

PROPOSED CURRICULUM STRUCTURE FOR THE SEMESTER 4 of DIPLOMA IN ARRIGULTURAL ENGINEERING

							Examination Pattern						Full Marks For			FULL MARKS	Credits	Page No.	
					contact period per week		Internal assessment(for theoretical sub			External assessment (for theoretical sub)			Theoretical subject	Sessional subjects					
SL no	SUBJECT	Subject code	Question code	Packet code	lecture	sessional	Mid Semester Exam(CT)	TA	Total internal	obj	Subj	Marks allotted For ESE		TW	PR				Total
THEORITICAL																			
1	Principles Of Agronomy				4	--	20	10	30	20	50	70	100	--	--	--	100	3	
2	Dairy & Food Products Technology				3	--	20	10	30	20	50	70	100	--	--	--	100	3	
3	Ground Water, Wells & Pumps				3	--	20	10	30	20	50	70	100	--	--	--	100	3	
4	Soil Mechanics				4	--	20	10	30	20	50	70	100	--	--	--	100	3	
5	PHE Of Horticultural Crops				3	--	20	10	30	20	50	70	100	--	--	--	100	3	
6	Agricultural Economics & Farm Management				3	--	20	10	30	20	50	70	100	--	--	--	100	3	
SESSIONAL																			
7	Principles Of Agronomy Lab.				--	4	--	--	--	--	--	--	--	50	50	100	100	2	
8	Dairy & Food Products Technology Lab.				--	4	--	--	--	--	--	--	--	50	50	100	100	2	
9	Ground Water, Wells & Pumps Lab.				--	3	--	--	--	--	--	--	--	25	25	50	50	2	
10	Soil Mechanics Lab.				--	4	--	--	--	--	--	--	--	25	25	50	50	2	
11	PHE Of Horticultural Crops Lab.				--	3	--	--	--	--	--	--	--	25	25	50	50	2	
TOTAL					20	18	120	60	180	120	300	420	600	200	200	350	950	28	

Student contact hour per week is 31 hour.

Theory and Practical classes will be of 1(one) hour duration.

List of abbreviation used: CT – class test; TA - Teacher's Assessment (Attendance & surprise quizzes = 6 marks ; Assignment & group discussion = 4 marks.)

Obj: objective Subj - Subjective Minimum passing marks for Theoretical and Sessional subjects will be 40%

All other rules and regulations for assessment of practical and term work will be carried out as per prevailing norms

NO QUESTION SHOULD START WITH “WHY” OR ASKS FOR “ GIVING OR CITING REASONS”

TW – Term work (to be evaluated by a board of departmental teachers) PR- Practical (to be evaluated by external teachers)

1 PRINCIPLES OF AGRONOMY

Name of course: Diploma in Agricultural Engineering
Course Code: Agr. E Course Duration: 6 semester
Subject Code: Question Code:

Subject: PRINCIPLES OF AGRONOMY
Subject offered in semester: fourth
Marks: 100

Teaching Scheme	Examination Scheme
Theory :4 lecture per week	CT- 20
Tutorial: Nil	Attendance, Assignment & Quiz -10
Practical: Nil	End Semester Exam - 70
Credit:- 3	Total Marks - 100

Aim:-

The aim of the subject is to enlighten the students about the agronomical practices used for cultivation of cereals, oilseeds and pulses. The optimum condition for proper use of these machineries will also be thought under this subject.

Objective :-

The basic knowledge of various crops and their production system is very important for an agricultural engineer in view of appropriate selection of improved agricultural machinery and implements for their cultivation. This subject will enlighten the students about various types of cereals, oilseeds, pulses and other similar crops, their cultivation technique as well as machinery and tools used for the same.

SL. NO.	TOPIC	Contact period	Maximum Marks
Unit 1	General Concept	6	5
Unit 2	Soil-Water Plant Relationship	6	8
Unit 3	Cropping Sequences And System	7	12
Unit 4	Weed And Its Management	6	10
Unit 5	Crop Cultivation	10	8
Unit 6	Concept Of Dry Farming And Rainfed Agriculture	7	9
	TOTAL	48	70

Content: Theory (Principles of Agronomy)

3 hrs/wk

1. GENERAL CONCEPT
2. Definition and scope of Agronomy, Classification of crop, Effect of different weather parameters on crop growth and development.

3. Principles of tillage, Tillage and its characteristics, Tillage implements, Conservation Tillage, Conventional Tillage
4. SOIL-WATER PLANT RELATIONSHIP
5. Soil-water-plant relationship,
6. Water requirement of crops and irrigation scheduling,
7. Irrigation requirement of field crops
8. CROPPING SEQUENCES AND SYSTEM
9. Crop rotation, cropping systems, mono, double and multiple cropping,
10. Relay cropping and mixed cropping,
11. WEED AND ITS MANAGEMENT
12. Definition of weed,, crop-weed relationship and competition
13. Weeds, its management & control
14. CROP CULTIVATION
15. Cultivation practices of important field crops, improved varieties, seed rate, time and method of sowing, maturing, Fertilization and plant protection during *kharif* season
16. Cultivation practices of important field crops, improved varieties, seed rate, time and method of sowing, maturing, Fertilization and plant protection during *rabi* season
17. Cultivation practices of important field crops, improved varieties, seed rate, time and method of sowing, maturing, Fertilization and plant protection during *pre-kharif* season
18. CONCEPT OF DRY FARMING AND RAINFED AGRICULTURE
19. Concept of dry farming,
20. Rainfed Agriculture
21. Rainwater harvesting and in-situ moisture conservation.

Text Books:

SI NO	Name of Book	Writer's Name
1	Principles of Agronomy	T. Yellamanda Reddy and G. H. Sankara Reddy
2	Principles of Agronomy	S. R. Reddy
3	Modern Technique of Raising Field Crops	Chhidda Singh, Prem Singh and Rajbir Singh
4	Crop Management under Irrigated and rainfed conditions	Dr.S. R. Singh
5	Cropping and Farming System	S.C. Panda
6	Advances in Legume Systematic	R.M. Polkill and P.H. Raven
7	Pulses, Status and Cultivation Technology	O.P. Khedar, R.V. Singh, M. Shrimali, N.P. Singh
8	Environment and Agriculture	K.L. Chadda & M.S. Swaminathan
9	Precision Agriculture : 1997	John V. Stafford
10	Remote Sensing and its Application	L.R. A. Narayan

2 DAIRY AND FOOD PRODUCTS TECHNOLOGY

Name of course: Diploma in Agricultural Engineering
 Course Code: Agr. E Course Duration: 6 semester
 Subject Code: Question Code:

Subject: DAIRY AND FOOD PRODUCTS TECHNOLOGY
 Subject offered in semester: fourth
 Marks: 100

Teaching Scheme	Examination Scheme
Theory : 3 lecture per week	CT- 20
Tutorial: Nil	Attendance, Assignment & Quiz -10
Practical: Nil	End Semester Exam - 70
Credit:- 3	Total Marks - 100

Aim:-

This course aims to equip the students with knowledge of modern technology for dairy and food processing and manufacturing of several value-added products. It also aims at imparting knowledge on the operation and maintenance of related machines and equipments.

Objective :-

Technology for processing of dairy and food products is integral parts of agricultural engineering profession and the students should have a thorough knowledge on this subject. This course contains the technology for manufacturing of various dairy and other food products as well as operation and maintenance of dairy and food processing plants.

SL. NO.	TOPIC	Contact period	Maximum Marks
Unit 1	Dairy and food industries in India. Properties of dairy food products	4	5
Unit 2	Unit operation of various dairy and food processing systems; Process flow charts for product manufacture;	6	8
Unit 3	Manufacture of flavored milk - cream - butter- condensed milk – Ghee – ice cream etc	6	12
Unit 4	Processing of bakery products - bread - biscuit - cake.	6	10
Unit 5	Manufacture of jam-jelly-Marmalade sauce and squash	6	8
Unit 6	Beverages - alcoholic and non alcoholic - carbonated and non carbonated	6	9
Unit 7	Essence and flavours of food products - preservatives and modes of preservation, packaging of dairy and food products.	6	8
Unit 8	Working principles of equipment for receiving, pasteurization, sterilization, homogenization, filling and packaging, butter manufacture, evaporation, drying, freezing, juice extraction, filtration, membrane' separation, thermal processing, plant utilities requirement.	8	10
	TOTAL	48	70

Content: Theory (Dairy and Food Products technology) 3 hrs/wk

1. Dairy and food industries in India. Properties of dairy food products
2. Unit operation of various dairy and food processing systems; Process flow charts for product manufacture;
3. Manufacture of flavored milk - cream - butter- condensed milk – Ghee – ice cream etc
4. Processing of bakery products - bread - biscuit - cake.
5. Manufacture of jam-jelly-Marmalade sauce and squash
6. Beverages - alcoholic and non alcoholic - carbonated and non carbonated
7. Essence and flavours of food products - preservatives and modes of preservation, packaging of dairy and food products.
8. Working principles of equipment for receiving, pasteurization, sterilization, homogenization, filling and packaging, butter manufacture, evaporation, drying, freezing, juice extraction, filtration, membrane' separation, thermal processing, plant utilities requirement.

Text Books:

SI NO	Name of Book	Writer's Name	Publisher's Name
1	Food Engineering & Dairy Technology	C.P.Arora	Mc Graw Hill
2	Dairy Technology	Sukumar Dey	Oxford University Press, New Delhi
3	Dairy Engineering	Farrall	-----

3 GROUND WATER, WELLS & PUMPS

Name of course: Diploma in Agricultural Engineering
Course Code: Agr. E Course Duration: 6 semester
Subject Code: Question Code:

Subject: GROUND WATER, WELLS & PUMPS
Subject offered in semester: fourth
Marks: 100

Teaching Scheme	Examination Scheme
Theory : 3 lecture per week	CT- 20
Tutorial: Nil	Attendance, Assignment & Quiz -10
Practical: Nil	End Semester Exam - 70
Credit:- 3	Total Marks - 100

Aim:-

To develop the skill in ground water exploration, proper design of tube wells and pumps matching to different condition.

Objective :-

Ground water is an important source of water for irrigation as well as domestic purposes. Knowledge of occurrence and movement of ground water and its exploration and tube well technology along with its design and installation helps to use the ground water resources properly.

SL. NO.	TOPIC	Contact period	Maximum Marks
Unit 1	Introduction	6	5
Unit 2	WELLS	8	14
Unit 3	DRILLING METHODS AND INSTALLATION OF TUBE WELLS	8	15
Unit 4	PERFORMANCE OF WELLS	8	10
Unit 5	PUMPING SYSTEM	9	12
Unit 6	DESIGN OF PUMPS AND ITS PERFORMANCE	9	14
	TOTAL	48	70

Content: Theory (Ground water, wells & pumps)

3 hrs/wk

1.0 Introduction:

- 1.1 Occurrence and movement of ground water
- 1.2 Aquifer and its types
- 1.3 Groundwater exploration techniques

2.0 Wells:

- 2.1 Classification of wells
- 2.2 steady and transient flow into fully-penetrating and open wells
- 2.3 Familiarization of various types of bore wells common in the state
- 2.4 Design of open well

3.0 Drilling Methods And Installation of Tube wells:

- 3.1 Percussion, rotary, reverse rotary drilling
- 3.2 Design of assembly and gravel pack
- 3.3 Installation of well screen
- 3.4 Joining of pipes
- 3.5 Completion and development of well

4.0 Performance of wells:

- 4.1 Well interference
- 4.2 Multiple well systems
- 4.3 surface and subsurface exploitation and estimation of ground water potential
- 4.4 Quality of ground water

4.5 Artificial groundwater recharge planning

5.0 Pumping System:

- 5.1 Water lifting devices
- 5.2 Different types of pumping machinery
- 5.3 Classification of pumps
- 5.4 Component parts of centrifugal pumps
- 5.5 Pump selection, installation and trouble shooting

6.0 Design of pumps and its performance:

- 6.1 Design of centrifugal pumps
- 6.2 Performance curves, effect of speed on head capacity, power capacity and efficiency curves
- 6.3 Effect of change of impeller dimensions on performance characteristics
- 6.4 Priming and self priming devices
- 6.5 Rotodynamic pumps for special purposes such as deep well turbine pump and submersible pump.

Text Books:

SI NO	Name of Book	Writer's Name	Publisher's Name
1	Water Well & Pump Engineering	A. M. Micheal & S.D. Khepar	Mc Graw Hill, N.D.
2	Irrigation Principles & Practices	A. M. Michael	Vikas Publishing House Pvt.Ltd.576 Masjid Road , Jangpura New Delhi110004
3	Ground Water & Tube wells	S. P. Grog	Oxford & Ibh Publishing House Pvt. Ltd.
4	Ground Water Hydrology	D. K. Todd	John Wiley & Sons
5	Ground Water	H. M. Raghunath	-----

4 SOIL MECHANICS

Name of course: Diploma in Agricultural Engineering
Course Code: Agr. E Course Duration: 6 semester
Subject Code: Question Code:

Subject: SOIL MECHANICS
Subject offered in semester: fourth
Marks: 100

Teaching Scheme	Examination Scheme
Theory : 4 lecture per week	CT- 20
Tutorial: Nil	Attendance, Assignment & Quiz -10
Practical: Nil	End Semester Exam - 70
Credit:- 3	Total Marks - 100

Aim:-

To develop knowledge and skills of -

- (a) Classification of soils and soil structure
- (b) Soil mass and fundamental concepts and principles
- (c) Permeability, seepage, compaction, consolidation, stability of slopes and shear strength of soils
- (d) Bearing capacity of shallow and deep foundations of soils
- (e) Settlement of foundations
- (f) Estimation of thickness of pavement by CBR method
- (g) Stabilization of soils.

Objective :-

The knowledge and skills of Geo-Technical Engineering provided is as important as any other subject of Agricultural Engineering. Practical works in Geo-Technical Engineering are equally important. The theory together with practices of this subject will definitely help in Construction Works, specially in the design and construction foundation of building, agricultural structures, and other animal barn.

SL. NO.	TOPIC	Contact period	Maximum Marks
Unit 1	Introduction	1	1
Unit 2	Classification Of Soils	2	5
Unit 3	Soil Structure	2	4
Unit 4	Soils Mass And Its Definitions	4	4
Unit 5	Atterberg Limits In Soils	3	4
Unit 6	Permeability	5	5
Unit 7	Seepage Flow-Net And Drainage	1	2
Unit 8	Compaction	4	6
Unit 9	Consolidation	3	5
Unit 10	California Bearing Ratio (Cbr)	2	2
Unit 11	Shear Strength	3	2
Unit 12	Earth Pressure On Retaining Structures	2	4
Unit 13	Stability Of Slopes	2	4
Unit 14	Soil Stabilisation	2	4
Unit 15	Soil Exploration	2	3
Unit 16	Foundation Engineering	6	10
Unit 17	Settlement Of Foundations	2	5
	TOTAL	48	70

Content: Theory (Soil Mechanics)

3 hrs/wk

1.0 INTRODUCTION:

- 1.1 Define soil and soil engineering
- 1.2 Define and explain the soil formation

2.0 CLASSIFICATION OF SOILS:

- 2.1 Classify soils according to: I.S. Particle size classification, Textural classification Chart and Plasticity chart.
- 2.2 Describe principal types of soils State properties of different soil components
- 2.3 Identify and describe (a) coarse grained soils (b) fine grained soils

- 3.0 SOIL STRUCTURE:
 - 3.1 Define and explain (a) soil particles (b) electrical forces of clay particles
 - 3.2 Define and explain particle size arrangement in coarse-grained and fine-grained soils, particle size arrangement in composite soils, with sketches.
- 4.0 SOILS MASS AND ITS DEFINITIONS:
 - 4.1 Define and derive expressions for the following terms : Soil-mass, water content, density and unit weight of soil solids, specific gravity, void ratio and porosity, percentage air voids and air content, degree of saturation, density index, bulk saturated / dry / submerged density.
 - 4.2 Solve problems on 4.1
 - 4.3 Class tests and assignments.
- 5.0 ATTERBERG LIMITS IN SOILS:
 - 5.1 Define and explain consistency limits of soils with sketches
 - 5.2 Define the following terms: (a) Liquid limit (b) Plastic limit (c) Plasticity index (d) Shrinkage limit (e) consistency index (f) liquidity index (g) Shrinkage ratio (i) Volumetric shrinkage.
 - 5.3 Solve problems on Atterberg limits.
- 6.0 PERMEABILITY:
 - 6.1 Define permeability of soils
 - 6.2 Explain hydraulic head, hydraulic gradient & potential energy with sketches.
 - 6.3 State and explain Darcy's law and its validity
 - 6.4 State and explain the factors affecting the permeability of soils.
 - 6.5 State and explain the formulae of co-efficient of permeability for fine grained and coarse grained soils.
 - 6.6 Solve problems on 6.5
- 7.0 SEEPAGE FLOW-NET AND DRAINAGE:
 - 7.1 Define seepage pressure and explain the phenomenon of quick sand condition.
 - 7.2 Concept and applications of flow net
- 8.0 COMPACTION:
 - 8.1 Define (a) compaction of a soil (b) optimum moisture content if a soil, with sketches.
 - 8.2 State and explain factors affecting the compaction of a soil.
 - 8.3 List various compaction tests and compare these tests using parametrical variations. Define the relative compaction of a soil.
 - 8.4 Describe briefly the field compaction methods and its application in different soils.
 - 8.5 Draw and compare compaction curves between dry density and water content % for different compaction test.
- 9.0 CONSOLIDATION:
 - 9.1 Define and explain consolidation and effective pressure
 - 9.2 Describe the followings with sketches: Void ratio (e)-effective pressure(σ') curve (b)e-log σ' curve (c) Time vs. consolidation curve, (d) coefficient of consolidation using Terzaghi's formula (e) Assumptions of Terzaghi's theory of consolidation (f) Consolidation settlement.
- 10.0 CALIFORNIA BEARING RATIO (CBR):
 - 10.1 Define and explain the CBR
 - 10.2 Describe briefly a method of estimating the thickness of Roads and Railway pavements using CBR
- 11.0 SHEAR STRENGTH:
 - 11.1 Define (a) shear strength (b) Cohesion (c) Angle of internal friction
 - 11.2 State and explain Coulomb's law and Mohr's strength theory and explain Coulomb – Mohr strength curve.
 - 11.3 Establish the relation between Major (σ') and Minor (σ_3') effective stresses.
 - 11.4 Describe briefly the different shear tests with sketches and their relative advantages
- 12.0 EARTH PRESSURE ON RETAINING STRUCTURES:

- 12.1 Define and explain (a) Active earth pressure Passive earth pressure (c) Neutral earth pressure with sketches.
- 12.2 State the formula related to 12.1 for c- ϕ soils
- 12.3 Solve problems on 12.1
- 13.0 STABILITY OF SLOPES:
 - 13.1 Define a slope surface
 - 13.2 Explain the stability of different slopes and failure surfaces
 - 13.3 Describe the different types of failures with sketches and state the causes of failure.
- 14.0 SOIL STABILISATION:
 - 14.1 State general principles of soil stabilisation and describe briefly mechanical stabilization, water retentive, chemical and cement stabilisation. Stabilisation by grouting, electrical stabilization.
- 15.0 SOIL EXPLORATION:
 - 15.1 Define and state the purpose of soil exploration
 - 15.2 Describe briefly different excavation and boring methods of sub-surface exploration with sketches
 - 15.3 State different types of soil samples and compare their merits and demerits
 - 15.4 State the principles of procuring and handling of undisturbed samples. (Note: Handouts to be provided extensively.)
 - 15.5 Class test and assignment.
- 16.0 FOUNDATION ENGINEERING:
 - 16.1 Define and state the functions of shallow foundation
 - 16.2 Draw failure planes of Terzaghi's bearing capacity for shallow foundation (sketch only)
 - 16.3 Bearing capacity of soils and their calculation using Terzaghi's Formula.
 - 16.4 Determine allowable bearing capacity of soils using I. S. Code of Practice.
 - 16.5 Describe briefly the Plate load test for bearing capacity of soils.
 - 16.6 Explain the functions of deep foundations
 - 16.7 Different types of foundation: State the functions of raft or mat, pile, pier, strip and isolated footings, well foundation, cofferdams and caisson foundation (sketches only) and types of pile. Write down the formulae for bearing capacity of different types of piles as per I.S. Code of practices.
- 17.0 SETTLEMENT OF FOUNDATIONS:
 - 17.1 State the various causes of settlement of foundation, determine the permissible settlement using I.S. Code of practice.

SI NO	Name of Book	Writer's Name	Publisher's Name
1	Soil Mechanics & Foundation	Alam Singh & B. C. Punmia	----
2	A text book of Soil Mechanics	Bharat Singh & Shamsher Prakash	-----
3	Foundation Engineering	W. C. Teng	-----
4	Geo-Technical Engineering (Soil Mechanics) S. I. Units	Appa Balwant Chowk	Everest Publishing House, Pune – 411 030, Maharashtra
5	Soil Engineering in Theory & Practice, Part-I (3 rd Edition)	Alam Singh & Chowdhary	CBS Publishers and Distributors
6	Soil Mechanics	T.W.Lambe & R.V.Whitman	----
7	Principles of Soil Mechanics & Foundation Engineering	V.N.S. Murthy	UBS Publishers
8	Introduction of Soil Mechanics	B.M.Das	Galgotia Publications
9	Basic & Applied Soil Mechanics	Gopal Ranjan & A.S.R.Rao	Willes Eastern Ltd.

5 PHE OF HORTICULTURAL CROPS

Name of course: Diploma in Agricultural Engineering
 Course Code: Agr. E Course Duration: 6 semester
 Subject Code: Question Code:

Subject: PHE OF HORTICULTURAL CROPS
 Subject offered in semester: fourth
 Marks: 100

Teaching Scheme	Examination Scheme
Theory : 3 lecture per week	CT- 20
Tutorial: Nil	Attendance, Assignment & Quiz -10
Practical: Nil	End Semester Exam - 70
Credit:- 3	Total Marks - 100

Aim:-

The aim of this course is to train the students with technical knowledge of processing of horticultural crops. It will enlighten the students about the various unit operation and machineries involved.

Objective :-

The horticultural crops mainly constitute of the fruits, vegetable and spices. Processing of these crops need special attention as these are perishable in nature. Various popular and nutritional food products are prepared from these crops which are essential parts of our diet. There are several engineering aspects and unit operations involved in these processes and the students should learn for effective operation and maintenance of related processing plants.

SL. NO.	TOPIC	Contact period	Maximum Marks
Unit 1	Properties Of Horticultural Crops	6	10
Unit 2	Principles Of Preservation	1	5
Unit 3	Process Parameters And Equipment For Various Operations	14	15
Unit 4	Cooling And Cold Storage	6	6
Unit 5	Drying And Dehydration	8	10
Unit 6	Product Manufacturing	8	10
Unit 7	CA And MA Storage	3	8
Unit 8	Quality Control Techniques And Application	2	6
	TOTAL	48	70

Content: Theory (PHE Of Horticultural Crops)

3 hrs/wk

- 1 PROPERTIES OF HORTICULTURAL CROPS
 - 1.1 Physical Properties
 - 1.2 Mechanical Properties
 - 1.3 Thermal Properties
- 2 Principles Of Preservation
- 3 PROCESS PARAMETERS AND EQUIPMENT FOR VARIOUS OPERATIONS
 - 3.1 Cleaning, Sorting And Grading
 - 3.2 Washing
 - 3.3 Handling
 - 3.4 Peeling And Slicing
 - 3.5 Blanching
 - 3.6 Mixing
 - 3.7 Packaging And Storage
- 4 COOLING AND COLD STORAGE
- 5 DRYING AND DEHYDRATION
 - 5.1 Pre-Drying Techniques
 - 5.2 Theory Of Drying
 - 5.3 Various Types Of Dryers And Their Operation
 - 5.4 Quality Changes In Dried Products
 - 5.5 Novel Drying Techniques
- 6 PRODUCT MANUFACTURING
 - 6.1 Juice And Beverages
 - 6.2 Preserves And Pickles
 - 6.3 Extrusion Cooking And Extruded Products
 - 6.4 Fermentation And Fermented Products
- 7 CA AND MA STORAGE
- 8 QUALITY CONTROL TECHNIQUES AND APPLICATION

Text Books:

SI NO	Name of Book	Writer's Name	Publisher's Name
1	Vegetable Processing	M.Gutterson	Noyes Data Corpn. N.J.
2	Commercial Processing of Vegetables	L.P.Hanson	Noyes Data Corpn. N.J.
3	Fruits and Vegetables	Duckworth R.B	Perganon Inst. Library, Oxford.
4	Physical properties of plant and Animal Materials	N.N.Mohsenin	Garden and Breach Science Publishers NY.

6 AGRICULTURAL ECONOMICS & FARM MANAGEMENT

Name of course: Diploma in Agricultural Engineering Subject: AGRICULTURAL ECONOMICS & FARM MANAGEMENT
 Course Code: Agr. E Course Duration: 6 semester Subject offered in semester: fourth
 Subject Code: Question Code: Marks: 100

Teaching Scheme	Examination Scheme
Theory : 3 lecture per week	CT- 20
Tutorial: Nil	Attendance, Assignment & Quiz -10
Practical: Nil	End Semester Exam - 70
Credit:- 3	Total Marks - 100

Aim:-

The aim of the subject is to educate the students about the economic management of agricultural cultivation system and their appropriate use.

Objective :-

The basic knowledge for economic management of agricultural cultivation system and proper management of agricultural machinery for their efficient and optimum use are important for the students of agricultural engineering. It play major role in

agri-business related to hiring charge of agricultural machinery. The proper management of these machineries in view of their economic use is an essential component which will be taken care under this subject.

SL. NO.	TOPIC	Contact period	Maximum Marks
Unit 1	BASIC TERMS AND CONCEPTS IN ECONOMICS. SCOPE OF ECONOMICS	4	7
Unit 2	LAWS OF DEMAND AND MARKET SUPPLY, FACTORS GOVERNING SUPPLY, MARKET AND PRICE DETERMINATION UNDER DIFFERENT MARKET SITUATION, FARM PRODUCE MARKETING SYSTEMS IN INDIA. PLACE OF AGRICULTURE IN INDIAN ECONOMY.	7	7
Unit 3	DEPRECIATION AND METHODS OF CALCULATING DEPRECIATION COST OF CULTIVATION PER HECTARE, COST OF PRODUCTION PER QUINTAL, ECONOMIC SIZE OF HOLDING.	6	7
Unit 4	GOVERNMENT POLICIES REGARDING ECONOMIC INCENTIVES FOR ENHANCING PRODUCTIVITY AND PRODUCTION.	4	7
Unit 5	BENEFIT COST RATIO, INTERNAL RATE OF RETURN, PAYBACK PERIOD, NET PRESENT VALUE.	6	7
Unit 6	FARM MANAGEMENT- MEANING, SCOPE AND IMPORTANCE OF FARM MANAGEMENT.	4	7
Unit 7	FARM PLANNING AND BUDGETING.	3	7
Unit 8	SOURCES OF FARM FINANCE.	3	7
Unit 9	PROBLEMS RELATING TO MECHANIZATION, MANAGEMENT OF LAND, LABOUR, CAPITAL AND FARM MACHINERY, IRRIGATION SYSTEMS, ETC.	6	7
Unit 10	MEASURES OF FARM EFFICIENCIES, VIZ., PRODUCTION EFFICIENCY, CROP YIELD INDEX, CROPPING INTENSITY.	5	7
	TOTAL	48	70

Content: Theory (Agricultural Economics & Farm Management)

3 hrs/wk

1. Basic terms and concepts in economics. Scope of economics.
2. Laws of demand and market supply, factors governing supply, market and price determination under different market situation, farm produce marketing systems in India. Place of agriculture in Indian economy.
3. Depreciation and methods of calculating depreciation cost of cultivation per hectare, cost of production per quintal, economic size of holding.
4. Government policies regarding economic incentives for enhancing productivity and production.
5. Benefit cost ratio, internal rate of return, payback period, net present value.
6. farm management- meaning, scope and importance of farm management.
7. Farm planning and budgeting.
8. Sources of farm finance.
9. Problems relating to mechanization, management of land, labour, capital and farm machinery, irrigation systems, etc.
10. Measures of farm efficiencies, viz., production efficiency, crop yield index, cropping intensity.

Text Books:

SI NO	Name of Book	Writer's Name	Publisher's Name
1	Agricultural Economics	S. Subba Reddy & P. Raghu Ram	Indus Book
2	Agricultural Economics	R.G. Desai	Indus Book
3	Agricultural Economics	D.S. Chauhan	Odyssey
4	An Introduction to the Study of Agricultural Economics	Henry C. Taylor	Manohar Publishing

7 PRINCIPLES OF AGRONOMY LAB.

Name of course: Diploma in Agricultural Engineering

Subject: PRINCIPLES OF AGRONOMY LAB.

Course Code: Agr. E

Course Duration: 6 semester

Subject offered in semester: fourth

Subject Code:

Question Code:

Marks: 100

Teaching Scheme	Examination Scheme
Theory : Nil	Term work (TW) – 50
Tutorial: 4 periods/wk	Practical (PR) - 50
Practical: 7	Total marks -100
Credit:- 2	

Aim:-**Objective :-****Content:** Practical (Principles Of Agronomy Lab.)

3 hrs/wk

- 1.1 Identification Of Crops And Their Varieties, Seeds And Weeds
- 1.2 Fertilizer Application Methods
- 1.3 Different Weed Control Methods
- 1.4 Different Seedbed Preparation Methods
- 1.5 Different Methods Of Sowing And Transplanting
- 1.6 Different Methods Of Sowing And Transplanting
- 1.7 Judging Maturity Time For Harvesting Of Crop

8 DAIRY AND FOOD PRODUCTS TECHNOLOGY LAB.

Name of course: Diploma in Agricultural Engineering Subject: DAIRY AND FOOD PRODUCTS TECHNOLOGY LAB.
Course Code: Agr. E Course Duration: 6 semester Subject offered in semester: fourth
Subject Code: Question Code: Marks: 100

Teaching Scheme	Examination Scheme
Theory : Nil	Term work (TW) – 50
Tutorial: 4 periods/wk	Practical (PR) - 50
Practical: 16	Total marks -100
Credit:- 2	

Aim:-

Objective :-

Content: Practical (Dairy And Food Products Technology Lab.) 3 hrs/wk

1. Study Of A Composite Pilot Milk Processing Plant And Equipments
2. Study Of Pasteurizers
3. Study Of Sterilizers
4. Study Of Homogenizers
5. Study Of Separators
6. Study Of Butter Churners
7. Study Of Evaporators
8. Study Of Milk Dryers
9. Study Of Freezers
10. Design Of Food Processing Plants And Preparation Of Layout
11. Determination Of Physical Properties Of Food/Dairy Products
12. Visit To Multi-Product Dairy Plants
13. Determination Of Physical Properties Of Food Products
14. Estimation Of Steam Requirements
15. Estimation Of Refrigeration Requirements In Dairy And Food Plant
16. Experiment On Evaporators - Experiments On Design Of Single And Multiple Effect Systems -Study Of Tray And Drum Driers - Study Of Ultrafiltration And Reverse - Osmosis Equipments -Study Of Fluidized Bed Driers - Spray Driers - Freeze Driers - Vacuum Driers, Tunnel Driers - Puff Drying.

9 GROUND WATER, WELLS & PUMPS LAB.

Name of course: Diploma in Agricultural Engineering Subject: GROUND WATER, WELLS & PUMPS LAB.
Course Code: Agr. E Course Duration: 6 semester Subject offered in semester: fourth
Subject Code: Question Code: Marks: 50

Teaching Scheme	Examination Scheme
Theory : Nil	Term work (TW) – 25
Tutorial: 3 periods/wk	Practical (PR) - 25

Practical: 16	Total marks - 50
Credit:- 2	

Aim:-

Objective :-

1. Verification of Darcy's Law
2. Study of different drilling equipments
3. Sieve analysis for gravel and well screens design
4. Estimation of specific yield and specific retention
5. Testing of well screen
6. Drilling of a tube well
7. Measurement of water level and drawdown in pumped wells

8. Estimation of aquifer parameters by Thies method, Coopers-Jacob method, Chow method, Theis Recovery method
9. Well design under confined and unconfined conditions
10. Well losses and well efficiency
11. Study of artificial ground water recharge structures
12. Study of radial flow and mixed flow centrifugal pumps, multistage centrifugal pumps, turbine, propeller and other pumps
13. Installation of centrifugal pump
14. Testing of centrifugal pump and study of cavitations
15. Study and testing of submersible pump.
16. Study of performance characteristics of hydraulic ram;

10 SOIL MECHANICS LAB.

Name of course: Diploma in Agricultural Engineering Subject: SOIL MECHANICS LAB.
 Course Code: Agr. E Course Duration: 6 semester Subject offered in semester: fourth
 Subject Code: Question Code: Marks: 50

Teaching Scheme	Examination Scheme
Theory : Nil	Term work (TW) – 25
Tutorial: 4 periods/wk	Practical (PR) - 25
Practical: 8	Total marks - 50
Credit:- 2	

Aim:-

Objective :-

Content: Practical (Soil Mechanics Lab.) 3 hrs/wk

1. To Determine The Water Content Of A Given Soil Sample By Oven-Drying Method.
2. To Determine The Specific Gravity Of A Given Soil Using Specific Gravity Bottle/ Pycnometer.
3. To Determine The Field Density Of A Soil Using Core-Cutter Method. To Determine The Grading Of Particle Sizes (Sieve Analysis) Of Coarse-Grained Soils Using I.S. Sieves For Sand And Gravel.
4. To Determine The Grading Of Particle Sizes (Wet Analysis) Of Fine-Grained Soils Using Hydrometer Method For Clay And Silt.

5. To Determine The Liquid Limit Of A Given Soil Sample Using Casagrande's Liquid Limit Device Using Casagrande's Tool / ASTM Tool.
6. To Determine The Plastic Limit And Shrinkage Limit Of A Given Soil.
7. To Determine The Coefficient Of Permeability Of Coarse-Grained Soils Under Constant Head Method.
8. To Determine The Maximum Dry Density And Optimum Moisture Content Using Modified Proctor's Test.

11 PHE OF HORTICULTURAL CROPS LAB.

Name of course: Diploma in Agricultural Engineering Subject: PHE OF HORTICULTURAL CROPS LAB.
 Course Code: Agr. E Course Duration: 6 semester Subject offered in semester: fourth
 Subject Code: Question Code: Marks: 100

Teaching Scheme	Examination Scheme
Theory : Nil	Term work (TW) – 25
Tutorial: 3 period/wk	Practical (PR) - 25
Practical: 14	Total marks -50
Credit:- 2	

Aim:-

Objective

Content: Practical (PHE Of Horticultural Crops Lab.) 3 hrs/wk

1. Study Of Physical Properties Of Fruits And Vegetables.
2. Performance Study Of A Fruit/Vegetables Washer.
3. Performance Study Of Peeler & Slicer
4. Load Deformation Characteristics Of Fruits/Vegetables.
5. Study Of Chilling Behaviour Of Fruits & Vegetables.
6. Fluidized Bed Drying Of Green Peas.
7. Tray And Vacuum Drying Of Fruits And Vegetables
8. Osmo-Drying Of Fruits Or Vegetables
9. Preparation Of Juices Or Squash
10. Preparation Of Jam/Jelly/ Preserves
11. Pickling Of Vegetables
12. Comparative Study Of Packaging Materials.
13. Study Visit To Fruit/Vegetable Factory.
14. Study Visit To Cold Storage