PROCEEDINGS OF THE DIRECTOR OF ACADEMICS AND RESEARCH
KERALA VETERINARY AND ANIMAL SCIENCES UNIVERSITY
Pookode, Wayanad – 673576

(Abstract)

KVASU-DAR – Syllabus Revision of Diploma Programmes in Dairy Science, Laboratory Techniques, and Feed Technology (For Implementation from the 2025–26 Admission Batch Onwards) – Alignment with NEP 2020 –Approved-Orders Issued.

Directorate of Academics and Research

No. KVASU/DAR/B2/1509/2025(5) Dated, Pookode, 23/09/2025

Read: Decision of the 12th Special Meeting of the Academic Council held on 19.06.2025 (Item No. 12.S.1)

ORDER

In accordance with the recommendations of the 24th meeting of the Board of Studies of the Faculty of Veterinary and Animal Sciences, and as per the decisions of the 40th meeting of the Academic Council and the 12th Special Meeting of the Academic Council held on 19.06.2025, the Revised Syllabi for the Diploma Programmes of the University, viz., the Diploma in Dairy Science, Diploma in Laboratory Techniques, and Diploma in Feed Technology, aligned with the National Education Policy (NEP) 2020 guidelines, are hereby approved with the modifications as suggested and endorsed by the Academic Council.

The Revised Syllabi shall be implemented with effect from the Academic Year 2025–26 and shall be applicable only to students admitted from the Academic Year 2025–26 onwards, while the existing syllabi shall continue to apply to students admitted in previous academic years.

The revised Syllabi is appended herewith.

(By Order of the Academic Council)

Prof. (Dr.) C. Latha
DIRECTOR (ACADEMICS & RESEARCH)

To :All Deans/Special Officers

Copy To: PS to VC/PA to Registrar/CoE

DIPLOMA IN DAIRY SCIENCE – REVISED SYLLABUS

DEPARTMENT OF DAIRY SCIENCE

1. Title of the Programme : **Diploma in Dairy Science**

2. Faculty : Veterinary and Animal sciences

3. Department offering : Dairy Science, CV& AS, Mannuthy

4. Duration : 2 years (Four semesters)

5. Degree/certificate awarded : Diploma in Dairy Science

Total credits : 80

6. Proposed academic year of start : 2025-26

7. Present staff position : Professor-1

Associate Professor -1

8. Eligibility of candidates : Plus Two(Biology), VHSE (Livestock Management/Dairy Husbandry),VHSE (Dairying-Milk Products) DFE (Dairy Farmer/ Entrepreneur)

9. Medium of instruction : English

10. Mode of selection : Through Entrance Examination

11. No. of seats : 30

12. Examination : As per existing pattern for Diploma Programme

13. Course contents : Attached as Annexure I

14. Thrust areas covered : 1. Course provides comprehensive knowledge on production and processing and quality assurance of milk and milk products

Diploma in Dairy science

BUDGET 2025-26

A	Income from Tuition fees	35000x30x4	42,00,000
B	**Expenditure**		
1.	Remuneration to Lab Assistant on contract basis @ Rs 730/day (To a maximum of 25 days)	18250x12x2	438000
2.	Remuneration to clerk cum accountant contract basis @ Rs 755/ day (To a maximum of 25 days)	18875x12x2	453000
3.	Remuneration to Teaching Assistant on contract basis – 1 post @ Rs 1600/ day (To a maximum of 25 days)	40000x12x2	960000
4.	Wages labourer on daily wage basis @ Rs 675/ day (To a maximum of 25 days)	16875x12x2	405000
5.	Chemicals/reagents, equipments for teaching, infrastructure development if any		400000
6.	Miscellaneous expenses (Guest Lecture's remuneration, stationery and other items		284000
7.	Institutional overhead@30%per year		1260000
	Total		42,00,000/-

*Reappropriation of different heads may be allowed depending on the number of admitted students and personnel employed

New Syllabus for Diploma in Dairy Science

Sl. No	Catalogue No.	Expanded Title	Course Title	Credit
1	DDS 111	Dairy Husbandry-I	Dairy Farm Management	2+1=3
2	DDS 121	Dairy Husbandry-II	Forage production & Dairy cattle Nutrition	2+1=3
3	DDS 124	Dairy Microbiology I	Microbiology of milk	2+1=3
4	DDS 113	Dairy Chemistry I	Chemistry of milk	2+1=3
5	DDS 125	Dairy Chemistry II	Quality assurance of milk & milk products	2+1=3
6	DDS 114	Dairy Engineering	Equipments in dairy processing	2+1=3
7	DDS 112	Dairy Technology I	Market milk	2+1=3
8	DDS 122	Dairy Technology II	Technology of Dairy Products	2+1=3
9	DDS 123	Dairy Technology III	Indigenous milk products	2+1=3
10	DDS 115	Business Management	Dairy farm Business Management & Dairy Economics	2+1=3

11	DIP 101	English I	English Communication Skills and Personality Development-I	2+0=2
12	DIP 102	English II	English Communication Skills and Personality Development-II	2+0=2
13	DDS 211	Dairy Microbiology II	Microbiology of milk products	2+1=3
14	DDS 212	Extension	Dairy Extension	2+1=3
15	DDS 213	Co-operation	Co-operation	1+1=2
16	DDS 214	Accountancy	Accountancy	2+1=3
17	DDS 215	Experiential learning	Experiential learning in processing and marketing of milk products	0+6
18	DDS 221	Farm Training 50 days	Hands on Training at Dairy Farms	10
19	DDS 222	Plant Training 50 days	Hands on Training at Dairy Plants	10
20	SEP DDS 101	Skill enhancement programme I	Dairy farm practices	0+3=3

21	SEP DDS 102	Skill enhancement programme II	General Laboratory Practices	0+3=3
22	SEP DDS 201	Skill enhancement programme III	Dairy plant operations	0+3=3

Semester I

Subject	Catalogue No.	Credits	Sessions/week		
			Theory	Practical	Total
Dairy Husbandry I	**DDS 111**	2+1=3	2	1	3
Dairy Technology I	**DDS 112**	2+1=3	2	1	3
Dairy Chemistry I	**DDS 113**	2+1=3	2	1	3
Dairy Engineering	**DDS 114**	2+1=3	2	1	3
Dairy farm Business Management & Dairy Economics	**DDS 115**	2+1=3	2	1	3
Skill enhancement programme I	**SEP DDS 101**	0+3=3	0	3	3
English I	**DIP 101**	2+0=2	2	0	2
Total		20	12	8	20

Semester II

Subject	Catalogue No.	Credits	Sessions/week		
			Theory	Practical	Total
Dairy Husbandry II	**DDS 121**	2+1=3	2	1	3
Dairy Technology II	**DDS 122**	2+1=3	2	1	3
Dairy Technology III	**DDS 123**	2+1=3	2	1	3
Dairy Microbiology I	**DDS 124**	2+1=3	2	1	3
Dairy Chemistry II	**DDS 125**	2+1=3	2	1	3
Skill enhancement programme II	**SEP DDS 102**	0+3=3	0	3	3
English II	**DIP 102**	2+0=2	2	0	2
Total		20	12	8	20

Exit option

The students exiting the programme after successful completion of two semesters should undergo five weeks Skill Enhancement Course (SEC) at Dairy farms /Dairy Plants in order to get Certificate in Dairy science.

Semester III

Subject	Catalogue No.	Credits	Sessions/week		
			Theory	Practical	Total
Dairy Microbiology II	**DDS 211**	2+1=3	2	1	3
Extension	**DDS 212**	2+1=3	2	1	3
Co-operation	**DDS 213**	1+1=2	1	1	2
Accountancy	**DDS 214**	2+1=3	2	1	3
Experiential Learning	**DDS 215**	0+6=6	0	6	6
Skill enhancement programme III	**SEP DDS 201**	0+3=3	0	3	3
Total		20	7	13	20

Semester IV

Subject	Catalogue No.	Credits	Sessions/week		
			Theory	Practical	Total
Farm Training for 50 days	**DDS 221**	10		10	10
Plant Training for 50 days	**DDS 222**	10		10	10
Total		20		20	20

DAIRY HUSBANDRY-1

DDS 111- Dairy Farm Management (2+1)

Unit-I

Dairying- advantages and limitations- present status of dairy farming in India with special reference to Kerala. Types of dairy farming. Breeds of cattle and buffaloes- Indian & exotic breeds - characters- productivity

Unit-II

Farm Routines - feeding, cleaning, milking and milk disposal- housing systems- space requirements- wallowing tanks for buffaloes- Management of Calf- Heifers- pregnant animals- Lactating cows - Summer management -Other management practices

Unit-III

Lactation- Mammary gland-anatomy and physiology, -lactogenesis – biosynthesis of milk –milk secretion-letting down. Milk removal –methods- galactopoiesis – drying off- Involution of udder.

Unit-IV

Cleaning and sanitation of cattle sheds, disposal of barn waste, dung, urine, gobar gas plant-Management of different classes of cattle- summer management-milking and milk recording-machine milking - Record keeping in farm- Identification methods -computerisation

Unit-V

Factors affecting health of cattle- -Disease, signs of illness, Common ailments - metabolic disorders -first aid- isolation - general prophylaxis, vaccination and - External and internal parasites - deworming -culling

Practicals:

Identification of different breeds of cattle- indigenous and exotic- Identification methods – dehorning – calf feeding - milking of cows - record keeping in the farm - judging of cattle - field diagnosis of mastitis -Visit to animal farms - maintenance of records- evaluation of animals.

DAIRY HUSBANDRY II

DDS-121 Forage Production & Dairy Cattle nutrition (2+1)

Unit-I

Basics of agronomy - Essentials of fodder cultivation- Light, land, manure, water, management, labor.

Unit-II

Nutrients and proximate principles in fodder. Nutrients- minerals, vitamins. Common fodder grass, shrubs and tree fodder - Leguminous fodder and its implications - season and method of cultivation Fodder conservation-changes occurring during preservation -hay making, silage making Hydroponics

Unit-III

Toxic substances in feed-nutrient requirements-feeding of different categories of animals. digestive processes (mechanical, secretary, enzymatic)

Unit-IV

Factors affecting digestibility- measures to improve digestion - Feed quality-proximate principles- classification of feedstuffs- roughage, concentrates-fortification of paddy straw, mineral supplementation-standards for feeds. Feeding of urea- NPN sources-Feed technology- bypass protein and fat - total mixed ration, complete feed block. Nonconventional feeds

Practicals:

Uses of farm tools and implements- practice of sowing methods-identification of various fodder crops-cultivation of fodder-Herbarium of fodder crops - Identification of different feed ingredients -formulation of ration–proximate analysis of feed- Familiarization of non- conventional feeds-visit to feed mixing unit

DAIRY MICROBIOLOGY I

DDS-124 Microbiology of milk (2+1)

Unit-I

Classification of microbes- Bacteria, virus, yeast & mold - growth requirements – Bacterial growth, nutrition and metabolism - growth curve.

Unit-II

Milk microbes- types- beneficial, spoilage causing & pathogenic - classes of bacteria - mesophilic, thermoduric, thermophilic and psychotropic organism.

Unit-III

Bacteriological quality of milk- hygienic milk production - spoilage of milk - curdling, sweet curdling, ropiness, gas production, proteolysis, lipolysis, discolouration .

Unit-IV

Milk-borne diseases- - pathogens – Microbial destruction- sterilisation, thermisation, tyndallisation, fermentation pathway, mastitis- delvo test

Practicals

Common laboratory equipments- microscope, autoclave, hot air oven, incubator, laminar air flow, colony counter-Microbiological sampling of milk -staining

methods -preparation of culture media - standard plate count - coliform count - direct microscopic count -dye reduction tests.

DAIRY CHEMISTRY I

DDS-113 Chemistry of milk (2+1)

Unit-I

Milk-definition- composition of milk – variation in composition- physical state - physical and chemical properties of milk, Milk fat- fat globules -properties- rancidity

Unit-II

Milk proteins- classification - physical and chemical properties of milk proteins- Casein-structure-Isoelectric precipitation-whey proteins-Immunoglobulins- non-protein nitrogen substances in milk- Effect of heat on milk protein .

Unit-III

Lactose- structure- physical forms-solubility-physical & chemical properties- crystallization, fermentation,

Unit-IV

Vitamins – classification- availability in milk- deficiency. Milk enzymes- significance, Minerals in milk-ash-salt balance -action of milk on metals. FSSAI standards for milk.

Unit-V

Cream – composition and standards-Butter–churning-composition and standards-Ghee-standards- butter oil – composition- adulteration of milk fat- Rancidity-hydrolytic, oxidative - antioxidants- - Ice cream - frozen dessert- composition-physico chemical properties .

Unit-VI

Cheese – composition- chemistry of rennet coagulation physico-chemical changes during preparation and ripening-standards- Fermented dairy products-standards- Condensed and evaporated milk, composition. Milk powder-- physico-chemical properties- composition and standards-Baby foods-types and standards--Defects in dairy products- chemical changes- heat stability defects- FSSAI regulations

Practicals:

Sampling - determination of specific gravity-pH- Estimation of milk fat - estimation of total solids and SNF by Gravimetric and by lactometer methods-estimation of milk proteins –estimation of Lactose - ashing-Phosphatase test. Determination of chlorides in milk.

Sampling of dairy products Cream -analysis of fat and acidity Butter- moisture, fat, salt and curd Ghee- -determination of melting point- acidity Detection of adulteration in milk fat Cheese -determination of moisture, fat, salt, protein & acidity. Condensed milk and milk powder- analysis Ice-cream- analysis

DAIRY CHEMISTRY I1

DDS-125 Quality assurance of milk & milk products (2+1)

Unit-I

Quality control -objectives- definitions-general principles- Quality assurance-total quality management (TQM), quality audit, quality circles-HACCP.

Unit-II

Setting up of quality control laboratories & testing facilities - sampling procedures, labeling of samples for analysis, choice of chemical and microbiological tests for milk & milk products - accreditation of analytical laboratories, good laboratory practices (GLP)- calibration of equipments, glassware.

Unit-III

Food safety legislation, quality certification- FSSAI, AGMARK, BIS & Codex standards related to dairy products- National & international bodies concerned with quality control-

Unit-IV

Contaminants in milk- hygienic quality of milk at production & processing level.classification-residues of drugs, pesticides, disinfectants, toxic metals & mycotoxins. radio nuclides , dioxins. Water quality- soft & hard water, softening of hard water.

Unit-V

Instrumental methods of analysis- spectrophotometry – chromatography- IRMA-HPLC-responsibilities of quality assurance personals

Practicals

Preparation & standardization of reagents, -chemical analysis of detergents & sanitizers. Preparation & testing of Gerbers sulphuric acid- testing of amyl alcohol- Familiarization of equipments in quality control. Detection of adulterants, preservatives and neutralizers -detection of contaminants in milk - tests for mastitic milk- tests for residues in milk- assessment of microbial load and detection of specific pathogens- test for microbial load on equipment surface- Visit to quality control laboratories.

DAIRY ENGINEERING

DDS-114 Equipments in dairy processing (2+1)

Unit-I

Milking machine- parts and functioning- -thermodynamics -principles on heat transfer-heat exchangers -boilers-types -functioning

Unit-II

Fundamentals of electricity-AC and DC - Refrigeration- principles- mechanical vapour compression system and vapour absorption system- refrigeration cycle- refrigerants-refrigeration equipment.

Unit-III

Milk receiving equipment- conveyers, bulk tank-dump tanks-weighing bowl-can washers- clarifiers and separators-care and maintenance.

Unit-IV

Homogenisers-construction-care and maintenance –Pasteurizer -batch and continuous types-pasteurizer controls – study of milk packaging equipment-care and maintenance.

Unit-V

Butter making equipment-types - Cheese making equipments- khoa kettle. Ice cream freezers-batch and continuous types-operation and maintenance-Milk condensing equipment- vacuum pan- multiple evaporators- spray drier- cup filling machine.

Practicals

Study on refrigeration equipment- refrigeration plant -Study of parts of a cream separator, homogenizer -operation of a HTST pasteurization system- butter churn- Ice cream freezer-practice in the operation- spray drier.

DAIRY TECHNOLOGY I

DDS-112 Market Milk (2+1)

Unit-I

Indian Dairy industry-history -projects under five year plans and operation flood programme- present status and future- Dairy situation in Kerala-

Unit-II

Milk procurement –collection and transportation- bulk milk coolers- milk silos- Pricing of milk

Unit-III

Milk reception – equipments, process-grading- adulterants, neutralizers, preservatives-chilling and storage-methods and equipments.

Unit-IV

Processing of milk- filtration, clarification, bactofugation, standardisation - Thermal processing of milk-pasteurisation, sterilization, UHT processing-methods,equipment.—LP system and non thermal methods. Packaging of milk – packaging material- equipments, aseptic packaging.

Unit-V

Marketing of milk-types of milk-legislation-FSSAI-standards-fortification. Filled milk -imitation milk -fortified milk.

Unit-VI

Cleaning-sanitisation-detergents-sanitisers-physical and chemical methods-CIP-operation

Practicals

Platform tests- tests for adulterants, neutralizers, preservatives – tests for cleanliness of cans, equipments-Visit to milk co-operative & dairy processing plant- familiarization of milk collection and processing operations-problems on standardization of milk- milk pricing chart- types of packaging materials-CIP operation-dairy statistics of Kerala, India and abroad

DAIRY TECHNOLOGY II

DDS-122 Technology of Dairy products (2+1)

Unit-I

Cream separation-centrifugal cream separation- cream-types- skimming efficiency.

Unit-II

Butter - churning- fat-losses in butter milk- packaging and storage -utilization of butter milk- -

Unit-III

Cheese- classification- manufacture of cheddar cheese-role of starter and rennet - mould ripened cheese- mozzarella cheese- processed cheese**,** -

Unit-IV

Condensed milk & evaporated milk- manufacture--pilot sterilization test -Dried milk- Spray drying of milk- -defects and control measures- instantization of powder.

Unit-V

Frozen dairy products – ice-cream -role of milk constituents, sweeteners, stabilizers, emulsifiers, flavouring and colouring materials-processing steps-freezing, hardening -over-run-softy ice-cream--

Unit-VI

Packaging of dairy products -Definition and FSSAI standards for dairy products-common defects in milk products- utilization of byproducts-skim milk, butter milk, cheese whey.

Practicals

Operation of cream separator - churning of cream- butter-working, salting - calculation of over run. Preparation of ice cream . Preparation of cheddar cheese, Cottage cheese-Preparation of whey beverage

DAIRY TECHNOLOGY III

DDS-123 Indigenous Milk products (2+1)

Unit-I

Ghee- methods of manufacture- marketing of ghee- - AGMARK grading-use of antioxidants- FSSAI standards.

Unit-II

Khoa- methods of manufacture –types- khoa based sweets- gulab jamun, peda, burfi - Kheer & Palada- preparation –

Unit-III

Chhana-preparation-Chhana based sweets- rasogolla, sandesh. -Paneer-preparation-yield- paneer based dishes.

Unit-IV

Chakka -shrikhand, FSSAI standards;

Unit-V

Defects in indigenous dairy products- Packaging of indigenous dairy products

Practical:

Preparation of ghee- chemical analysis- Preparation of khoa –peda- burfi gulab jamun, Preparation of chhana, rasagolla, sandesh -Preparation of Paneer, paneer based dishes -Manufacture of Kheer & Palada. Preparation of shrikhand - Estimation of cost of production of indigenous dairy products - Testing of packaging materials

DDS-115 DAIRY FARM BUSINESS MANAGEMENT & DAIRY

ECONOMICS (2+1)

Unit-I

Principles of farm planning and budgeting- Elements of supply and demand for dairy animals and products, factors influencing supply and demand- Fixed and variable cost in dairying.

Unit-II

Management functions- principles, function and decision making, manpower planning- coordination- types, need and importance, leadership- characteristics, functions, qualities - communication- supervision.

Unit-III

Selection of site for dairy farm and procurement of inputs- dairy farm. Milch cattle, size of herd, purchase of animals, replacement of animals. Land management-requirement and management of land, equipment and fodder - efficient use of land and equipment-improving productivity of land.

Unit-IV

Labour management - types, organization, objectives, control of labour and labour efficiency. Personnel hygiene- methods to improve, farm sanitation, labour welfare, labour legislation as applicable to dairy farms-selection and training of personnel.

Unit-V

Financial management –budget, capital, credits and loans, stores and inventory control, records, depreciation, cost of production of milk and fodder. Sales management-functions, sales promotion, advertising, marketing services and transportation.

Unit-VI

Public relations-definition, advantages, purpose, applications, public relations with reference to consumers, local authorities and government. Marketing of dairy products-concepts of marketing- market structure and functions- problems

in marketing of dairy products.

Practicals

Preparation of simple budgets for small dairy units. Estimation of capital requirements-credit considerations and cost of capital elements of break even analysis. Students are to be familiarized with the field problems in different aspects of management and marketing.

SEP DDS 101-Skill enhancement programme in Dairy farm practices (0+3)

Unit-I

Identification of breeds of cattle and buffalo - - Handling of dairy cattle- Restraining of cattle- Methods of Identification of animals

Unit-II

Reproductive organs of cow-reproductive organs of bull -Heat detection in dairy cows & Buffaloes - Care of calf at birth – Muconium - Colostrum feeding - Weaning - Milk replacer - Calf starter – signs of pregnancy– feeding of pregnant cows –- Care at and after calving –

Unit-III

Management of dry cows-– Signs of health and ill health - Care of sick animals - Handling of liquid nitrogen containers- Preparation of plans for animal housing- Record keeping in dairy farm- Preparation of project for starting a dairy farm

SEP DDS 102-Skill enhancement programme in General Laboratory Practices (0+3)

Unit-I

General laboratory procedures- care and maintenance of research equipments and safety measures while in lab- Preparation of buffers-common dairy reagents-

Unit-II

Determination of pH using pH meter-Handling of centrifuge and water bath-

handling of viscometer and calorimeter- handling of different types of microscope and colony counter- handling of autoclave and muffle furnace.

Unit-III

Handling of laminar air flow chamber and Incubator- handling of hot air oven and micro oven- handling of advanced lab equipments for estimation of milk constituents in dairy products

DIP 101- English Communication Skills and Personality Development-I (2+0=2)

Unit-I

Functional Grammar- Verbs-adjectives-nouns-pronouns-tenses-Idioms-synonyms

Unit-II

Functional Grammar- Change the Voice—Direct and indirect-Voice- Correct the Error

Unit-III

Resume Writing- effective resume writing

Unit-IV

Book Review

Unit-V

Letter writing- formal and informal letters

DIP 102- English Communication Skills and Personality Development-II (2+0=2)

Unit-I

Reading Comprehension- Purpose of reading- Improving Comprehension Skills- Learning new words- Effective sentence construction

Unit-II

Presentation Skills- Engaging audience-confident delivery- Effective Speaking

Unit-III

Interview tips-Mock Interview

Unit-IV

Precis writing

Unit-V

writing Skills -notice writing-office memo- report writing

DAIRY MICROBIOLOGY II

DDS-211 Microbiology of milk products (2+1)

Unit-I

Bacteriology of starter cultures- their propagation and maintenance, culture preservation-starter failure.

Unit-II

Types of fermentation in milk- fermented dairy products- dahi, yoghurt, buttermilk, acidophilus milk, kefir, koumiss

Unit-III

Functional foods- probiotics, prebiotics symbiotic products-

Unit-IV

Microbiology of cream, butter, ice- cream, milk powder, indigenous dairy

products – factors affecting the microbiological quality.

Unit-V

Microbiology of cheese- starters-specific types-moulds-changes in cheese during ripening-

Unit-VI

Pathogens in dairy products- Spoilage organisms in dairy products - indicator organisms – rapid methods for detection of pathogens. Microbiological defects in dairy products-Microbiological standards for different dairy products-antimicrobial packaging

Practicals

Propagation and maintenance of starter culture - Preparation of dahi, yoghurt, fermented milks - Bacteriological analysis of ice cream - Estimation of yeast & mold count in butter - Detection of *E.coli* in indigenous dairy products - total lactic count in curd – Methods to determine the bacterial load on equipment surface.

DDS-212 DAIRY EXTENSION (2+1)

Unit-I

Extension education – concepts, philosophy, principles and objectives.

Unit-II

Concept and function of communication-communication process- meaning, nature scope and importance of communication in dairy and rural development, key elements of communication, feedback in communication and its role in dairy extension

Unit-III

Basic concepts in rural sociology, society, social institutions, organizations and

groups and their functions in bringing about social change- culture and its role in effective extension work

Unit-IV

Definition of group nature and types of groups-formation of groups-principles of working with groups and their mobilization –factors affecting the functioning of groups-concepts of leadership, factors determining effectiveness of a leader.

Unit-V

Extension programme, development planning and execution of extension programme.

Practicals

Classification and use of different extension teaching methods, Collecting, processing and presenting useful data in charts of various types and preparing visual aids on specific topics for extension teaching. Presenting specific topics to a selected audience using effective combinations of audio-visual aids. Survey of village households - study of village farm situations, Sampling, processing of data, tabulation and preparation of survey reports. Visits to local dairy extension offices and preparation of reports, visits to local milk cooperative society and preparation of reports.

DDS-213 CO-OPERATION (1+1)

Unit-I

Definition of co-operation features of co-operative organization as distinguished from other types of organizations-

Unit-II

Fundamentals of co-operative principles, values-reformulation of co-operative principles (1966)-Rochdale Pioneers, ICA principles,

Unit-III

Dairy co-operatives: history, Operation Flood Programmes, National Dairy Plan, types, objectives & structure of Dairy Cooperatives, KCMMF, AMUL.

Unit-IV

Important provisions of Kerala co-operative societies. Act, 1969 applicable to formation, registration and management of co-operative societies-model bye-laws-auditing of co-operative societies.

Practicals

Students will be made familiar with the working of Co-operatives around the place

DDS-214- ACCOUNTANCY (2+1)

Unit-I

Accounting-Nature and scope, salient features, concepts and conventions. Book-keeping v/s accounting.

Unit-II

General principles- accounting classification-personal, real and nominal-rules for debit and credit.

Unit-III

Journal and subsidiary books-sales book, purchase book, sales return book, purchase return book, cash book, ledger accounts, balancing of ledger accounts – preparation of trial balance-final accounts, trading accounts- profit and loss account and balance sheet-depreciation- accounting-methods of depreciation.

Unit-IV

Definition, features and objectives, procedures of audit-difference between auditing and accounting-pre-audit –routine checking-internal check and audit-

vouching of cash book and day book- verification of assets-verification of closing stock of inventories.

Practicals

Students are to be made familiar with the actual book keeping work of the office and dairies-familiarization with accounts in co-operatives.

EXPERIENTIAL LEARNING

DDS 215 Experiential learning in processing and marketing milk products **(0+6)**

Unit-I

Preparation of student projects - small scale milk processing units- presentations- inventory control-financial management- record keeping-

Unit-II

milk procurement & processing- Innovative products- packaging-marketing- analysis of project-entrepreneurship development.

SEP DDS 201-Skill enhancement programme in Dairy plant operations (0+3)

Unit-I

Design and layout of dairy plant- cream separation-handling and operation of cream separator-standardization- Homogenizer-handling & operation-operating the butter churn-Ghee boiler-

Unit-II

Ice cream freezer-Khoa making –Preparation of Peda- Kulfi making-Whey drink-Paneer making-

Unit-III

sampling -platform tests- CIP cleaning-familiarisation with quality control operations.

Skill Enhancement Course (SEC)

The students exiting the programme after successful completion of two semesters should undergo five weeks skill development training at Dairy farms /Dairy Plants in order to get Certificate in Dairy science.

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1. Title of the Programme : **DIPLOMA IN LABORATORY TECHNIQUES**

2. Objectives :

1. To impart knowledge on the principles and techniques in laboratory diagnosis of animal diseases and technically equipping personnel on major categorical areas of laboratory technology
2. To provide human resource in the field of clinical and diagnostic laboratories of animal sector

3. Faculty : Veterinary and Animal Sciences

4. Duration : 2 years (Four semesters)

5. Degree/certificate awarded : Diploma in Laboratory Techniques

(Certificate course in Laboratory Techniques on exit after one year)

6. Total credits : 80

7. Proposed academic year of start : 2025-26

8. Eligibility of candidates : Plus II with biology as one of the subjects or VHSE with biology as one of the subjects.

9. Medium of instruction : English

10. Mode of selection : Through Entrance Examination conducted by KVASU

11. No. of seats : 30

12. Fee structure : Tuition fee Rs 35,000/ per semester

13. Other fees : As per existing fee structure for Diploma Programme

14. Examination : As per existing pattern for Diploma Programme

15. Additional space required : Two class rooms and one laboratory facility

16. Total staff strength :Two Teaching Assistants (One for each batch), Two Laboratory Assistants, One labourer (On contract)

17. Co-ordinating department : Veterinary Parasitology, CVAS, Mannuthy

18. Course contents : Attached as Annexure I

DETAILED BUDGET

A. INCOME			Total
	Income from tuition fees	35,000 x 30 x 4 semesters	42,00,000
B	EXPENDITURE *		
	Wages to labourer on contract basis @ Rs 675/day (To a maximum of 25 days)	16875x12x2	4,05,000
	Wages to Lab Assistant on contract basis @ Rs 730/day (To a maximum of 25 days)	18250x12x2x2	8,76,000
	Wages to Teaching Assistant on contract basis – 1 posts @ Rs 1600/ day (To a maximum of 25 days). [One more TA will be posted when subsequent batches join]	40,000 x 12 x 2	9,60,000
	Chemicals, reagents, equipment for teaching, infrastructure development if any		4,00,000
	Miscellaneous expenses (remuneration, stationery, other items)		2,99,000
	Institutional overhead @ 30% per year		12,60,000
	Total		**42,00,000**

*Reappropriation of different heads may be allowed depending on the number of admitted students and personnels employed

Annexure-I

DEPARTMENT OF VETERINARY PARASITOLOGY

NEW SYLLABUS OF

DIPLOMA IN LABORATORY TECHNIQUES

Semester I

Sl.No.	Catalogue No.	Course Name	Credits
1	DLT-111	Basic Techniques in Parasitology	1+1
2	DLT-112	Basics of Laboratory Equipment and Instrumentation	0+3
3	DLT-113	Clinical Biochemistry I	2+1
4	DLT-114	Laboratory Management and Ethics	1+1
5	DLT-115	Basic Techniques in Microbiology	1+1
6	DLT-116	Clinical Pathology	2+1
7	SEP-DLT-101	Skill Enhancement Programme I	0+3
8	DIP-101	English Communication Skills and Personality Development- I	2+0
Total			20

Semester II

Sl.No.	Catalogue No.	Course Name	Credits
1	DLT-121	Diagnostic Protozoology I	1+1
2	DLT-122	Diagnostic Helminthology I	1+1
3	DLT-123	Advances in Diagnostic Methods	1+2
4	DLT-124	Clinical Microbiology I (Bacteriology)	2+1
5	DLT-125	Quality Control techniques	1+1
6	DLT-126	Stains and Staining Techniques	1+2
7	SEP-DLT-102	Skill Enhancement Programme II	0+3
8	DIP-102	English Communication Skills and	2+0

		Personality Development- II	
Total			**20**

Exit option: On successful completion of Semester 2, a provision to opt for a certificate programme after an additional 5 weeks training on SEC-DLT-Skill Enhancement Course

Semester III

Sl.No.	Catalogue No.	Course Name	Credits
1	DLT-211	Diagnostic Helminthology II	1+1
2	DLT-212	Diagnostic Protozoology II	1+1
3	DLT-213	Diagnostic Entomology &Acarology	1+1
4	DLT-214	Clinical Biochemistry II	2+1
5	DLT-215	Clinical Microbiology II (Virology &Mycology)	2+1
6	DLT-216	Disease Diagnostic Methods	1+1
7	DLT-217	Histopathology and Cytopathology	1+2
8	SEP-DLT-201	Skill Enhancement Programme III	0+3
Total			20

Semester IV- Internship

Sl.No.	Catalogue No.	Course Name	Credits
1	DLT-221	Veterinary Hospital Laboratory training (In Hospitals under AHD & KVASU)	0+10
2	DLT-222	Farm Training (In Farms under KVASU)	0+10
Total			20

The courses will be offered by the following departments

1. Department of Veterinary Parasitology
2. Department of Veterinary Pathology
3. Department of Veterinary Public Health
4. Department of Veterinary Biochemistry
5. Department of Veterinary Microbiology

SYLLABUS

Semester I

DLT-111 BASIC TECHNIQUES IN PARASITOLOGY 1+1

Theory:

Unit I: Parasites and Parasitsm. Nomenclature. Introduction to Clinical Parasitology laboratory-Microscopy.

Unit II: Handling of equipment routinely used in laboratory like centrifuges, weighing balances, hot air oven, water bath, LAF, distillation apparatus, glass and plastic ware etc.

Unit III: Preparation of stains, solutions and mounting media.

Unit IV: Safe and scientific handling of clinical samples –basic safety measures to be adopted in a laboratory - Collection and processing of faecal samples, skin scrapings and preparation of blood smears.

Practicals: Microscopy, Preparation of stains like Hematoxylin stains, Acetic acid carmine, ZN carbol fuchsin, fixatives like 10% formalin, Boiun's fluid, Carnoy's fluid, Schaudinn's fixative etc., mounting media like lactophenol, glycerol etc., solutions like KOH, NaOH, saturated NaCl etc., Care and maintenance of laboratory equipment, glass wares and plastic wares- setting up of accessories for clinical sample examination- Collection and processing of faecal samples, skin scrapings and preparation of blood smears-scientific disposal of clinical samples.

DLT : 112 BASICS OF LABORATORY EQUIPMENT AND INSTRUMENTATION 0+3

Unit I: Foundational knowledge and practical skills in the operation, calibration, and maintenance of key laboratory instruments especially equipments such as balances, centrifuges, compound and advanced microscopes, colorimeters, UV-Vis spectrophotometers, atomic absorption spectrophotometers (AAS), hot air ovens, autoclaves, BOD incubators, biosafety cabinets, thermal cyclers (PCR machines), microtomes, and autoanalysers.

Unit II: Understanding the working principles, proper handling techniques, biosafety practices, and troubleshooting protocols for each instrument.

Unit III: Hands-on practical sessions to ensure students develop applied skills essential for diagnostic, research, and clinical laboratory settings.

DLT-113 CLINICAL BIOCHEMISTRY-I 2+1

Theory

Unit I: Cleaning and care of laboratory glassware, preparation of laboratory glassware. Composition of glass, properties of glass, varieties of glass soda glass, pyrex glass ground glass bottle glass etc.,Method of measuring liquids and weighing solids, use of chemical balance single pan balance, SI units, distillation and purification of organic solvents ,Preparation of normal molar and percent solutions, volumetric analysis, preparation of standard solutions of oxalic acid, sulphuric acid, hydrochloric acid, sodium hydroxide, silver nitrate and potassium permanganate, dilution of solution preparation of solution from another solution, preparation of saturated solution and half saturated solution, preparation of reagents for various for biochemical analysis.

Unit II: Concept of pH and buffers, definition and understanding pH meter and pH scale, biological buffers, preparation and use of various buffer solutions, use of pH indicators, Henderson and Hasselbalch equation for buffer solutions ,Collection and preservation of biological specimens for biochemical analysis,Colorimetric analysis- spectrum of light, monochromatic light, wavelength of light, colour of solutions, absorption and transmission of light principle of colorimetric analysis selection of filters, spectrophotometer and fluorometer preparation of standard curve.

Unit III: Blood analysis- collection of whole blood, plasma and serum preparation of anticoagulant bottles for blood collection common methods of estimation of glucose, urea, protein, triglycerides, cholesterol (HDL and free), uric acid, creatinine, creatine, phosphorous, calcium, sodium, potassium, bicarbonate, amylase, phosphatases (Alkaline and acid phosphates), transaminases (SGOT & SGPT), LDH and CPK in blood, glucose tolerance test, urea clearance test, creatinine clearance test,Quality control in clinical chemistry- elementary aspects only.

Practicals

Preparation of standard solutions of sodium hydroxide using oxalic acid, preparation of standard solutions of hydrochloric acid using sodium hydroxide, preparation of buffer solutions,

estimation of glucose, urea, protein, triglycerides, cholesterol (HDL and free), uric acid, creatinine, phosphorous, calcium, sodium, potassium, bicarbonate, amylase, phosphatases (alkaline and acid phosphates), SGPT, SGOT and GTT

DLT-114 LABORATORY MANAGEMENT AND ETHICS 1+1

Theory:

Unit I: Laboratory technician- Job description Ethics- Responsibility of Lab Technician, Relationship of Lab Technician with other staffs. General principles of organisation of laboratory, ventilation, lighting,record maintenance in laboratory

Unit II: Storage of dangerous chemicals and reagents, danger in laboratory and precautions to be taken, first aid principles and management of accidents in the laboratory, Biosafety. Maintenance and caliberation of analytical and laboratory instruments, safety guidelines and regulations

Practicals: Students are required to familiarize with the use and care of the laboratory wares, apparatus etc. Maintenance and caliberation of analytical and laboratory instruments, Record keeping.

DLT-115 BASIC TECHNIQUES IN MICROBIOLOGY 1+1

Theory:

Unit I: General microbiology [bacteria, virus, fungi], Good laboratory practices, Sterilisation- definition- methods, Microscopy- types of microscope- handling of microscope,

Unit II: Staining- types of stains- staining techniques [Gram's, Acid fast, Cotton blue, Wright's], Biochemical techniques, Definition of culture media- ingredients of culture media- different types of media- preparation of media- sterility check and storage

Practicals: Methods of sterilization, Handling of microscope, Preparation of stains, Different staining techniques- Gram's staining, acid fast staining, Leishman's staining, Wright's staining, Lactophenol cotton blue staining etc., Preparation and use of culture media- inoculation of culture and incubation, Preparation of bacterial smears on slides

DLT-116 CLINICAL PATHOLOGY 2+1

Theory:

Unit I: Definition, scope and importance in veterinary science, Role of a clinical pathologist in veterinary medicine, Fundamentals of microscopy

Unit II: Composition and function of blood, Collection, preservation and handling of blood samples

Red Blood Cells (RBCs): Genesis, Morphology, Estimations, disorders

White Blood Cells (WBCs): Formation, Types, Estimations and their significance, disorders

Platelets: Genesis, function, estimation and disorders

Unit III: Common hematological disorders (Anemia, Polycythemia, Leukocytosis, Leukopenia, etc.)

Staining – Common stains for hematology

Unit IV: : Handling of various clinical samples – blood, urine, milk, semen, other body fluids, impression smears etc.

Practicals

Collection and preservation of blood, preparation of blood smear, TEC, TLC, DLC, ESR, PCV, Hb, Calculation of erythrocyte indices, clotting time estimation, bleeding time, analysis of urine, milk, semen samples, Analysis of other body fluids (CSF, pleural, peritoneal, and synovial fluids) and impression smears.

COMMON COURSES

SEP- DLT-101 SKILL ENHANCEMENT PROGRAMME I 0+3

Unit I: Introduction to Clinical Laboratory practices-GLP/SOPs, lab organization, universal precautions, first aid, equipment handling (microscope, centrifuge, autoclave). Specimen maintenance- Chain-of-custody, labeling systems, sample integrity, cold-chain management

Unit II: Aquaintance with routine maintanence of equipments and labwares- Sterilization, calibration, maintenance logs, waste disposal protocols.

Unit III: Record keeping in Laboratories, Awareness on structure of lab reports, common veterinary terminologies and abbreviations, standard logbook keeping (manual and digital) and writing SOPs and test result summaries, presentations

Unit IV: Farm training- Animal handling, sample collection (blood, feces, milk), farm hygiene, acquaintance with routine farm activities

DIP-101 ENGLISH COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT- I 2+0

Theory:

Unit I: Functional Grammer-Verbs, adjectives, nouns, pronouns, tenses, idioms, synonyms,

Unit II: Functional Grammer- Change the voice, direct and indirect voice, correct the error,

Unit IV: Resume writing-Effective resume writing,

Unit V: Book review, Letter writing-Formal and informal letters

SEMESTER II

DLT-121 DIAGNOSTIC PROTOZOOLOGY I 1+1

Theory:

Unit I: Introduction to Protozoology, classification of protozoa.

Unit II: General aspects of *Entamoeba*, Lumen dwelling flagellates-*Trichomonas, Giardia, Histomonas*; Haemoflagellates – *Trypanasoma, Leishmania*

Unit III*:* Diagnosis of intestinal protozoa – Preservation of samples; Diagnosis of protozoa from throat swab; vaginal smear-floatation, iodine staining, preparation of permanent preparation of protozoan cysts

Unit IV: Collection of blood, wet film examination, preparation of thin and thick blood smears, buffy coat smear,Special diagnostic techniques – Animal inoculation, Xenodiagnosis.

Practicals: Collection, preservation and processing of faecal samples for diagnosis of *Entamoeba, Giardia etc.* Temporary and permanent staining techniques including iodine staining, Heidenhan's iron alum haematoxylin staining; Collection, processing and examination of throat swabs;Collection of blood, wet film examination, preparation of thin and thick blood smears, buffy coat smear, animal inoculation techniques.

DLT -122 DIAGNOSTIC HELMINTHOLOGY-I 1+1

Theory:

Unit I: Basic concepts in Veterinary and Medical helminthology

Unit II: General aspects of common Ascarids, strongyles, spirurids, filarids and Trichurids -life cycle stages with special emphasis to demonstrable stages of parasitic nematodes

Unit III: Collection, processing and preservation of clinical materials as well as parasite specimens (nematodes) obtained

Unit IV: Postmortem diagnosis-decanting methods for sample collection and sieving methods for sample collection-qualitative and quantitative coprological examination techniques, copro culture techniques- Micrometry, larval culture techniques, detection of anthelmintic resistance.

Practicals: Collection of nematodes and samples from live and dead animals, study of gross specimens, identification of ova of nematodes in faeces, urine, nasal discharges etc., methods for identification helminth larvae from blood samples by Knott's technique and histochemical staining, micrometry, preparation of temporary and permanent mount of helminths, copro culture techniques, faecal egg count reduction test and egg hatch assay.

DLT-123 ADVANCES IN DIAGNOSTIC METHODS 1+2

Theory :

Unit I: Overview of disease diagnostics: Conventional vs. advanced techniques, Role of immunological and molecular methods in modern diagnostics.

Unit II: Antigens, Antibodies, Principles of antigen-antibody interactions, Agglutination and precipitation tests, Basics of Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis (SDS-PAGE) , Western blotting , and Enzyme Linked Immunosorbent Assay (ELISA).

Unit III: General principles of DNA and RNA extraction methods, Polymerase chain reaction, Agarose gel electrophoresis

Unit IV: Application of immunological and molecular diagnostics in infectious diseases and non-infectious diseases.

Practicals : Preparation of buffers, safe handling and disposal of reagents, Antigen preparation, Agar gel immunodiffusion, SDS PAGE, Staining of gels, ELISA and its interpretation, DNA extraction, PCR,Case study analysis

DLT-124 CLINICAL MICROBIOLOGY I (BACTERIOLOGY) 2+1

Theory:

Unit I: Infections caused by bacteria, Collection of clinical samples- collection of different types of samples, preservation and transport of clinical specimens- processing of clinical specimens.

Unit II: Diagnosis of common bacterial diseases of animals and food microbiology

Bacterial infections (Anthrax, Brucellosis, Tuberculosis, Leptospirosis, *E.coli, Staphylococcus*)

Foodborne infections (*E coli, Salmonella, Campylobacter, Listeria, Staphylococcus*)

Practicals: Collection of clinical samples like blood, faeces, sputum, nasal swab, vaginal swab, Serum preparation and storage, Blood collection from different species of animals including lab animals. Sampling of food. Preparation of reagents for the storage of specimens, Processing of clinical and food samples.

DLT-125 QUALITY CONTROL TECHNIQUES 1+1

Theory:

Unit I: Definition, quality control, quality assurance, quality management, microbiological guidelines, specifications and standards

Unit II: National agencies associated with quality control- BIS, FSSAI, International agencies associated with quality control- FAO, WHO, WOAH

Unit III: Quality control systems in food industry- HACCP, ISO series salient features, Quality control tests used in water and food (milk & meat) industry.

Practicals: Collection and processing of sample for quality control tests, Analysis of water- physical, chemical and microbiological, Milk- rapid platform tests- direct and indirect quality control tests, Analysis of meat- physical, chemical and microbiological, Air- sampling and analysis.

DLT-126 STAINS and STAINING TECHNOLOGY 1+2

Theory:

Unit I: General Principles of staining, Factors influencing staining.

Unit II: Simple stains, compound stains , Special stain, Classification of stain, Preparation of stains and slides, Staining procedures. Mounting

Unit III: Labelling and Storage of slides, Inventory management of chemicals, Museum technology / preparation.

Practicals: Preparation of various stains - staining procedures, mounting, labelling

COMMON COURSES

SEP- DLT-102 SKILL ENHANCEMENT PROGRAMME II 0+3

Unit I: Career pathways -Identify roles in clinical labs, research, inspection, teaching, and certifications- Acquaintance with procedures for getting different laboratory certifications such as ISO/IEC 17025 Accreditation (International), NABL Accreditation (India) etc.

Unit II: Laboratory ethics and confidentiality- Patient/farmer confidentiality, data privacy, balancing client interest with animal welfare and public health.

Unit III: Use of visual aids and digital tools in reporting- Design visual lab results (charts, annotated photos of samples), Compile sample history, test results, interpretations, and recommendations, Include basic digital signatures and secure PDF conversion

Unit IV: Interdisciplinary teamwork- Clarify roles as facilitator, recorder, presenter, researcher. Simulations of group dynamics and strategies to manage conflict, Problem based learning and case study presentations

Unit V: Farm training-Animal handling, sample collection (blood, feces, milk), farm hygiene, acquaintance with routine farm activities, acquaintance records maintained in farms

DIP-102 ENGLISH COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT- II 2+0

Theory:

Unit I: Reading Comprehension- Purpose of reading, improving comprehension skills, learning new words,effective sentence construction

Unit II: Presentation skills-Engaging audience, confident delivery, effective speaking

Unit III: Interview Tips-Mock interview

Unit IV: Precis writing, Writing skills- Notice writing, office memo, report writing

SEMESTER III

DLT-211 DIAGNOSTIC HELMINTHOLOGY II 1+1

Theory:

Unit I:Trematodes: General aspects of Liver fluke (*Fasciola*), Blood flukes (*Schistosoma nasalis, S. spindale*), cecarial dermatitis, Amphistomes/ immature amphistomosis (*Paraamphistomum*). Lung flukes(*Paragonimus*) and oviduct flukes (*Prosthogonimus*) Their importance in the diagnosis.

Unit II: Cestodes: Metacestodes (bladder worm),General aspects of ruminant tape worm (*Moniezia*), Dog tape worms (*Dypilidium, Taenia, Echinococcus*), Equine tape worms (*Anoplocephala, Paranoplocephala*), Poultry tape worms (*Davainea, Raillietina*) and broad fish tape worms (*Diphyllobothrium*)

Unit III: Life cycle stages with special emphasis to demonstrable stages of parasitic trematodes and cestodes

Unit IV: Collection, processing and preservation of clinical materials as well as parasite specimens (trematodes and cestodes).

Practicals: Collection of trematodes and cestodes and clinical materials from live and dead animals, Study of gross specimens. Processing of samples, identification of ova of trematodes and cestodes in faeces, urine, nasal discharges etc.Preparation of temporary and permanent mount of trematodes and cestodes.

DLT-212 DIAGNOSTIC PROTOZOOLOGY II 1+1

Theory:

Unit I: General aspects of Apicomplexan parasites; haemo apicomplexans- *Plasmodium, Haemoproteus, Babesia, Theileria*

Unit II: Tissue apicomplexans- *Sarcocystis, Toxoplasma;* Intestinal apicomplexans – Coccidia, *Cryptosporidium*; Ciliate protozoa - *Balantidium, Buxtonella*

Unit III: Diagnosis of coccidiosis; Modified Ziehl Neelson staining for cryptosporidiosis- Diagnosis of blood protozoa- thin and thick blood smears, buffy coat smears, common staining techniques, quantitative buffy coat (QBC) technique

Unit IV: Diagnosis of protozoa from lymph node aspirates, tissue sections- Culture of protozoa, Sabin- feldmann dye test

Practicals: Collection, preservation and processing of faecal samples for diagnosis of intestinal protozoan infections – floatation, sedimentation, Formol-ether technique, Sporulation of coccidian oocysts, modified Ziehl Neilson staining for cryptosporidiosis; Preparation of thin and thick blood smears, buffy coat smear, lymph node smear

DLT-213 DIAGNOSTIC ENTOMOLOGY & ACAROLOGY 1+1

Theory:

Unit I: Introduction and Classification of arthropods of veterinary and medical importance

Unit II: General aspects of flies(mosquitoes, sand flies, tabnids, muscid, blow flies), fleas (*Ctenocephalides, Xenopsyella*), lice (*Haematopinus, Linognathus, Trichodectus, Menopon, Pthirus, Pediculus),* bugs (*Cimex*)

Unit III: General aspects of ticks (*Rhipicephalus, Haemaphysalis, Hyalomma*), mites (*Sarcoptes, Psoproptes, Demodex*)

Unit IV: Techniques of collection, processing, identification and preparation of permanent mounts, examination of skin scrapings-Pathogenic effects of arthropods- Collection of arthropods-Storage of arthropods in the laboratory

Practicals: Study of gross specimen of insects and acarines of veterinary and medical importance-study of morphology of common insects- collection of developmental stages from environment- Collection and processing and preservation of of flies, fleas, lice, bugs, ticks and mites-Rearing of ticks in laboratory

DLT-214 CLINICAL BIOCHEMISTRY-II 2+1

Theory

Unit I: Carbohydrates- definition of glycolysis, glycogenolysis and gluconeogenesis, hormonal regulation of blood sugar, diabetes mellitus, ketosis, glycosuria, pentosuria,Lipids- basic knowledge about triglycerides, cholesterol, plasma lipoproteins, ketone bodies and ketosuria,Protein- basic knowledge about amino acid and proteins, formation of urea, creatine, creatinine, proteinuria, edema, transaminase reactions.

Unit II: Urine – formation of urine, normal and abnormal constituents collection and preservation. Preservatives 24 hour urine random urine. Determination of specific gravity and reaction of urine, detection of protein in urine, Bence Jones Protein, detection and identification of reducing sugar in urine, Rothera test for ketone bodies, Fouchets test for bile pigments, Hay's test for bile salts, Ehrlich test for Urobilinogen, Schlesingers test for urobilin, detection of porphobilinogen in urine, test for blood in urine. Demonstration of absorption bands for haemoglobin in urine. Estimation of sugar, urea, creatinine, protein , calcium and chloride in urine.

Unit III: Gastric contents- stomach tubes, fractional test meal chemical examination for bile pigments, blood, starch and lactic acid in gastric juice, determination of free and total acid,Cerebrospinal fluid- physical and chemical examination, estimation of chloride, protein, and sugar in CSF, estimation of proteins and pleural and peritoneal fluids,Electrophoresis: Principles, separation of serum protein fractions, normal and abnormal patterns,Chromatography- paper chromatography- one dimensional separation of sugars and aminoacid using chromatography

Practicals

Estimation of specific gravity of urine, analysis of normal constituents of urine, analysis of abnormal constituents of urine, estimation of sugar, urea, creatinine, protein , calcium and chloride in urine

DLT-215 CLINICAL MICROBIOLOGY II (VIROLOGY AND MYCOLOGY) 2+1

Theory:

Unit I: Viral diseases- Rabies, FMD, NCD, Lumpy skin disease, Parvo viral infection, Avian influenza Classical swine fever.

Unit II: Fungal diseases- Aspergillosis, Dermatophytosis, Mycotoxins and major foodborne fungi.

Unit III: Diagnosis of common viral and fungal diseases.

Practicals: Collection of clinical samples like blood, faeces, sputum, nasal swab, vaginal swab, Serum preparation and storage, Blood collection from different species of animals including lab animals. Sampling of food.Preparation of reagents for the storage of specimens, Processing of clinical samples and food samples.

DLT-216 DISEASE DIAGNOSTIC METHODS 1+1

Theory:

Unit I: Basic principles of disease diagnosis, Diagnosis of bacterial infections, viral and fungal infections, isolation of the agent

Unit II: Identification of the agent using different culture media, staining techniques, and biochemical characterization, introduction to egg inoculation and cell culture, animal inoculation.

Unit III: Serological tests- Agglutination (Rose Bengal Plate Test, Standard Tube Agglutination Test, Latex Agglutination Test), Precipitation etc. Antibiotic Susceptibility Test (ABST)

Unit IV: Molecular methods:General principles and procedure of PCR, Gel electrophoresis

Practicals: Identification of bacteria by colony morphology, staining, biochemical tests, Demonstration of serological and molecular techniques, Antibiotic sensitivity tests, Demonstration of egg inoculation and cell culture, animal inoculation.

DLT-217 HISTOPATHOLOGY & CYTOPATHOLOGY 1+2

Theory:

Unit I: Post mortem techniques – objectives of post mortem examination – precautions to be taken - techniques for post mortem in large animals, small animals, lab animals, wild animals, poultry and pet birds

Unit II: Tissue collection and preservation.

Fixation of tissues – objectives of fixation – classification of fixatives – factors affecting fixation – common fixatives – bone decalcification.

Tissue processing – various steps involved in tissue processing - Dehydration - Clearing – Impregnation – Embedding – Tissue cutting/sectioning (microtomy) – types of microtome - staining (routine H&E staining) – common special staining techniques – automatic tissue processing.

Unit III: Biopsy and cytology

Biopsy - Techniques in biopsy – types of biopsy – biopsy tools (needles) – animal preparation for biopsy – processing of biopsy samples

Cytology – preparation of specimens for cytology

Practicals: Techniques for post mortem in large animals, small animals, lab animals, wild animals, poultry and pet birds, Tissue collection, fixation, processing, sectioning, staining and mounting, Processing and staining of biopsy samples, Staining of cytology samples

COMMON COURSE

SEP- DLT-201 SKILL ENHANCEMENT PROGRAMME III 0+3

Unit I: Overview of veterinary lab regulations (e.g., OIE, WOAH, local animal health acts), Legal responsibilities of veterinary lab technicians, Documentation requirements and chain of custody, Data protection, confidentiality, and bioethics

Unit II: Awareness on: Interpersonal communication in laboratories, Communicating abnormal results and emergencies, Conflict resolution and escalation protocols, Email and phone etiquette

Unit III: Awareness on : Biosafety levels and laboratory safety protocols, Zoonotic risks and biosecurity procedures,Emergency procedures (spills, needle sticks, animal bites)

Unit IV: Group PBL sessions (lab groups work on real case studies), Individual or group case presentations

Unit V: Farm training-Animal handling, sample collection (blood, feces, milk), farm hygiene, acquaintance with routine farm activities, acquaintance records maintained in farms, Interpersonal communication in clinical and farm environments

SEC-DLT-Skill Enhancement Course

On successful completion of Semester 2, a provision to opt for a certificate programme after an additional 5 weeks training on SEC-DLT-Skill Enhancement Course which includes the following:

Two weeks training in laboratories (Labs under Parasitology, Microbiology, VPH and Pathology, CVAS, Mannuthy)- Training on handling of biological and parasitological samples, processing and disposal, Awareness on lab safety measures

Two weeks training in Laboratories at TVCC, Mannuthy/ UVH, Kokkalai

One week training in farms- Aquintance with farm activities, animal handling and sample collection

1. Title of the Programme	:	**DIPLOMA IN FEED TECHNOLOGY**
2. Objectives	:	1. To achieve technological innovation in animal feed production through innovative research, providing practical guidelines, training in feed processing and functioning of feed mill 2. To provide trained human resource in the field of animal feed production
3. Faculty	:	Veterinary and Animal Sciences
4. Duration	:	2 years (Four semesters)
5. Degree/certificate awarded	:	Diploma in feed technology.
6. Total credits	:	80
7. Proposed academic year of start	:	2025-26
8. Eligibility of candidates	:	Pass in plus two or VHSE
9. Medium of instruction	:	English
10. Mode of selection	:	Through entrance examination conducted by KVASU
11. No. of seats	:	11
12. Fee structure	:	Tuition fee Rs 35,000/ per semester
13. Other fees	:	As per existing fee structure for Diploma Programme
14. Examination	:	As per existing pattern for Diploma Programme
15. Additional space required	:	Two class rooms and one laboratory facility
16. Total staff strength	:	One Teaching Assistant
17. Course contents	:	Attached as Annexure I

DETAILED BUDGET

A. INCOME			Total
	Income from tuition fees	35,000 x 11 x 4 semesters	**15,40,000**
B	EXPENDITURE *****		
	Wages to Teaching Assistant on contract basis – 1 posts @ Rs 1600/ day (To a maximum of 26 days)	40,000 x 12 x2	9,60,000
	Chemicals, reagents, equipment for teaching, infrastructure development if any		50,000
	Miscellaneous expenses (remuneration, stationery, other items)		68,000
	Institutional overhead @ 30% per year		4,62,000
	Total		**15,40,000**

*Re-appropriation of different heads may be allowed depending on the number of admitted students and personnel's employed

ANNEXURE- 1

DEPARTMENT OF ANIMAL NUTRITION

NEW SYLLABUS OF

DIPLOMA IN FEED TECHNOLOGY

Semester No.	Course No.	Title of the Course	Credits
Semester I	DFD 111	NUTRIENTS IN ANIMAL PRODUCTION	2+1=3
	DFD 112	PROCESSING AND PRESERVATION OF FEEDSTUFFS	2+2=4
	DFD 113	QUALITY EVALUATION OF FEED AND FODDER	2+1=3
	DFD 114	FEED ADDITIVES AND SUPPLEMENTS	1+1=2
	DFD 115	DESIGN, LAYOUT AND MANAGEMENT OF FEED MILL	2+1=3
	SEP-DFD 101	SKILL ENHANCEMENT PROGRAMME-I	0+3=3
	DIP-101	ENGLISH COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT- I	2+0=2
		Total	11+9=20

Semester No.	Course No.	Title of the Course	Credits
Semester Il	DFD 121	MACHINERY AND EQUIPMENTS IN MANUFACTURING OF FEED	2+1=3
	DFD 122	FEED MILL ENGINEERING (ELECTRICAL)	2+1=3
	DFD 123	LAWS AND REGULATIONS IN FEED INDUSTRY	2+0=2
	DFD 124	OPERATIONAL MANAGEMENT OF FEED MILL	1+2=3
	DFD 125	FORMULATION AND PRODUCTION OF MINERAL MIXTURE	2+2=4
	SEP-DFD 102	SKILL ENHANCEMENT PROGRAMME II	0+3=3
	DIP-102	ENGLISH COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT- II	2+0=2
		Total	11+9=20

Exit option

The students exiting the programme after successful completion of two semesters should undergo five weeks Skill Enhancement Course (SEC-DFD) at feed mills/feed plants in order to get Certificate in Feed Technology.

Semester No.	Course No.	Title of the Course	Credits
Semester III	DFD 211	LABELLING AND PACKAGING OF FEED	2+1=3
	DFD 212	PRINCIPLES OF MARKETING IN FEED INDUSTRY	2+2=4
	DFD 213	FEED STORAGE, INVENTORY AND WAREHOUSE MANAGEMENT	2+2=4
	DFD 214	QUALITY CONTROL AND WASTE MANAGEMENT	2+1=3
	DFD 215	BIOSECURITY IN FEED MILL	2+1=3
	SEP-DFD 201	SKILL ENHANCEMENT PROGRAMME III	0+3=3
		TOTAL	10+10=20

Semester No.	Course No.	Title of the Course	Credits
Semester IV	DFD 221		
		IN PLANT TRAINING (INDUSTRY)	0+20=20
		Total	0+20=20
		Grand Total	20+20+20+20=80

SYLLABUS

FIRST SEMESTER

1) NUTRIENTS IN ANIMAL PRODUCTION - DFD 111 (2+1)

Theory

Unit 1: Importance of nutrients in animal production and health. Terminologies in feed manufacturing techniques. Common feed and fodders, classification, availability and importance in livestock and poultry production. Carbohydrate- definition, classification, functions, source of carbohydrate and nutritional requirements in ruminants and non ruminants. Lipids- definition, classification, functions, source of lipid and nutritional requirement in ruminants and non ruminants. Proteins- definition, classification, functions, source of protein and nutritional requirement in ruminants and non ruminants.

Unit 2: Importance of minerals (major and trace elements) and vitamins in health and production, their requirements and supplementation in feed. Physical properties of feed ingredients important for the daily operations of feed plant.

Practical

Identification of ingredients, their physical properties and specifications. Familiarisation of cereals, pulses, legumes, millets, tree fodder, unconventional feed stuffs. Feed mill by products and their selection.

2) PROCESSING AND PRESERVATION OF FEED STUFFS- DFD112 (2+2)

Theory

Unit 1: Preparation of samples, sampling techniques, scale of sampling, processing and preservation of samples. Traditional and modern farm level storage structures. Role of moisture, temperature and relative humidity during storage of feedstuff and their effect on biotic factors. Handling and storage of liquid feed ingredients.

Unit 2: Introduction to feed processing methods – Processing of grains, Roughage processing methods, Steps involved in feed pelleting and extrusion techniques. Principle of feed and fodder preservation techniques. Hay making and silage making, silage additives, silos of various capacity, merits and demerits, flieg index. Effect of preservation on nutritional value of feed.

Practical

Preparation of sample for analysis, engaging in feed mill activities. Estimation of storage capacity and stack plan. Experiential learning in feed plant on processing techniques – grinding, mixing, pelleting and other major processing operations. Crumbling, flaking, extrusion. Preservation techniques of roughages, storage structures.

3) QUALITY EVALUATION OF FEED AND FODDER - DFD113 (2+1)

Theory

Unit 1: Physical examination of feed and feed ingredients, chemical analysis and biological examination of raw material and finished feed. Proximate compositions- Estimation of moisture, total ash, crude protein, ether extract, crude fibre and nitrogen free extract. Partitioning of forage fibre by Van Soest method, limitations of various system of analysis.

Unit 2: Adulteration- Definition, common adulterants in feed and fodder, classification of toxicants in animal feeds, plant origin toxicants, microbial origin toxicants, acquired toxicants (heavy metals, pesticide residues-drug residues) and their effect on animal health and production. BIS Specification of feed ingredients and finished feeds.

Practical

Visit to chemical laboratory, general precautions while working in nutritional laboratory. Common laboratory equipments. Laboratory evaluation of preserved and processed feed and forages. Physical properties of feed and feedstuffs. Proximate analysis. Van Soest fibre fractionisation. Qualitative detection of undesirable constituents and common adulterants of feed.

4) FEED ADDITIVES AND SUPPLEMENTS - DFD 114 (1+1)

Theory

Unit 1: Introduction to feed additives. Definition and types of feed additives. Probiotics, prebiotics, symbiotics and post biotics. Feed enzymes, antioxidants, preservatives, flavour enhancers. Functional feed additives, growth promoting antibiotics, special purpose feed additives. Additives for swine and poultry. Additives for ruminants and other production improvers. Commonly used minerals and vitamin supplements. Benefits and application of feed additives. Antimicrobial resistance. Future trends and developments.

Practical

Familiarisation of feed additives and supplements, identification of different additives. Requirements of different feed additives and supplements in feed formulations**.** Guidelines for feed formulation. Benefits and limitations of additives.

5) DESIGN, LAYOUT AND MANAGEMENT OF FEED MILL – DFD 115 (2+1)

Theory

Unit1: Status of feed industry in India. Related activities and development of feed industry. Importance of feed technology in relation to animal productivity. Planning and designing of feed plants of different capacities.

Unit 2: Layout and design of feed mills. Problems of feed manufacturing units - control measures. Automation in feed processing. Personal management in feed plants. Introduction to pulverisers, pelletisers, post pelleting applications- Complete feed block equipment.

Practical

Visit to feed mill, Plan, layouts and design of different capacity of feed mills. Problems related to feasibility. Mixer efficiency test- pellet durability tests. Record keeping in different sections of feed mill. Experiential learning at the feed plant.

6) SKILL ENHANCEMENT PROGRAMME - I SEP-DFD 101 (0+3)

Practical

Introduction to feed production practices/plant training. Acquaintance with routine activities in feed mill. Sample collection and preparation of samples, procedure for despatching various samples to laboratory. Feed mill equipments working and maintenance. Feed safety –regulatory compliance. Feed quality control practices- pest management and rodent control, godown management and logistics.

7) **ENGLISH COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT-I DIP-101 (2+0)**

Theory

Unit 1: Functional grammar, verbs, adjectives, nouns, pronouns, tenses, idioms synonyms, functional grammar, changes the voice- direct and indirect voice, correct the error.

Unit 2: effective resume writing, book review, letter writing- formal and informal letters.

SECOND SEMESTER

1) **MACHINERY AND EQUIPMENTS IN MANUFACTURING OF FEED - DFD 121 (2+1)**

Theory

Unit 1: Introduction to feed mill equipment. Equipment used for feed grinding – hammer mill, attrition and roller mills. Standard sieves and procedure of sieving for the determination of fineness of grinding. Feed mixing – hand mixing and mechanical mixing. Different types of mixers, equipment used for mixing. Processing of Feeds-pelleting technology – Pelleting of feeds, steps in the preparation of hard pellets, advantages of feed pelleting.

Unit 2: Boilers and steam generation. Thermodynamics. Air conditioning and refrigeration. Heat and mass transfer. Different elevators, conveyors-bins, magnetic separators. Description of sieving set- procedure of sieving- sieve shaker.

Practical

Visit to feed mill. Introduction to different machinery. Experiential learning at feed mill-pulveriser, pelletisers, complete feed block equipment, hammer and roller mill.
Points to be considered for selection of an efficient grinder and purpose of feed grinding. Mixer design and feed mixers-vertical batch mixer-horizontal batch mixer, Double paddle horizontal mixer, Ribbon blenders, capacity and working. Determination of feed mixing efficiency of a mixer. Feed mixing time in a mixer.

Working principle of pellet mill, cooler and capacity. Working principles of different equipment.

2) FEED MILL ENGINEERING (ELECTRICAL) - DFD122 (2+1)

Theory

Unit 1: Working principles of different machinery. Electrical power distribution systems, generator- capacity and working. Energy (Electricity) audit of different equipment. Load distribution- circuit breakers. Transformer and its working-working principle. Motors and its capacity.

Unit 2: Automated feed control system& control panels. Design installation and maintenance of electrical panels, effect on production and efficiency. PLC management. Electrical safety consideration, maintenance procedures for electrical systems.

Practical

Motors and windings, working principle-demonstration. Generator working-Load distribution of equipment. Electrical safety and first aid. Earthing and wiring.
Handling of plant equipment, electrical safety standards.

3) LAWS AND REGULATIONS IN FEED INDUSTRY- DFD 123 (2+0)

Theory

Unit 1: Laws and regulations of the feed manufacturing industry. Organisations and acts. Animal feed sectional Committee and objectives. Introduction to labour laws. Organisation charts for small, medium and large feed plants. Different regulating agencies in feed sales. WTO and GATT, FSSAI and Codex Alimentarius Commission (CAC). Salient features of feed act for livestock feed manufacturing

Unit 2: Feeding standards. Definition, classification. BIS specification, certification process, compliance requirements-labelling and claims. AFFCO standards for feed.

4) OPERATIONAL MANAGEMENT OF FEED MILL- DFD 124 (1+2)

Theory

Unit 1: Introduction to the principles of material handling. Processing of feed and forages. Effect of processing on nutritional values. Effect of processing on density. Particle size reduction procedures- Cutting, pressing, shearing, impact grinding- Expressing the particle size of ground feeds. Grinding of feed ingredients and advantage of grinding.

Unit 2: Modulus of uniformity. Modulus of fineness- Principle of mixing and compounding feeds. Mixing of ground ingredients. Factors that affecting mixing
Micro ingredient Premixing.

Practical

Engaging in feed mill activities. Batch mixing, line mixing. Procurement planning and purchase procedures. Ingredients storage and related structures, feed manufacturing process and activities. Computer assisted ration formulation. Cost of processing and packaging of feed per MT.

5) FORMULATION AND PRODUCTION OF MINERAL MIXTURE- DFD 125 (2+2)

Theory

Unit 1: Role of minerals in animal production. Major elements- function and purpose, Addition in the feed. Role of Minor/Trace/Toxic elements– classification, general function, formulation of premix, carriers and diluents. Sources of minerals used for mineral mixture production

Unit 2: Sources of minerals, procurement and storage. Mineral toxicity and antagonism. Equipment involved in preparations of mineral mixtures / blenders- function and working.

Practical

General principles of mineral Estimation. Sampling and processing techniques.

Estimation of Macro and Micro minerals. Determination of bioavailability of minerals. Formulation of mineral mixture for various species. Modern techniques used in mineral estimation

6) SKILL ENHANCEMENT PROGRAMME- II SEP-DFD 102 (0 +3)

Practical

Laboratory ethics and confidentiality . Record keeping in laboratories. Visual aids and digital tools in daily reporting. Familiarisation of various registers maintained in feed mill. Maintenance of log books for vehicles and machineries. Interdisciplinary team work. Feed production planning and management.

7) ENGLISH COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT- II DIP-102 (2+0)

Theory

Unit 1: Reading comprehension, purpose of reading, improving comprehension skills, learning new words- effective sentence construction.

Unit 2: Presentation skills, engaging audience, confident delivery and effective speaking-Interview tips, mock interview, Precise writing, writing skills-notice writing, office memo, report writing.

THIRD SEMESTER

1) LABELLING AND PACKAGING OF FEED- DFD 211 (2+1)

Theory

Unit 1: Importance of Packaging. History of packaging. Packaging materials-characteristics of basic packaging material (corrugated paper, fibre board glass, metal, plastic, foils and laminates, retort pouches, earthen pots etc). Package forms.

Unit 2: Legal requirements of packaging materials and product information. Packaging of feed for different classes of livestock. Modern Packaging Techniques. Coding and labelling of packages. Principles and methods of packaging.

Packaging systems- Smart packages. Recent advances in Packaging Technology.

Practical

Identification of packaging material, Testing of paper board, Percentage of moisture, Grease resistance, Water absorptiveness, Tearing resistance and bursting strength. Testing of plastic and Laminate thickness. Water vapour transmission rate (WVTR), oxygen transmission rate (OTR). Packaging of feed for different classes of livestock.

2) PRINCIPLES OF MARKETING IN FEED INDUSTRY- DFD 212 (2+2)

Theory

Unit 1: Concept of market, meaning and classification of markets. Market price and normal price determination under perfect competition in short and long run. Merchandising product, planning and development.

Unit 2: Market, function, exchange function- buying selling and demand creation. Physical function- grading, transportation, storage and warehousing. Facilitative function –standardization, risk bearing, market information and market intelligence. Market opportunities, market channel of livestock feed. Organised and unorganised market, import and export of livestock feeds. International agreements and regulations, WTO and GATT for marketing and trade of live animals and products.

Practical

Dynamics of cattle Feed market in Kerala, Current demand pattern, general market trend and growth prospects of feed markets in Kerala. Current market structure. Effective marketing strategies. Purchasing pattern and buyer behaviour with respect to feed products. Logistics involved in feed production.

3) FEED STORAGE, INVENTORY AND WARE HOUSE MANAGEMENT - DFD 213 (2+2)

Theory

Unit 1: Inventory management. Introduction to warehouse. Principle of warehousing. Definition, function and advantage. Physical and chemical changes during storage. Storage losses, common storage structure and its capacity.

Unit 2: Insects and pests control, common pest affecting feeds. Hygiene Management-methods. Rodent and Vector control, *Salmonella* species, Fowl Cholera and *E. coli* spreading. Fumigation and pest control in fed mill godown.

Practical

Modern approaches in combating grain pest and rodents. Identification of insects and pests in stored products. Techniques for detection of pests and rodents. Basic stock feed facility design. Warehouse working. Inventory management system.

4) QUALITY CONTROL AND WASTE MANAGEMENT- DFD 214 (2+1)

Theory

Unit 1: Quality standards in feed manufacturing. Different bodies regulating feed quality. Quality control in feed manufacturing and importance. Feed safety, role of FSSAI. Quality Assurance and identification (ISO), Good manufacturer practices (GMP) in feed mills. Best practices of record keeping and audits. Identification of hazard – HACCP. Traceability system in feed production.

Unit 2: identification of waste- Waste management system in feed mill- different waste disposal methods-Identifying, controlling and testing of mycotoxins in feed-Microbial contamination – effects of mycotoxins- Measures to reduce the risk.

Practical

Feed mill accreditation procedures. Consequence of consumption of mouldy hay. Insecticide and pesticide residue analysis in feed. Different mycotoxins in feed.

Techniques to lower the risk of mycotoxins. Waste disposal methods- Reduction, Recycle, Reuse (RRR)- principle. Identification of different wastes in feed mill and control measures.

5) BIOSECURITY IN FEED MILLS -DFD 215 (2+1)

Theory

Unit 1: Bio security – Proactive measures to minimize entry of infectious agents.
Feed mill premises, feed mill fencing, disinfectant, pits, personnel management and restriction of movement. Locational, Conceptual (Isolation), Structural and Operational (Sanitation).

Unit 2: Bio security concepts, barriers surrounding feed mill, inner and outer barrier.
Bio security safeguard – preventive measures against clinical and subclinical pathogens. Bio security risk control measures, personal and visitor entry, wash room, bath room, foot dip and dress changing room. Prohibition of entry, non-essential, unwanted personnel and trespassing.

Practical

Feed mill sanitation, disinfection procedures for an effective biosecurity cover. Floor washing-ceiling washing- air duct cleaning, and dust removal –blow out.
Approved disinfectant with concentrations- Feed as a source of infection e.g. BSE
Ventilation, water and temperature management.

6) SKILL ENHANCEMENT PROGRAMME- III SEP-DFD 201 (0+3)

Practical

Regulatory and legal frameworks for establishment of feed mills. Technical writing. Communication with supervisors, electricians and labourers. Occupational safety-hazard identification, personal protective equipment. Emergency procedures. Client communication and soft skill development. Preparation of annual reports.

FOURTH SEMESTER

1) IN PLANT TRAINING (INDUSTRY) - DFD 221 (0+20)

Industrial exposure visit and internship training in feed mills coming under Govt/ Co-operative sector..Hands on experience with feed milling and pelleting equipments. Preparing feed formulations based on specific animal needs. Understanding real world process in feed mill. Observing quality control and regulatory compliance.

Skill Enhancement Course (SEC-DFD)

The students exiting the programme after successful completion of two semesters should undergo five weeks skill development training at Feed Mills/Feed analysis laboratary in order to get Certificate in Feed Technology, which includes the following:

Three weeks training in RF feed mill- training on sampling, processing and various activities of feed mill

Two weeks training in feed analysis laboratory- Training on proximate analysis of feed samples. Record keeping in feed mills.