro-Economics- Micro and Macroeconomic paradoxes. Utility function: Marginal Utility Analysis, Indifference curve; Budgetline, Marginal rate of substitution, Consumer's equilibrium. Theory of demand and supply. Elasticities of demand and supply. Elasticity of demand and total expenditure. Demand and supply established market equilibrium. Production functions in the case of a single and two variable inputs. The law of diminishing marginal returns-Equal product curves or Isoquants, Isocost line, marginal rate of technical substitution, expansion path and ridge lines. Theory of the firm-Equilibrium of the firm and industry under perfect competition, monopoly and monopolistic competition. Circular flow of income. National income estimation, concepts of national income and GNP deflator. Classical

V/s Keynesian aggregative economics-Say's law of markets. Keynesian theory of consumption. Consumption, savings and investment functions. Theory of income determination, two sector, three sector and four sector models. Concept of Multiplier-Injections and Leakages –Marginal efficiency of capital. Business cycles-policies for economic stabilization-Inflationary and Deflationary gaps-Inflation and unemployment. Phillips curve.

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

AMC. 114 Agricultural Input Marketing 1+1

Theory: Importance, scope and characteristics of input marketing. Derived demand. Input marketing V/s output marketing. Input demand and commercial agriculture. Factor Pricing. Meaning of rent, types of rent (economic rent, contract rent, quasi rent, scarcity rent), theories of rent (Ricardian theory of rent, Modern theory of rent) , Meaning of wages, methods of wage payment (cash, kind, time, piece, task), types of wages (money wage, real wage), theories of wages (subsistence theory, wage fund theory, residual claimant theory, marginal productivity theory, modern theory),

Meaning of Interest: Theories of interest (Productivity theory, Abstinence theory, Austrian theory, Time preference theory). Theories of interest rate determination (classical theory, loanable fund theory, liquidity preference theory) Meaning of Profit: Theories

of Profit (Rent theory, wage theory, Dynamic theory, risk theory, uncertainty bearing theory, innovations theory, monopoly theory).

Seed marketing -Importance, consumption, supply of seeds, agencies involved in marketing channels of distribution, MNC's - marketing strategies. Government agencies- KSSC, NSC. Government policy on seed marketing.

Fertilizer marketing – importance, consumption, regional disparity in consumption, demand and supply for fertilizers. Agencies involved in fertilizer marketing- Public, Private, Co-operative sectors. Channels of marketing. Partial decontrol. Pricing policies and subsidies. Marketing of agricultural credit products. Farm machinery and implements. Types of pre and post-harvest farm machinery. Marketing of farm machinery- agencies, demand and supply. Plant protection chemicals - importance, crop wise utilization, size of Indian pesticide market. Demand and supply of pesticides. Agencies in marketing. Channels of marketing. Market share. Land market reforms – tenancy, ceiling, elasticity, pricing.

Labor markets - productivity, heterogeneity, wage differentials - skill differentials. Theory of supply and demand. Ground water marketing - importance and emergence of ground water markets - rationale, pricing. Factors affecting ground water markets - economic, political, and institutional. Equity and sustainability of groundwater markets. Existing practices.

Government policy. Legislation on groundwater marketing. Energy-demand and supply, pricing and disturbing policies. IT applications in agri- input marketing. E- Marketing. Role of IT in decision support system- private information shops/ kiosks- emergence of agri-web-portals. Emerging IT needs in agri-input marketing Government policy regarding agril. Inputs (subsidy, custom hiring units etc.). Estimation and forecasting of demand for and supply of agricultural inputs

Practical : Study of marketing channels for seeds, Study of marketing channels of fertilizers, Study of marketing channels of plant protection chemicals, Study of marketing channels of farm machinery and implements , Study of groundwater marketing , Study of supply of farm energy, Estimation of demand for seeds, Estimation of demand for fertilizers, Estimation of demand for plant protection chemicals , Estimation of demand for land and labour, Estimation of demand for farm machinery and implements, Visit to Agricultural Implement Manufacturing Unit, Visit to RSK, Visit to IFFCO/KRIBCO, Visit to fertilizer and PPC marketing agencies, Visit to NSC and KSSC outlets, Visit to implement custom hiring unit

AMC. 115 Agricultural Finance and Insurance 1+1

Theory: Agricultural finance - Nature and scope. Agricultural credit - Meaning, definition, need and classification. Credit analysis- 4 R's, 5 C's and 7 P's of credit. Financial Statements: Meaning, types, analysis and uses. Repayment plan - single end payment, amortization, balloon payment. Time value of money - compounding and discounting. History of financing agriculture in India. Commercial banks, nationalization of commercial banks, lead bank scheme, regional rural banks, micro-financial institutions, scale of finance, security for loans. Banking Schemes for agricultural finance: Village Adoption Schemes, Lead Bank Schemes, DRI scheme, Kisan Credit Card Scheme. Financial inclusion - *Jan-Dhan* Scheme, Financial literacy, Business Correspondents Models. Higher financing agencies - RBI, NABARD, AFC, ADB, World bank, Insurance and Credit Guarantee Corporation of India. Assessment of crop losses, determination of compensation. Insurance - Crop insurance, National Agricultural Insurance Scheme, Livestock Insurance, Weather based crop insurance, *Fasal Bima Yojana*. Advantages of crop insurance. Limitations in application and estimation of crop yields.

Practical: Exercises on time value of money - compounding and discounting. Estimation of credit needs for crop enterprises, livestock

enterprises, hi-tech agriculture/ horticulture. Determination of scales of finance. Repayment plan for short term loans, amortization of loan - estimation of annuity factors. Repayment plans - decreasing payment plan, even payment plan. Study of weather parameters defining yield risk. Estimation of risk in crops/ livestock. Estimation of premium amount for insurance. Visits to financial inclusion branch of commercial bank, regional rural bank, insurance agency in public and private sectors. Visit to weather station

AMC. 116 Theory and Practice of Banking 2+1

Theory: Financial markets. Bank - meaning, definition, functions. Types of banking- Commercial, developmental and central. Systems of banking- Unit, branch, holding company, chain. Liquidity and profitability. Sound principles of banking. Credit creation by banks. Development banking institutions. Central banking - functions. Credit control- qualitative and quantitative measures. Bankers' clearing house. Functioning of stock exchange. Indian banking system. Banker - his functions and relationship with customer. Deposit accounts and their operations. Negotiable instruments- bills of exchange, check and bank drafts. Loans and advances and their operations. Securities and modes of charges- lien, mortgage, hypothecation, pledge etc. Investment Banking: Meaning, functions, importance, operational issues. Recent reforms in banking sector in India.

Practical: Opening and operation of Savings Bank Account and Current Account, opening and operation of Fixed Deposit Account, Recurring Deposit Account and Cumulative Deposit Account. Study of bank drafts, pay orders and letter of credit. Study of bills of exchange and promissory note. Operation of mobile banking and SMS banking. Opening and operation of net banking. Operation of credit card and debit card. Assignments on banking regulation act. Study of proxy banking in India. Opening and operation of loan, cash credit, over draft, lien and pledge accounts. Opening and operation of hypothecation account and mortgage loan account. Study of recovery procedures and interest calculation of different loans

and advances. Visits to commercial bank to study the actual operation of deposit accounts, loan procedures and recovery aspects.

AMC. 121 Retailing Management 2+0

Theory: Introduction to Retail management Evolution of retailing, meaning, retailing and retail management, Retailing in India.

Types of retailers- stores formats by location, store formats by ownership, store formats by merchandise categories, store formats by size, store formats by price, store formats and non-store formats.

Organized retailing and unorganized retailing, trends in retailing – special- convenience, growing diversity of retailing formats, e-commerce, franchise, mail order catalog, etc. Retail location and retail layout - importance of location decision, selection of city/area, selection of a specific site. Types of location – free standing location, neighborhood services, highway stores, business associated location, cost factor in location decision. Types of consumer goods - consumer goods, shopping goods, specialty goods, FMCGS – Fast Moving Consumer Goods. Retail layout patterns – layout guidelines, external factors and internal factors, building interiors. Retail market, segmentation – market and market segmentation, market approaches, benefits of market segmentation – marketing mix, merchandising decision, promotion campaign. Criteria for market segmentations dimension of segmentation, demographic segmentation, psychographic segmentation. Retail strategies – develop vision and mission statements, operational excellence, produce differentiation, customer intimacy, growth strategy, market expansion strategy, market penetration, market development, product range development, diversification. Retail merchandising – merchandising planning, merchandising hierarchy, SKU, range planning, planogram, buying function – advantages of an open to buy plan. Category management – category vision, definition, category role, assessment strategies, balanced score card, tactics, category implementation, markups and markdowns in merchandise management, shrinkage in retail

merchandise management, gross margin return on inventory (GMROI) Supply chain management in retailing definition, ISC, vender management, EDI, warehouse management. Retail marketing and advertising – retail marketing strategies, retail marketing mix, customer relationship management (CRM). Direct marketing – direct mail, catalogues and mail order, telemarketing, electronic retailing, micro-marketing advertising in retailing – advantages, types of advertising, advertising campaign. Brand management – branding, brand management of retail outlets. Merchandise management – target market and competition, analysis, planning, merchandise budget plan, inventory plan, and criteria for selection of suppliers. Pricing and Communication – Introduction, Concept of Retail Price, Retailing Pricing Strategies – Demand Oriented Pricing, Market Skimming, Penetration Pricing, Price Bundling, Leader Pricing, Multi-Unit Pricing, Every Day Low Pricing and it's benefits, Odd Pricing, Single Pricing, Multiple Pricing, Prestige Pricing. Methods for setting Retail Prices – Cost based method, Competition based method, Demand oriented pricing method. Pricing Adjustments, Retail Promotion Strategy – Introduction, Selection of Promotion Mix-Control, Flexibility, Credibility, and Cost. The Retail Marketing Mix- Product, Price, Place, Promotion, Presentation, Customer Service, People. Advertising-objectives, Significance, Benefits. Types of Advertising- Persuasive Advertising, Informative Advertising, Corporate Advertising, Financial Advertising, Classified Advertising. Steps involved in Retail Advertising Campaigns – Selecting Advertisement objectives, Retail operations – Areas of retail operations, Stores operating parameters, Customer conversion ratio, Returns of net sales, Transaction per hour, Sales per transaction, Hourly customer traffic. Stocks – Average selling price, average stock price, Stock turnover / inventory turnover, Franchising in retailing – franchising, types of franchise agreement. Retail Information System and Advantages of retail data base of RIS.

AMC. 122 Theory and Practice of Cooperation 2+0

Theory: Concept of cooperation–Main features of cooperative organizations-Origin of cooperative movement-History of cooperative movement in India- Principles of cooperation.

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

Cooperative education and training-organizational structure–NCUI-NCCE-NCCT- VMNICM –RICM-ICM.

The state and the cooperative movement-an overview-evolution of relationship in western countries and in developing countries-dependence of the cooperative movement on the state - dangers of state aid-politics in cooperation- basis of future relationship. Cooperative movement in retrospect- achievements- crisis in the movement - The agenda for the future.

AMC. 211 Agricultural Marketing Legislation and Policies 2+0

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 Act 1986, 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, Special Market, conduct of

business of the market committee, Powers and duties of Market committee, staff of the Market committee, regulation of the contract forming 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.

AMC. 212 Agricultural Price Analysis 1+1

Theory: Meaning and concepts of agricultural prices: FOB price, C&F price, CIF price, farm harvest price, futures and spot prices, producer price, price spread. Functions and importance of prices. Market prices and administered prices. Sources of price statistics. Price and output determination under perfect competition, monopolistic competition, oligopoly and monopoly markets. Simultaneous pricing issues in perfect competition. Cobb web models – convergent, divergent and perpetually oscillating models. Pricing methods – skimmed pricing, cost-plus pricing, penetration pricing. Estimation of demand for and Supply of agricultural commodities. Price, income, cross price and

promotional elasticity of demand and supply. Point and Arc elasticity concepts.

Temporal and spatial fluctuations in agricultural prices: types and their causes. Analysis of price movements: estimation of trend, seasonal, cyclical and irregular movements in prices over time. Analysis of spatial price variations and market integration.

Types, construction and uses of price relatives and weighted index numbers. General price level and inflation. Types of inflation. Retail and wholesale price index based inflation measures. Commission on Agricultural Costs and Prices (CACP) and State Agricultural Price Commissions. Minimum Support Price Scheme and Market Intervention Scheme. Price stabilization measures. Price forecasting methods: simple trend analysis, use of seasonal index, exponential smoothing, and Delphi method.

Practical: Collection of data on arrivals and prices of agricultural produce from APMCs, Study of farm harvest prices, Study of administered prices for agricultural produce, Study of wholesale prices, Construction of simple index numbers for prices, Construction of Laspeyre's index, Paasche's index Fisher's index, Exercises on the methodology used for constructing wholesale and retail price index numbers in the country, Exercises on the calculation of inflation rate using wholesale and retail price index numbers, Calculation of demand and supply elasticities with different methods, Estimation of demand and its forecasting, Estimation of supply and its forecasting, Estimation of trend in time series of agril. Prices, Estimation of Cyclical fluctuations in time series of agril. Prices, Estimation of Seasonal variations in time series of agril. Prices, Estimation of Irregular price movement in time series of agril. Prices, Price forecasting exercises, Price forecasting exercises, Exercises on spatial price variation and market integration

Theory : Introduction to management-Management functions - Management levels-Managerial roles-Management skills-Definitions of management-Role of management.

Evolution of management thought-Management theories-Scientific management-Administrative management-Bureaucratic organization - Human relations school-Behavioral schools -Modern management theory -Systems theory -Contingency theory.

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

Organizing: meaning-nature and purpose of organizing-Span of management-Principles of organizing-Organization structure and design-Authority-Delegation and Decentralization-Informal organization-Managing Human Resources-Staffing-importance-human resource planning- recruitment- sources of recruitment - Recruitment process -Selection- steps in the selection process - Orientation or socialization-Training and development-Training programs -Management development programmes.

Leading- Leadership-meaning -Leadership behaviour & styles - Human factors in managing-Motivation-Meaning and purpose-Motivational theories-Motivational techniques- -Communication-meaning-objectives-importance-types-barriers.Controlling: -meaning and nature of controlling-essential elements of controlling-requirements and effective control system.

Ethics and social responsibility in business: meaning and implications-responsibility to customers -Consumers' associations-Employees-business community- Shareholders and state-social audit.

AMC. 214 Monetary Theory and Public Finance 2+0

Theory: Money - Meaning, definition and evolution of money. Functions of money. Demand for and supply of money. Value of money. Monetary standards. Inflation and deflation – meaning and definition. Types of inflation. Causes and Characteristics of inflation. Effects of inflation on economic activities and remedial measures. Nature and scope of public finance- Meaning and definition. Public finance v/s private finance. Subject matter of public finance-Public revenue-Meaning and importance. Source of revenue. Tax revenue and non-Tax revenue. Canons of taxation. Tax base and tax rate. Types of taxes –proportional, progressive, regressive, digressive. Single and Multiple taxes, Specific and Advalorem taxes. Indian Tax structures. Direct taxes: income tax, wealth tax, capital gains tax, gift tax; their meaning, merits and demerits. Indirect taxes: VAT, custom duties, excise duty - meaning, merits and demerits. Taxable capacity. Public expenditure- meaning and classification of public expenditure. Canons of public expenditure. Reasons for growth of public expenditure. Effect of public expenditure on economic activities. Public debt- Meaning, Sources, Types and forms. Causes of increase in public debt. Debt trap. Government budget and deficit financing.

AMC. 215 Management of Cooperatives 2+0

Theory: Cooperative management–distinctive features- Relevance of cooperative law in the management of cooperatives-Organizational set up of the Department of cooperation in Karnataka. Evolution of cooperative law—History of cooperative legislation in India and Karnataka.

Study of important provisions of Karnataka State Cooperative Societies Act, 1959 and Rules 1960: Procedure for Registration of Co-operative Societies-Byelaws- Amalgamation and Division of cooperative societies.

Member of co-operative societies and their rights and liabilities-qualification and disqualifications for membership.

Management of co-operative societies- Final Authority- Annual general and special general meetings- Managing committee- Disqualifications for membership of the committee. Privileges of co-operative societies- Promotion of co-operative movement-State aid to co-operative societies.Properties and funds of co-operative societies-Investment of funds. Audit inquiry, Inspection and Surcharge- settlement of disputes-winding up of cooperative Societies.

The Karnataka Souharda Sahakari Act, 1997: Procedure for Registration of a cooperative society-Members of cooperative societies- Management of cooperative societies- Final Authority- Properties and funds- Audit Inspection and Inquiry-Winding up of cooperative societies-The Federal Cooperative-functions-The Board of Federal Cooperative.

Study of important provisions of Multi State Cooperative Societies Act, 2002: Registration of a Cooperative society - Management of cooperative societies- Audit Inspection and inquiry- Winding up of cooperative societies.

AMC. 221 Agribusiness Management 2+1

Theory: Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or

E-Commerce, types of E-commerce, categories of E-commerce based transacting parties, benefits of E-commerce to businesses and consumers. E-trading, e-choupals, websites and Emails, IT tools for marketing.

Six Sigma – Meaning, Probability of defects of different sigma levels, essentials of the six sigma methodology and Roles required for implementation of six sigma.

Futures trading – meaning and features. Differences between spot and future markets. Commodities covered under futures trading. Options, derivatives and functionaries. Speculation, hedging and risk management mechanisms of commodity in future trading. Institutions involved in futures trading- NCDEX, NMCE, MCX.

Use of print media for generation of market information, Use of Reports and Periodicals, Use of Electronics Media, Use of internet and IVRS, Analysis of Market Information for presentation, Use of moving averages, Use of trends, Use of seasonal index numbers, Use of cyclical index numbers, Use of irregular index numbers, Study of web portals relating to market information, Preparation of Audio-visual aids for presentation, Demonstration of e-trading.

AMC. 312 Consumer Behaviour and 1+1
Market Research

Theory : Concepts of consumer and consumer behavior – consumer behaviour v/s user behavior. Importance of consumer behavior study. Factors affecting purchases. Impact of distribution of consumers – age, sex, location, income.. Consumer buying motives - types-internal, external. Product motives – patronage motives, rational motives, emotional motives. Factors influencing consumer behaviour - cultural, social, personal, psychological. Consumer’s perception - learning, attitudes. Importance of motivation to marketers. Consumer decision process - recognition, information search, evolution of alternatives, involvement, purchase intentions, post purchase behavior.

Introduction to market research, research process, steps in market research, exploratory and descriptive research. Approaches to economic analysis - basic and applied research. Identification of market research problems. Research design. Sources of data. Methods of data collection. Preparation of questionnaires. Analysis of data using analytical techniques using computer packages. Writing of reports.

Practical: Identification of market research problems, Formulation of objectives & hypothesis, Review of literature, Preparation of questionnaires, Study of sampling designs, Selection of samples, Collection of primary and secondary data, Analytical tools commonly used in the study of consumer behaviour and market research, Analysis, Report writing, Presentation of results

AMC. 313 Recent advances in Agricultural 1+1
Marketing

Theory : Marketing methods – meaning, evolution and development. Importance of web pages in modern marketing for advertisement, sales, collection of data, customer feedback. Concept of direct marketing: personal selling, Raitha santhe, niche marketing etc. Contract farming – concepts, agencies, regulations and present status. E-marketing methods: E-Choupals, online marketing, spot exchanges. E-tendering. Trade in commodity exchanges. Internet based marketing: meaning, advantages and disadvantages. Study of web portals in agricultural marketing. Self Help Groups and Producer Companies and their marketing arrangements.

Practical: Access to web portals relating to agricultural marketing, Visit to Retail Chains, Visit to SHG, Visit to contract farming agencies, Visit to Commodity Exchange brokerage firms, Visit to E-Choupals, Visit to Chain marketing agencies, Visit to Shandies, Visit to Spot Exchange, Visit to Regulated Markets with E-tendering Practice, Visit to Export Oriented Units (EOU), Visit to Agri-Export Zones (AEZ), Visit to Trade Promotion Organization.

AMC. 314 Standardization, Grading and Quality Control in Crop Produce 2+1

Theory: Meaning and definition of grading standardization. Role of grading in agricultural products. Criteria for grade standards, advantages of grading. Types of grading. The agricultural produce (Grading and Marking) Act, 1937.

Standardization and Grading as per AGMARK, FAQ, FPO, BIS, ISO, HACCP, EUREPGAP, CODEX, Eco-mark. Spot Exchange Grade Requirements. General characteristics and grade designations for crops as per different methods: Food grains- jowar, maize, rice, wheat, red gram, bengal gram, black gram, green gram field peas; Oilseeds - groundnut, sunflower; Commercial crops - cotton, chilli. tobacco, areca nut, copra. Grading of Fruit and Fruit Products. General characteristics and grade designations of processed foods – jaggery, instant foods, fruit and vegetable products.

Practical: Study of laboratory equipments: sampling equipments, scientific grading instruments and other apparatus and equipments in the process of grading. Estimation of quality characters of cereals such as jowar, wheat, maize, bajra etc; pulses such as chick pea, tur, green gram etc; oil seeds such as groundnut, sunflower etc; commercial crops such as cotton, chilli, areca nut etc; and oil seeds, fruits and vegetables. Estimation of quality characters of Instant foods. Visit to APMC to study the eye-sight grading at field conditions of important crops. Visit to Ghee and Honey Grading Laboratory

AMC 315 Accountancy 2+1

Theory: Introduction to and necessity of accounting. Meaning & definition of book keeping. Accountancy objects of book keeping, system of book keeping, concepts and conventions. Double entry system of book keeping - objectives and classification of accounts. Journal, Journalizing. Ledger - preparation of ledger accounts, ledger posting. Subdivision of Journal: cash book - nature, types of cash

book and petty cash book. Bank reconciliation statement. Preparation of trail balance, Final accounts - trading, profit and loss account, balance sheet preparation. Single entry system of accounts - preparation of statement of affairs, profit or loss statement, advantages & disadvantages. Non-trading organizations-preparation of accounts relating to non-trading organization. Concepts of revenue & capital expenditure and income, Receipts and payment account, Income and expenditure account, and Balance sheet. Ratio analysis - meaning & expression of ratios, objectives and importance of Ratio analysis. Classification and computation of liquidity ratios, solvency ratios, activity ratios and profitability ratios. Cash flow statement - concepts, objectives, uses and preparation of cash flow statement, source and applications of cash, cash from operation, procedure of cash flow statement, difference between funds and cash flow statement.

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 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 balanced 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. Practical problems to be solved on liquidity and solvency ratio, Practical problems to be solved on activity & profitability ratios, Preparation of cash flow statement- sources and application of cash, Calculation of cash from operation. Preparation of cash flow statement

AMC. 321 Agricultural Commodity & 1+1
Livestock Marketing

Theory: Production and marketing system; and important markets for major food and non-food field crops. Problems in the marketing of major field crops. Marketable and marketed surplus of field crops. State policies in food grain trading. Food security programmes of the State and their implications for food grain marketing. FCI and State Food and Civil Supplies Corporation. Export avenues for major field crops. Export and import policies concerning field crops.

Production and marketing of important horticultural crops. Agencies involved in promoting production, marketing and export of major horticultural crops. Scope for foreign trade in horticultural crops. Problems in domestic and export trade of major horticultural crops. Remedial measures for trade promotion.

Importance of sericulture in Indian economy. Preparation of cocoons for marketing. Systems of cocoon marketing in the country. Marketing of cocoons in filature and seed markets. Problems and corrective measures. Export and import of silk and silk products.

Importance of livestock in Indian economy. Production scenario of livestock and livestock products; and their utilization. Livestock marketing in India. Marketing of cattle, goat, sheep, poultry and swine. Marketing of livestock products: marketing of milk, meat, eggs and wool. Problems in the marketing of livestock and their products. Remedial measures. Co-operatives engaged in production and marketing of livestock and their products. Organizations for promotion of trade in livestock and their products. National Dairy Development Board (NDDB) and Karnataka Co-operative Milk Producers' Federation Ltd. (KMF) and their Operation Flood programmes. Karnataka Sheep and Wool Development Corporation Ltd. Export trade in livestock and their products.

Fishery resources of India – Inland and Marine. Fish and fish products – their utilization. Fish marketing scenario in the country. Fisheries

co-operatives. Karnataka Fisheries Development Corporation Ltd. (KFDC) and other organizations engaged in promoting fisheries sector. Problems in fish marketing and remedial measures. Export trade in fisheries.

Practical: Estimation of marketing costs and margins in major food crops, non-food crops and horticultural crops. Visit to primary markets, secondary markets and terminal markets for crop produce; and HOPCOMS. Estimation of marketing costs and margins in silk cocoons. Visit to commercial silkworm rearing unit and cocoon market. Estimation of marketing costs and margins in milk and milk products; and eggs. Visit to KMF, organized dairy units in private sector and poultry units. Estimation of marketing costs and margins in fisheries. Visit to KFDC Ltd.

AMC. 322 Standardization, Grading and Quality 1+1
Control in Livestock and Livestock Products

Theory: General quality characteristics determining grades of livestock. Grade specifications for cattle, buffaloes, poultry, sheep, pig, fish and cocoons. Factors affecting quality of the end products of livestock, poultry, fish and cocoons. Grading of milk and milk products, leather, wool, egg, meat and cocoons. Existing methods of grading of livestock, poultry, fish and cocoons - advantages and disadvantages.

Practical: Study of external body parts of indigenous and exotic breeds of cattle and buffalo. Selection and judging of dairy cattle, Grading of cattle and buffalo based on different characters, Study of external body parts of goat. Belschner's score card for judging and grading of goat, Study of external body parts of swine. Grading of pig meat. Ultrasonic testing for grading of live pig. Study of external body parts of different breeds of sheep, Study of quality, classification and grading of wool, Study of external body parts and characteristics of different classes of fowl-breed, varieties and strains. Egg-methods of judging of egg quality, defects identifiable in eggs, internal

characteristics, Nutritive value of egg, AGMARK standards for grading egg. Study of grading of dressed chicken, ISI characteristics for grading chicken. Study of physio-chemical properties of milk from different mammals. Grading of milk and milk products. Visit to mutton market. Study of silkworm cocoons, Grading of cocoons. Quality testing and grading of raw silk. Study of external parts of fish, prawns, crabs and grading of Fish.

AMC. 323 Advanced Accounting and Auditing 2+1

Theory: Single Entry System of Accounts: meaning, definition, merits and demerits. Application of single entry system and its relevance and suitability. Preparation of statement of affairs, profit or loss statements and conversion of single entry system of accounting to double entry system of accounting, guidelines for conversion. Prospective and retrospective conversion. Preparation of total debtors account, total creditors account, bills receivable and payable accounts and finding missing values of different ledger accounts. Preparation of final accounts after conversion.

Accounts of Non-Trading organisations: Meaning, definition, objectives, application and scope, establishment, sources of funds and their application. Preparation of accounts pertaining to non-trading organisations. Preparation of accounts relating to non-trading organization, viz. Associations - Clubs –Hospitals-Charitable Institutions etc. preparation of Receipts and Payments A/c. Income and Expenditure A/c and Balance Sheet, Concepts of Revenue and Capital receipts and Revenue and Capital Expenditure. Distinctive features of Income & Expenditure A/c and Profit & loss A/c

Partnership accounts: Meaning, definition, advantages and disadvantages partnership. Incorporation of partnership firm, preparation of partnership deed. Rights and duties of partners. General partnership accounts-preparation of profit & loss appropriation a/c, capital accounts under fixed and fluctuating methods. Goodwill, meaning, definition, reasons for existence of goodwill. Valuation of

Goodwill-methods of valuation- Average profit method, super profit method and capitalization of profit method. Treatment of Goodwill on admission of partner – Death of partner, Retirement of partner and Dissolution of partnership. Preparation of partnership accounts- Admission of partner, Retirement of partner and death of partner.

Company Accounts: Formation of Company, meaning, definition, types of companies viz., private ltd., companies, public ltd., companies, public sector companies, government companies, multinational companies. Incorporation of companies under Indian companies Act of 1956. Memorandum of Association, Articles of Association, Shares, types of shares, IPO- Issue of Shares and debentures, issue at premium and discount, forfeiture of shares. Preparation of company balance sheet after issue of capital.

Practical: Preparation of single entry system of accounts, statement of affairs and profit and loss statement - Preparation of accounts relating to conversion of single entry to double entry system.

Preparation of accounts relating to non-trading organizations, revenue and capital accounts - Preparation of Receipts and Payments A/c, Preparation of income and expenditure accounts and Balance sheet of non-trading organisations. Debtors and creditors accounts and accounts relating missing values and preparation of final accounts after conversion into double entry.

Preparation of General Partnership Accounts with profit and loss appropriation A/c. - Preparation of fixed capital and fluctuating capital accounts in general partnership - Preparation of partnership accounts on admission. Accounts relating to prior to and after the admission of new partner into business. Accounts relating retirement, death of partners and accounts of Dissolution of partnership- realization account and bank account a/c's. Preparation Company accounts relating to - Issues of share capital and balance sheet after of issue capital.

**STUDENT “READY” (RURAL ENTREPRENEURSHIP
AWARENESS DEVELOPMENT YOJANA)
PROGRAMME**

Components of the programme :

- i. Experiential Learning/Hands on Training / Skill Development Training
- ii. Rural Agriculture Work Experience
- iii. In Plant Training/ Industrial Attachment / Students Projects

I EXPERIENTIAL LEARNING

- To be offered during Eighth semester
- **0+20** Credit Hours
- Register for any of two modules
- Each module of **0+10** credit hours.

a) Concept

- ❖ ‘Experiential’ means that learning and development are achieved through personally determined experience and involvement.
- ❖ Experiential learning is a business curriculum related endeavour which is interactive.
- ❖ EL is for building (or reinforcing) skills in
 - Project development and execution
 - Decision-making
 - Individual and team coordination
 - Approach to problem solving
 - Accounting, marketing and resolving conflicts etc.
- ❖ End to end approach.

- ❖ Carefully calibrated activities move participants to explore and discover their own potential.
- ❖ Both activities and facilitation play a critical role in enhancing team performance.

b) Objectives

- To provide excellent opportunity to develop analytical and entrepreneurial skills, and knowledge through meaningful hands on experience, confidence in their ability to design and execute project work.

The main objectives of EL are:

- To promote professional skills and knowledge.
- To build confidence and to work in project mode.
- To acquire enterprise management capabilities.

c) Duration

- 180 days (one semester) period in the final year.
- Students and faculty are expected to attend the activities even on institutional holidays with total commitment, and without any time limit or restriction of working hours.

d) Attendance

- ❖ Minimum attendance required is 85%.
- ❖ Any student in the event of recording shortage of attendance has to re-register the EL when offered next by paying the assigned fee.

e) Students’ Eligibility

- To get the eligibility for registering the EL programme, the students should have completed all the courses successfully.

- Assignment/allotment of the EL programme shall be based on merit of the student at the end of 5th Semester.

II RURAL AGRICULTURAL WORK EXPERIENCE

- To be offered during Seventh semester
- 0+20 credit hours in two parts: RAWE and AIA
- Attachment in University/ College/ KVK or a Research Station
- Helps the students primarily to understand the rural situations, status of Agricultural technologies adopted by farmers, prioritize the farmer's problems and to develop skills & attitude of working with farm families for overall development in rural area.
- Timings for RAWE can be flexible for specific regions to coincide with the main cropping season.

Objectives

- To provide an opportunity to the students to understand the rural setting in relation to agriculture and allied activities.
- To make the students familiar with socio-economic conditions of the farmers and their problems.
- To impart diagnostic and remedial knowledge to the students relevant to real field situations through practical training.
- To develop communication skills in students using extension teaching methods in transfer of technology.
- To develop confidence and competence to solve agricultural problems.
- To acquaint students with on-going extension and rural development programmes.

MODULES FOR SKILL DEVELOPMENT AND ENTREPRENEURSHIP

A student has to register 20 credits opting for two modules of (0+10) credits each (total 20 credits) from the package of modules in the **VIII semester.**

Course No.	Course Title	Cr. Hrs.
EMC. 421	Agri Market Information, Intelligence and Dissemination	0+10
EMC. 422	Agri Input and Output Management	0+10
EMC. 423	Agri-import & Export management	0+10
EMC. 424	Management of Agro-Based Industries	0+10

EMC. 421 Agricultural Market Information, Intelligence and Dissemination 0+10

Importance of agricultural market information, intelligence and dissemination, steps in data collection, data presentation and report preparation.

Procedure for mapping of major crops grown in various seasons, mapping area coverage, estimation of crop output in different seasons in the selected area. Season-wise major crops in different districts and mapping perennial crops.

Placement at different APMC's to record arrivals, price discovery, market information and intelligence practices interaction with traders and officials at APMC.

Procedure for identifying maximum, minimum and modal prices methods of uploading information, recording observations and report preparation.

e-mandi, features, performance and participation by different players of APMC. Recording procedures and report preparation.

Information processing system analysis of time series data introduction, meaning of trend, seasonal and cyclical variations, irregular movements, time plots and computation of each of the components and report preparation.

Identification of major Markets for Commodities – Introduction, procedure for identification, selecting important commodities and identification of markets.

Fortell Business Solutions (Pvt Ltd). Actual procedure followed for providing market intelligence for selected commodities.

Preparation of documents related to market intelligence studies assigned by foretell business solutions.

SAFAL Market – Business Management at SAFAL, forward and backward linkages, processing and exports, Methods of price determination, e- auctioning and managing wholesale and retail outlets. Preparation and presentation of reports.

Placement in Cocoon Market Siddlaghatta- to study the pricing and market information.

Contract farming, problems and prospects, types of contracts in vogue, involvement of APMC, pricing, inputs supplied, farmer' opinion, constraints faced by firms and farmers.

Establishing Linkages with Market Functionaries – pricing and price discovery practices of selected markets for different commodities. Establishing commodity interest groups, arranging for direct sale of selected commodities.

Collection of Price Statistics - Secondary Sources, various agencies providing statistics, steps in collection of price statistics, collection of wholesale and Retail prices, computation of index numbers for different categories of the population

Market information and dissemination procedures to be followed preparing information for dissemination through different report preparation and presentation.

Dissemination of Market Information through MIC. Steps in getting good forecasts, validation process and press release.

EMC. 422 Agricultural Input-Output Management 0+10

The student should work with a retail seed dealer-work in the sales counter-Attend to the customer purchase-List out the range of products dealt by the retailer-purchase of seeds and payment conditions.

Identification of varieties of seeds-observe/record the display system of seeds in the retail outlet-Verify the Stock Keeping Units (SKU) of the different products.

List the different brands of seeds sold in the retail outlet-Interact with the retailer about seed assortment, MRP, retailers margins etc-closely observe and make a note of customer relationship by the owner of the retail outlet.

Acquaint with the different statutory documents maintained in the retail outlet- Record the problems faced by the retailer in seed retail trade-Listing of the different agencies/suppliers- Listing of packaging material used for seeds- Collect the information on brand promotion and advertisement at retailer point.

The student should work in the sales counter of a fertilizer dealer-Attend to the customer purchase- List out the range of products dealt by the retailer-purchase of fertilizer and payment conditions.

Identification of kinds of Fertilizers- observe/record the display system of Fertilizers in the retail outlet- Verify the SKU of the different products.

List the different brands of fertilizers sold in the retail outlet -Interact with the retailer about fertilizer assortment, MRP, retailers margins

etc-closely observe and make a note of customer relationship by the owner of the retail outlet.

Acquaint with the different statutory documents maintained in the retail outlet-Collect the information on brand promotion and advertisement at retailer point.

The student should work in the sales counter of a pesticide dealer-Attend to the customer purchase- List out the range of products dealt by the retailer.

Identification of varieties and brands of Pesticides -observe/record the display system of Pesticides in the retail outlet- Verify the SKU of the different products-List the different brands of Pesticides sold in the retail outlet.

Interact with the retailer about Pesticides assortment, MRP, retailers margins etc- closely observe and make a note of customer relationship by the owner of the retail outlet.

Acquaint with the different statutory documents maintained in the retail outlet – documentation of rules and formalities of rules and formalities of purchase of Pesticides and payment conditions – collect the information on brand promotion and advertisement at retailer point.

The student should work with a farm machinery and equipments dealer-list out different kinds of Farm Machinery and Equipments dealt by the Dealer- work in a sale counter-Attend to the customer purchase.

List out manufacturers of farm machinery and equipments-After sales service provided by the dealer-attending to customer complaints-promotional activities of the dealer.

Listing of the various commodities notified & traded, types of market functionaries, trading practices, infrastructure facility in the regulated markets-Observe the price determination process- Record the number of participants in the auction/tender-

Record the quality and price differences between the lots offered for sale-List out the different kinds of weights and measures used in trading- Record the mechanism of Weighment. Record the payment details by the buyer to the seller- Record the market charges subjected on trade- Documentation of the type of the farmer's participation and crops sold in Regulated Markets-Go through the managerial decisions of the APMC-list out the processing firms and products in the market area.

The student should work in the sales counter of a Food Retail Chain -Attend to the customer purchase-List out the range of products dealt by the Food Retail Chain - commodities sold in the Food Retail Chain -Observe/record the display system of products in the Food Retail Chain.

Verify the SKU of the different products-wastage of fruits and vegetables- space management- grading, weighment removal of wastage, replenishment of stocks- billing of the produce- public relations, customer care-maintenance of premises.

EMC. 423 Agri Export - Import Management 0+10

Introduction-registration process-application for IEC number-procedures involved in filling of application for IEC number – industrial: details – Service tax registration details-PAN *details*-VAT details-Excise details- procedures for modification of IEC number.- bank account details.

Preliminaries for starting export/ import business – decision about business organization-Sole Proprietary concern or a partnership firm or a company- merchant exporter – manufacturer exporter – sales agent – steps involved in naming and establishing of business firm-procedures involved in selection of produce for exports- Knowing of import regulations in importing countries – payment conditions and Procedures involved in payment.

Introduction- to understand the nature of import transactions-to discuss the policy framework concerning the imports- to present a framework for an import transaction.

To highlight import finance facilities available in India-to explain the procedures for documents-auxiliary commercial documents – regulatory documents – commercial invoice-pre-shipment documents – post-shipment documents – Clearance for bond warehousing-demurrage-recapitulation.

Introduction to APEDA- its goals and vision- functions- procedure for registration action plan for creating infrastructure facility - action plan for marketing- action plan for promotional activities.

Procedures followed by exporters facilitated by APEDA-how to get export order finalization of export order-steps taken to procure quality raw material-logistic arrangements.

Preparation of documents related to exports-insurance of goods-payment methods and conditions-preparation of documents to claim export subsidies- stipulations for exporters and importers followed as per the WTO requirement.

Introduction to KAPPEC- its goals and vision- functions- Procedure for registration action plan for creating infrastructure facility - action plan for marketing- action plan for promotional activities. An exporter facilitated by KAPPEC.

Preparation of documents related to exports-insurance of goods-payment methods and conditions-preparation of documents to claim export subsidies- stipulations for exporters and importers followed as per the WTO requirement.

Introduction to NAMDHARI business firm-vision & mission-range of products-contractfarming-quality management- quality control – certification procedures – No. of competitors –consumer’s preference – product promotion – marketing strategies for promotion of sales in the domestic market Range and quantity of fruits and vegetables

exported by NAMDHARI firm-what percentage of production is exported-tips followed for the quality production of fruits and vegetables for export-how to get export order-processing of export order-grading, packaging and packing of fruits and vegetables for export as per the requirement of importing countries-documentation procedures for export of goods-preparation of document to claim subsidy from *Government* after performance of exports.

Introduction to flower exports-variety of flowers exported-important production pockets of the State and Country-export destinations-rules governing the flower imports in different countries-steps to be followed for the procurement of quality flowers for exports-logistic arrangements- documentation procedures for exports and claiming of subsidies followed by flower exporters.

Introduction to Coffee Board- constitution-organization- functions - *objectives*- research-extension-export promotion schemes-notified commodities-marketing strategies-Issue of export permits & certificate of origin-procedure for de registration- list the export promotion schemes for Coffee-Promotional and developmental *activities* undertaken by the board-procurement-pooling-grading – processing curing- payment to grower-other activities relating to-input supply - credit-domestic consumption-export-volume-value and destination *over* the last 5 years-problems /constraints of the board.

Introduction to Export Inspection Council-functions- notified commodities under export inspection council- systems of export inspection and certification- in process quality control(IPQC) system-self certification(SC) system- food safety management systems based certification (FSMSC)- countries recognized under EICS certification- certificates of origin- laboratory services- training and technical assistance - role of export inspection council in WTO regime.

Introduction to The Export Credit Guarantee Corporation of India Limited (ECGC)- functions and *objectives*- major activities-

procedure for making policy- export credit insurance- management- credit insurance policies- special schemes- commodity oriented insurance schemes which comes under ECGC.

Introduction to The State Trading Corporation of India Ltd. (STC)- functions and objectives- type of activities- countries it deals with- agricultural commodities imported for last two years- agricultural commodities exported for last two years- global strengths to provide competitive prices- performance indicators- area of operation- domestic trading- services.

Introduction to EXIM bank- initiatives- functions and *objectives*- *vision*- range of products and services- organizations- bank regulations- finance and services- performance indicators- export credit facilities - rate of interest - institutional linkages- lines of credit- rural initiatives-export services.

EMC. 424 Management of agro based industries 0+10

The Trainee should understand the working of oil processing industry; by studying the company profile, organization structure, financial management, processing mechanisms, marketing and supply chain aspects.

Visits to Dairy Milk Cooperative Society, to study the procurement, management, primary processing and other operational cum managerial issues of milk procuring centre.

Visit to Commercial Dairy plant: to study the establishment, technology and milk processing machinery, equipment, processing of other byproducts and other products processed in dairy unit, studying management hierarchy, organizational structure, marketing aspects, human resource management.

Visit to Ice Cream Plant: understanding of Ice cream making plant covering various technological, quality standards, production nuances, marketing issues and management aspects.

Visit to Jaggery preparing / making unit, the students are trained in jaggery processing unit, understanding this very important traditional know how of making jaggery by the farmers and also studying the economics of jaggery over sale of cane to the sugar factory, studying the problems faced by the farmers in respect labour, chemicals and marketing of jaggery.

Visit to modern rice mill to study the milling of rice and technology involved in this vital processing unit. Study of various aspects of rice mill operations, machinery used in rice milling, layout of rice mill plant. Studying various bi-products of rice milling, recovery rate. Establishment and organizational structure of rice mill. Procurement and marketing of rice and other products, provisions and acts pertaining to rice levy and price fixation.

Visit to fruit / vegetable processing unit to study the nature and type processing activity, plant layout and design, machinery used in processing of fruits and vegetables. Procurement of seasonal raw materials, storage and processing, major products and bi products, marketing aspects, supply chain and value additions.

The Trainee should undergo the working of sugar industry; by studying the company profile, organization structure, financial management, procurement of cane, crushing mechanisms, by products viz., paper, molasses, handling ash and power generation etc., marketing of sugar and other by products and levy regulations, pricing etc.,

Hands on training at coffee curing works: the student will be placed in coffee curing works to understand the technique and technology involved in processing of coffee, procurement of cherry/ bean, studying of different processes and stages involved in coffee curing, technology/ machinery, management of by products, price fixation and marketing of processing of coffee. Bulk and retail vending of processed coffee. Capital, Management and financial structure of coffee curing unit.

Evaluation of Experiential Learning (EL) / Hands on Training (HoT) Programme

Sl.No.	Parameters	Max. Marks
1.	Project Planning and Writing	10
2.	Presentation	10
3.	Regularity	10
4.	Monthly Assessment	10
5.	Output delivery	10
6.	Technical Skill Development	10
7.	Entrepreneurship Skills	10
8.	Business networking skills	10
9.	Report Writing Skills	10
10.	Final Presentation	10
Total		100

EVALUATION OF STUDENT READY PROGRAM

- Students shall be evaluated component-wise under village attachment/ agro-industrial attachment/ hands on training/skill development training/experiential learning/student projects.
- Each College of the University will designate a Student READY Program Coordinator and component wise evaluation committees. These committees will evolve a method of evaluation depending upon the component undertaken giving due weightage to the observations made by the Scientists/Agro-industrial Officer and the Program Coordinator with whom they are attached.

- Since the Credit Hours allotted to the Student READY program are gradial, the minimum condition of attendance and grading system will apply for the program as will be applicable to other courses.
- It is expected that at the end of Student READY program, the students should gain competency for entrepreneurship, which should be innovative and creative in nature. The evaluation committee must ensure percentage increase in this competency at the end & successful organization of all Student READY programs.

Educational Tour

One Educational Tour for 15 days during break period after the V Semester shall be conducted and grading shall be done as Satisfactory/ Non Satisfactory.

EXAMINATION AND EVALUATION SYSTEM

Declaration of division(I, II and III divisions, distinctions etc.) in the degree certificate to be made compulsory by all Universities:

1 Examination

- External theory (50%)
- Internal Theory + Practical (50%)
 - **Courses with Theory and Practical**
Mid-term Exam (30%) + Assignment (5%) in practical oriented courses + Practical (15%)
 - **Courses with only Theory**
Mid-term Exam (40%) + Assignment (10%)
 - **Courses with only Practical:**
(100%) Internal

- Paper to be set by external: HOD shall ensure the coverage of syllabus. If needed moderation can be done.
- Evaluation to be done internally by the faculty other than the Course Instructor. Syllabus of the concerned course shall be sent to the external examiner, who shall prepare the question papers. For practical, it is recommended that examination shall be conducted by course instructor(s) and one teacher nominated by HOD.

2. Evaluation

Percentage of Marks Obtained	Conversion into Points	OGPA	Division
100	10 Points		
90 to <100	9 to < 10		
80 to <90	8 to < 9	5.000 – 5.999	Pass
70 to <80	7 to < 8	6.000 – 6.999	II division
60 to <70	6 to < 7	7.000 – 7.999	I division
<50 (Fail)	< 5	8.000 and above	I division
Eg. 80.76	8.076		with distinction
43.60	4.360		
72.50 (but shortage in attendance)	Fail (1 point)		
<hr/>			
GPA	= Total points scored / Total credits (for 1 semester)		
CGPA	= Σ Total points scored / Course credits		
OGPA	= Σ Total points scored (after excluding failure points) / Course credits		
% of Marks	= OGPA x 100/10		