

**Curriculum
For
Livestock Manager
(1 year)**

Contents Page

Introduction.....3

Overview about the program.....4

Livestock Manager Curriculum Contents.....10

Assessment.....38

1. Introduction

Name of course: **Livestock Manager**

The overall objective of course is to enable the learner to gain competencies related to enhancing livestock productivity through understanding the basics and overall perception of veterinary, livestock management, better breeding policies, improved feeding practices, using modern techniques in artificial insemination, in time and proper vaccination, deworming and spraying to control the endo and ecto parasites. The knowledge of fodder crop production and its preservation as silage or hay will help improve the livestock productivity. Proper planning and marketing will help gaining maximum profitability

Having been completing this course, learners will have the opportunity to enter careers relating to Livestock Management. Livestock Managers will have the technical knowledge and expertise which is necessary to efficiently manage a livestock farm for earning maximum returns. This ability will ensure him job opportunities in the livestock farming community of Pakistan and in government created/ announced vacancies. This course will also enable him to earn employment opportunities overseas (especially in the Middle East).

2. Overview about the program – Curriculum for Livestock Manager–

Module Title and Aim	Learning Units	Theory ¹ Days/hours	Workplace ² Days/hours
Module 1: Identification of body parts of domestic animals Aim of Module Understand the name and physical location of bones, muscles and organs of the animals.	LU-1 Introduction to Anatomy LU-2 Skeletal System LU-3 Joints LU-4 Respiratory and Blood Vascular System. LU-5 Digestive System LU-6 Reproductive System	2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hr s	8 hrs 8 hrs 8 hrs 8 hrs 8 hrs
Module 2: Scope of Physiology in Ruminants Aim of Module Understand the physiological functions of different systems of the ruminant animals.	LU-1 Introduction of Physiology LU-2 Functions of Digestive System of Ruminants LU-3 Respiratory System. LU-4 Functions of Reproductive System	3 hrs 3 hrs 3 hrs 4 hrs	12 hrs 12hrs 12 hrs 16 hrs
Module 3: Prescribe, prepare and administer medicine in correct proportions. Aim of Module Introduction to drug preparation and administration in animals	LU-1 Introduction of Pharmacology LU-2 Drug Administration in Animals	4 hrs 4 hrs	16 hrs 16 hrs
Module 4: Livestock care and management	LU-1 Introduction to Livestock	6 hrs	24 hrs

¹ Learning hours in training provider premises

² Training workshop, laboratory and on-the-job workplace

<p>Aim of Module Understand the livestock feeding, management, breeding and production practices.</p>	LU-2 Management of young calves, tagging, tattooing and Casting of animals	6 hrs	24 hrs
	LU-3 Production Management of dairy and beef animal.	6 hrs	24 hrs
	LU-4 Production management of sheep and goat for milk and meat production	6 hrs	24 hrs
	LU-5 Record Keeping	5 hrs	20 hrs
	LU -6 Fodder production and preservation	6 hrs	24 hrs
<p>Module 5: Examine animals to detect illness</p> <p>Aim of Module Understand the pathological causes of illness of the animal.</p>	LU-1 Introduction to Pathology	3 hrs	12 hrs
	LU-2 Postmortem	3 hrs	12 hrs
	LU-3 Lesions	3 hrs	12 hrs
	LU-4 Inflammation	3 hrs	12 hrs
	LU-5 Ulcer	3 hrs	12 hrs
<p>Module 6: Vaccination of livestock and diagnosis of Microbial diseases.</p> <p>Aim of Module Understand different microbial diseases and their control through vaccination in animals.</p>	LU-1 Introduction to Microbiology	3 hrs	12 hrs
	LU-2 Microbiology of Different Diseases	4 hrs	16 hrs
	LU-3 Microbiology of Different Diseases	4 hrs	16 hrs
	LU-4 Microbiology of Different Diseases	3 hrs	12 hrs
	LU-5 Vaccines	3 hrs	12 hrs
	LU-6 Vaccines Production	3 hrs	12 hrs
<p>Module 7: Taking preventative measures against parasites, diagnosis of parasitic diseases.</p>	LU-1 Introduction of Parasitology	4 hrs	16 hrs
	LU-2 Parasitic Infestation of Different Systems	4 hrs	16 hrs

<p>Aim of Module Understand different parasitic diseases and demonstrate measures to control parasites.</p>	<p>LU-3 Diseases LU-4 Dewormers LU-5 Anti-parasitic drugs</p>	<p>4 hrs 4 hrs 4hrs</p>	<p>16 hrs 16 hrs 16hrs</p>
<p>Module 8: Poultry Management.</p> <p>Aim of Module Understand poultry feeding, management, disease control and production practices.</p>	<p>LU-1 Introduction of Poultry LU-2 Breeds and Site Selection LU-3 Birds Management LU-4 Meat Production and Housing LU-5 Diseases Management LU-6 Poultry Genetics</p>	<p>3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs</p>	<p>12 hrs 12 hrs 12 hrs 12 hrs 12 hrs 12 hrs</p>
<p>Module 9: Treatment against diseased animals.</p> <p>Aim of Module Demonstrate the diagnosis treatment of sick animals.</p>	<p>LU-1 Introduction of Veterinary Medicine LU-2 Diseases Investigation LU-3 Economic Importance of Diseases LU-4 Transmission of Diseases LU-5 Principles of Treatment LU-6 Principles of Treatment</p>	<p>3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs</p>	<p>12 hrs 12 hrs 12 hrs 12 hrs 12 hrs 12 hrs</p>
<p>Module 10: Treatment against bacterial, viral, parasitic and fungal diseases for ill livestock.</p> <p>Aim of Module</p>	<p>LU-1 Bacterial Diseases & Their Treatments LU-2 Bacterial Diseases& Their Treatments</p>	<p>3 hrs 3 hrs</p>	<p>12 hrs 12 hrs</p>

Understand the disease causative organisms and treatment of animals accordingly.	LU-3 Viral Diseases & Their Treatments	3 hrs	12 hrs
	LU-4 Viral Diseases & Their Treatments	3 hrs	12 hrs
	LU-5 Parasitic Diseases & Their Treatments	3 hrs	12 hrs
	LU-6 Parasitic Diseases & Their Treatments	3 hrs	12 hrs
Module 11: Perform Minor Veterinary Surgery. Aim of Module Demonstrate minor surgeries and post operative care.	LU-1 Introduction of Veterinary Surgery	3 hrs	12 hrs
	LU-2 Treatments of Different Ailments	3 hrs	12 hrs
	LU-3 Hemorrhage Arrest and Sterilization	3 hrs	12 hrs
	LU-4 Preparation of Patient	3 hrs	12 hrs
	LU-5 Post Operative Care	3 hrs	12 hrs
	LU-6 Diagnosis and Surgical Treatment	3 hrs	12 hrs
Module 12: Managing Animal Nutrition. Aim of Module Understand nutrient requirement of animals and, balanced and economical ration formulation.	LU-1 Introduction of Animal Nutrition	5 hrs	20 hrs
	LU-2 Introduction to Essential Nutriment	5 hrs	20 hrs
	LU-3 Digestion and absorption of nutrients	5 hrs	20 hrs
	LU-4 Minerals and Vitamins	5 hrs	20 hrs
	LU-5 Nutritional Management of Dairy Animals	5 hrs	20 hrs
	LU-6 Feeding Problems and Nutritional Disorders	5 hrs	20 hrs

Module 13: Managing Animal Reproduction. Aim of Module Demonstrate heat detection, insemination, pregnancy diagnosis and treatment of reproductive disorders.	LU-1 Female Reproductive System LU-2 Puberty and Breeding Seasons LU-3 Estrus Cycle LU-4 Insemination and Pregnancy Management LU-5 Reproductive Problems LU-6 Male Reproductive System	4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs	16 hrs 16 hrs 16 hrs 16 hrs 16 hrs 16 hrs
Module 14: Manage breeding and genetics of Livestock. Aim of Module Understand genetic improvement of animals through improved breeding practices.	LU-1 Breeding Management LU-2 Selection of Animals	4hrs 4hrs	16hrs 16hrs
Module 15: Economics of livestock production and marketing. Aim of Module Develop annual business plan and marketing strategies.	LU-1 Introduction to livestock economics LU-2 Marketing system of Livestock and its produce in Pakistan LU-3 Application of economic principles in development of annual business plan LU-4 Problems of livestock marketing systems and its impact on the economy LU-5 International	3 hrs 3 hrs 3 hrs 3 hrs 3 hrs	12 hrs 12 hrs 12 hrs 12 hrs 12 hrs

	marketing systems and their advantages over conventional marketing systems of Pakistan		
	LU-6 Cost-benefits analysis sheet and net return per unit adult animal	3 hrs	12 hrs
Module 16: Maintain farm machinery and equipment.	LU-1 Manage various kinds of farm machinery	3 hrs	12 hrs
Aim of Module Understand the operation of farm machinery and its maintenance.	LU-2 Primary & secondary tillage for proper seedbed preparation	3 hrs	12 hrs
	LU-3 Harvesting and threshing machinery	3 hrs	12 hrs
	LU-4 Care/repair/maintenance and calibration of machinery	3 hrs	12 hrs

3. Livestock Manager Curriculum Contents (Teaching and Learning Guide)

Module 1

Title: Identification of body parts of domestic animals

Objective of the Module: Understand the name and physical location of bones, muscles and organs of the animals.

Duration: 60 hours Theory: 12 hours Practice: 48 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction to Anatomy	<ul style="list-style-type: none"> • Orientation to anatomy of domestic animals. 	<ul style="list-style-type: none"> • History. • Definitions. • Importance. 	10 hrs	<ul style="list-style-type: none"> -Animal skeleton for demonstration. -Multimedia for classroom use -Reference book 	Class room Laboratory Livestock farm
LU-2 Skeletal System	<ul style="list-style-type: none"> • Able to identify and demonstrate main bones. 	<ul style="list-style-type: none"> • Types. • Functions. • Comparative studies of skeletons of domestic animals. 	10 hrs	<ul style="list-style-type: none"> -Animal skeleton for demonstration. -Multimedia for classroom use -Reference book 	Class room Laboratory Livestock farm
LU-3 Joints	<ul style="list-style-type: none"> • Explain and understand the main joints of the body. 	<ul style="list-style-type: none"> • Types. • Movements. • Functions. 	10 hrs	<ul style="list-style-type: none"> -Animal skeleton for demonstration. -Multimedia for classroom use -Reference book 	Class room Laboratory Livestock farm
LU-4 Respiratory and Blood Vascular System.	<ul style="list-style-type: none"> • Should be able to demonstrate the respiratory system. • Can explain the blood vascular system. 	<ul style="list-style-type: none"> • Anatomical comparisons of respiratory and blood vascular systems of domestic animals. 	10 hrs	<ul style="list-style-type: none"> -Chemicals to preserve the animal for dissection to study different systems -Animal skeleton for demonstration. -Multimedia for classroom use -Reference book 	Class room Laboratory Livestock farm

LU-5 Digestive System	<ul style="list-style-type: none"> Should be able to identify different compartments of rumen, small and large intestine. 	<ul style="list-style-type: none"> Anatomical comparisons of digestive systems of domestic animals. 	10 hrs	<ul style="list-style-type: none"> Chemicals to preserve the animal for dissection to study different systems Animal skeleton for demonstration. Multimedia for classroom use Reference book 	Class room Laboratory Livestock farm
LU-6 Reproductive System	<ul style="list-style-type: none"> Should be able to demonstrate the general over view of reproductive system. 	<ul style="list-style-type: none"> Female reproductive organs. Male reproductive organs. 	10 hrs	<ul style="list-style-type: none"> Chemicals to preserve the animal for dissection to study different systems Animal skeleton for demonstration. Multimedia for classroom use Reference book 	Class room Laboratory Livestock farm

Practical: Identification of bones and joints, Demonstration on different body systems using slaughter house facility

Module 2

Title: Scope of Physiology in Ruminants

Objective of the Module: Understand the physiological functions of different systems of the ruminant animals.

Duration: 65 hours Theory: 13 hours Practice: 52 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction of Physiology	<ul style="list-style-type: none"> Orientation to physiology of different systems. 	<ul style="list-style-type: none"> History. Definition. Functions and importance. 	15 hrs	<ul style="list-style-type: none"> Multimedia for classroom use Removable markers and charts Reference books 	Class room Laboratory Livestock farm

<p><u>LU-2</u></p> <p>Functions of Digestive System of Ruminants</p>	<ul style="list-style-type: none"> • Should be able to know the digestion and absorption of nutrients in ruminants. • Should have knowledge about the microbial fermentation in the ruminants. 	<ul style="list-style-type: none"> • Functions in domestic animals. • Ruminant and non ruminant stomach. • Microbial fermentation in ruminants. • Digestion and absorption in small and large intestine. 	15 hrs	<ul style="list-style-type: none"> -Preserved structure of digestive system of ruminant and non-ruminants animals for demonstration -Reference book 	Class room Laboratory Livestock farm
<p><u>LU-3</u></p> <p>Respiratory System.</p>	<ul style="list-style-type: none"> • Explain and demonstrate the importance lungs in respiratory system. 	<ul style="list-style-type: none"> • Physiology of respiration. • Function of lungs in respiration. 	15 hrs	<ul style="list-style-type: none"> -Preserved structure of respiratory system of ruminant animals for demonstration -Reference book 	Class room Laboratory Livestock farm
<p><u>LU-4</u></p> <p>Functions of Reproductive System</p>	<ul style="list-style-type: none"> • Could demonstrate the functions of ovary. • Should be able to explain the functions of uterine horns. • Explain the functions of male reproductive system. 	<ul style="list-style-type: none"> • Functions of uterus, uterine horns and ovaries. • Functions of male reproductive organs. 	20 hrs	<ul style="list-style-type: none"> Preserved structure of reproductive system of male and female ruminant and non-ruminants animals -Reference book 	Class room Laboratory Livestock farm

Practical: Recording of pulse, respiration and temperature in different animals. Ruminal movements in different animals. Collection of blood samples.

Module 3

Title: Prescribe, prepare and administer medicine in correct proportions.

Objective of the Module: Introduction to drug preparation and administration in animals

Duration: 40 hours Theory: 8 hours Practice: 32 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<u>LU-1</u> Introduction of Pharmacology	<ul style="list-style-type: none">• Define and classify drugs.• Explain and demonstrate organic, inorganic and herbal drugs.• Should know the side effects of drugs.	<ul style="list-style-type: none">• Definitions.• Branches.• Drug sources.• Drug residues.	20 hrs	-Samples of ingredients being used in Ethno-Veterinary medicines for identification. -Chemicals for preparation of ointments, lotions, cream and tincture for demonstration purpose	Class room Laboratory Livestock farm
<u>LU-2</u> Drug Administration in Animals	<ul style="list-style-type: none">• Demonstrate the oral, intra-dermal. Intramuscular and intravenous application of drugs.• Can explain the effectiveness of drug use.	<ul style="list-style-type: none">• Routes.• Methods.• Advantages and disadvantages.	20 hrs	-Samples of ingredients being used in Ethno-Veterinary medicines for identification. -Chemicals for preparation of ointments, lotions, cream and tincture for demonstration purpose. Instruments/equipments for preparation and administration of drug	Class room Laboratory Livestock farm

Practical: Weights and measures of different ingredients, Solution preparation, Drug administration, Ethno-Veterinary medicines – identification and preparation. Ointment, cream, lotions and tincture preparation in the laboratory.

Module 4

Title: Livestock care and management

Objective of the Module: Understand the livestock feeding, management, breeding and production practices.

Duration: 175 hours Theory: 35 hours Practice: 140 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<u>LU-1</u> Introduction to Livestock	<ul style="list-style-type: none">• Orientation to livestock management.• Should know the important breeds of livestock.• Explain the traits of good quality animals.• Should know the direction of shed construction.• Explain the space requirement for different age group of animals in the shed.	<ul style="list-style-type: none">• History and importance of food animals.• Important breeds of animals.• Identification of good quality animals.• Construction and management of animal sheds on scientific basis in order to avoid diseases and external parasites.	30 hrs	<ul style="list-style-type: none">-Good quality animals of different breeds for demonstration-Multimedia for classroom use-Reference books	Class room Laboratory Livestock farm
<u>LU-2</u> Management of young calves, tagging, tattooing and Casting of animals	<ul style="list-style-type: none">• Explain the importance of colostrums for new born calf.• Demonstrate the feeding management of young calves.• Should know the tagging and tattooing of animals.	<ul style="list-style-type: none">• Care and management of neonates and pregnant animals.• Animals breeding procedures.• Tagging and tattooing of animals.	30 hrs	<ul style="list-style-type: none">-Tagging machine-Plastic tags for demonstration-Tattooing machine along with accessories-Ropes far casting the animals-Reference books	Class room Laboratory Livestock farm
<u>LU-3</u> Production Management of dairy and beef animals	<ul style="list-style-type: none">• Able to explain different methods to control the endo and ecto parasites.• Should know special feeding for better	<ul style="list-style-type: none">• Dipping/spraying of animals to control external parasites.• Flushing and shearing.	30 hrs	<ul style="list-style-type: none">-Medicines for demonstration to control external parasites by dipping and	Class room Laboratory Livestock farm

	<p>breeding and economical beef production.</p> <ul style="list-style-type: none"> • Should be able to demonstrate the benefits of cleaning (sheds, animals and milking utensils regarding hygienic milk production. 	<ul style="list-style-type: none"> • Hygienic milk production and handling. • Quality and economical beef production 		<p>spraying</p> <ul style="list-style-type: none"> -Milking machine for hygienic milk production -Reference books 	
<p><u>LU-4</u></p> <p>Management of sheep and goats for milk and mutton production</p>	<ul style="list-style-type: none"> • Able to explain different methods to control the endo and acto parasites. • Should know special feeding for better breeding and mutton production. • Should be able to demonstrate the benefits of cleaning (sheds, animals and milking utensils regarding hygienic milk production. 	<ul style="list-style-type: none"> • Dipping/spraying of animals to control external parasites. • Flushing and shearing. • Hygienic milk production and handling. • Quality and economical mutton production 	30 hrs	<p>Medicines for demonstration to control external parasites by dipping and spraying</p> <ul style="list-style-type: none"> -Equipments for hygienic milk production -Reference books 	
<p><u>LU-5</u></p> <p>Record Keeping</p>	<ul style="list-style-type: none"> • Able to maintain the birth register, tag register, weight register, milk record register, and feed and fodder register. 	<ul style="list-style-type: none"> • Preparation of herd book. • Methods of selection of better animals. 	25 hrs	<ul style="list-style-type: none"> -Different types of registers for record keeping 	<p>Class room Laboratory Livestock farm</p>
<p><u>LU -6</u></p> <p>Fodder production and preservation</p>	<ul style="list-style-type: none"> • Explain different sowing seasons and fodder crops • Demonstrate hay and silage making. • Demonstrate other non conventional feed stuff 	<ul style="list-style-type: none"> • Fodder classification according to sowing season • Importance of hay and silage. • Use of various agro-industrials by 	30 hrs	<ul style="list-style-type: none"> -Seeds of different improved fodder varieties for identification - Hydraulic Press machine for silage production in 30 to 	<p>Class room Laboratory Livestock farm</p>

	which can be used for feeding to livestock.	products in livestock and poultry.		40 kg bails	
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Practical: Casting of animals, Aging of animals, Demonstration on dehorning of animals, Tail docking of sheep, Tagging, Tattooing and branding of animals, Dipping and spraying of animals to control external parasites, Record maintenance, Demonstration on identification fodder seed varieties, Demonstration on preservation of fodder by making hay and silage.

Module 5

Title: Examine animals to detect illness

Objective of the Module: Understand the livestock feeding, management, breeding and production practices.

Duration: 75 hours Theory: 15 hours Practice: 60 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<u>LU-1</u> Introduction to Pathology	<ul style="list-style-type: none"> • Orientation to pathology. • Know the branches of pathology. • Demonstrate economic importance of pathology. 	<ul style="list-style-type: none"> • History. • Definitions. • Branches. • Importance. 	15 hrs	<ul style="list-style-type: none"> -Multimedia for classroom use -Removable markers and charts -Reference books 	Class room Laboratory Livestock farm
<u>LU-2</u> Postmortem	<ul style="list-style-type: none"> • Explain and demonstrate the postmortem of animals. • Can collect the sample to diagnose the pathogen. • Have Knowledge about Forensic and clinical autopsy. 	<ul style="list-style-type: none"> • Postmortem of various animals. • Significance. • Forensic autopsy. • Clinical autopsy. 	15 hrs	<ul style="list-style-type: none"> -Bio-safety kit for postmortem of animals -Instruments for postmortem and sample collection 	Class room Laboratory Livestock farm
<u>LU-3</u> Lesions	<ul style="list-style-type: none"> • Know the different types and causes of lesions. • Can explain the internal lesions and causative pathogens. 	<ul style="list-style-type: none"> • Types. • Causes. • Internal lesions and their pathogenesis. 	12 hrs	<ul style="list-style-type: none"> -Chemicals for laboratory diagnosis of causative pathogens -Reference books 	Class room Laboratory Livestock farm

LU-4 Inflammation	<ul style="list-style-type: none"> • Understand types and causes of inflammation. • Know the inflammation of cellular components. • Explain the inflammatory disorders. 	<ul style="list-style-type: none"> • Types. • Causes. • Exudative components. • Cellular components. • Inflammatory disorders. 	12 hrs	-Chemicals for laboratory diagnosis of causative pathogens -Reference books	Class room Laboratory Livestock farm
LU-5 Ulcer	<ul style="list-style-type: none"> • Have knowledge about the types and causes of ulcer. • Able to diagnose and suggest the treatment. 	<ul style="list-style-type: none"> • Types. • Causes. • Pathogenesis and diagnosis. 	15 hrs	-Chemicals for laboratory diagnosis of causative pathogens -Reference books	Class room Laboratory Livestock farm

Practical: Demonstration of postmortem procedures, Collection of normal and abnormal tissue samples and their transportation to laboratory for pathological examination, Incineration/deep burial of dead animals, Disinfection of laboratory equipments/apparatus.

Module 6

Title: Vaccination of livestock and diagnosis of Microbial diseases.

Objective of the Module: Understand different microbial diseases and their control through vaccination in animals.

Duration: 70 hours Theory: 14 hours Practice: 56 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction to Microbiology	<ul style="list-style-type: none"> • Orientation to veterinary microbiology. • Apply microbiological terminology by classifying different types of single-celled creature's bacteria according to their 	<ul style="list-style-type: none"> • Microorganisms and their types. • Introduction and importance of bacteria. • Virus and fungi. • Pathogenesis of microbial diseases. 	15 hrs	-Samples of available vaccines for demonstration -Chemicals for laboratory diagnosis of causative pathogens	Class room Laboratory Livestock farm

	systematic names.			-Reference books	
LU-2 Microbiology of Different Diseases	<ul style="list-style-type: none"> • Know the main infectious diseases of livestock and poultry. • Able to explain the microorganisms responsible for these diseases and suggest proper treatment. 	<ul style="list-style-type: none"> • Important infectious diseases of livestock and poultry in Pakistan. • Hemorrhagic Septicemia. • Black quarter. • Enterotoxaemia. • Anthrax. • Mastitis. • Pleuro-pneumonia. 	20 hrs	Samples of available vaccines for demonstration -Chemicals for laboratory diagnosis of causative pathogens -Reference books	Class room Laboratory Livestock farm
LU-3 Microbiology of Different Diseases	<ul style="list-style-type: none"> • Know the economic importance of these infectious diseases. • Can diagnose and treat them properly. 	<ul style="list-style-type: none"> • Important infectious diseases of livestock and poultry in Pakistan. • Gas gangrene. • Abortion. • Post parturient hemoglobin urea. • Foot and mouth disease. • Rinder pest. • New Castle Disease. 	20 hrs	Samples of available vaccines for demonstration -Chemicals for laboratory diagnosis of causative pathogens -Reference books	Class room Laboratory Livestock farm
LU-4 Microbiology of Different Diseases	<ul style="list-style-type: none"> • Have knowledge about the important infectious diseases of livestock and poultry. • Can diagnose these diseases and treat them properly. 	<ul style="list-style-type: none"> • Important infectious diseases of livestock and poultry in Pakistan. • Gumboro. • Hydro pericardium syndrome. 	15 hrs	Samples of available vaccines for demonstration -Chemicals for laboratory diagnosis of causative	Class room Laboratory Livestock farm

		<ul style="list-style-type: none"> • Plorum and Cough. 		pathogens -Reference books	
LU-5 Vaccines	<ul style="list-style-type: none"> • Know vaccines to be used to prevent different diseases and their uses. • Can demonstrate how to store these vaccines. 	<ul style="list-style-type: none"> • Vaccines and vaccination. • Their storage. • Transportation and uses. 	15 hrs	Samples of available vaccines for demonstration -Chemicals for laboratory diagnosis of causative pathogens -Reference books	Class room Laboratory Livestock farm
LU-6 Vaccines Production	<ul style="list-style-type: none"> • Have knowledge about vaccines being produced within country and those being imported from abroad. • Know the vaccines schedule to vaccinate different animals in different seasons. 	<ul style="list-style-type: none"> • Vaccines availability. • Import. • Management and vaccination schedules in different animals. 	15 hrs	Samples of available vaccines for demonstration -Chemicals for laboratory diagnosis of causative pathogens -Reference books	Class room Laboratory Livestock farm

Practical: Sterilization and its types, Use of autoclave and hot air oven, Smear preparation, staining and microscopic examination of microorganisms, Practice of vaccination in animals,

Module 7

Title: Taking preventative measures against parasites, diagnosis of parasitic diseases.

Objective of the Module: Understand different parasitic diseases and demonstrate measures to control parasites.

Duration: 100 hours Theory: 20 hours Practice: 80 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction of Parasitology	<ul style="list-style-type: none"> • Orientation to parasitology. • Understand classification of 	<ul style="list-style-type: none"> • Types of parasites. • Endo-parasites. • Ecto-parasites. • Protozoa. 	20 hrs	-Preserved samples of parasites for identification	Class room Laboratory Livestock farm

	parasites.	<ul style="list-style-type: none"> • Coccidiosis • Amoebiasis. 		<ul style="list-style-type: none"> -Multimedia for classroom use -Removable markers -Chemicals for laboratory analysis -Reference books 	
LU-2 Parasitic Infestation of Different Systems	<ul style="list-style-type: none"> • Explain parasitic infections caused by different parasites. • Diagnose disease by understanding symptoms. 	<ul style="list-style-type: none"> • Gastro-enteritis due to parasites. • Parasites of lungs. • Blood and other organs. 	20 hrs	<ul style="list-style-type: none"> -Preserved samples of parasites for identification -Multimedia for classroom use -Removable markers -Chemicals for laboratory analysis -Reference books 	Class room Laboratory Livestock farm
LU-3 Diseases	<ul style="list-style-type: none"> • Demonstrate the control of these parasites. • Diagnose the disease and explain the treatment for that one. • Explain economic importance of these diseases. 	<ul style="list-style-type: none"> • Disease produced by : • Tick • Lice. • Flies. • Fleas. • Other ecto-parasites. 	20 hrs	<ul style="list-style-type: none"> -Preserved samples of parasites for identification -Multimedia for classroom use -Chemicals for laboratory analysis -Reference books 	Class room Laboratory Livestock farm
LU-4 Dewormers	<ul style="list-style-type: none"> • Have the knowledge about different dewormers available in the market. • Know how to use these dewormers. 	<ul style="list-style-type: none"> • Pharmaceutical classes. • Natural dewormers. • Methods. • Significance. 	20 hrs	<ul style="list-style-type: none"> -Samples of deworming medicines for demonstration -Multimedia for classroom use -Chemicals for laboratory analysis -Reference books 	Class room Laboratory Livestock farm

LU-5 Anti-parasitic Drugs	<ul style="list-style-type: none"> • Know the use of drugs to control parasites. • Demonstrate preventive measures to control parasites. 	<ul style="list-style-type: none"> • Anti-parasitic drugs against internal and external parasites. • Preventive measures against parasites. 	20 hrs	Samples of deworming medicines for demonstration -Multimedia for classroom use -Chemicals for laboratory analysis -Reference books	Class room Laboratory Livestock farm
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Practical: Diagnosis of parasitic diseases through faecal examination. Demonstration on use of different dewormers / antiparasitic drugs against external and internal parasites, preventive measures against parasites (spraying, dipping and oral).

Module 8

Title: Poultry Management

Objective of the Module: Understand poultry feeding, management, disease control and production practices.

Duration: 90 hours Theory: 18 hours Practice: 72 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction of Poultry	<ul style="list-style-type: none"> • Orientation about poultry industry in Pakistan. 	<ul style="list-style-type: none"> • Definition of poultry. • Importance of poultry industry in Pakistan. • Present and future of poultry industry. 	15 hrs	-Multimedia for classroom use -Removable markers and charts -Reference books	Class room Laboratory Livestock farm
LU-2 Breeds and Site Selection	<ul style="list-style-type: none"> • Explain the main breeds of poultry. • Should be able to select proper site and direction. 	<ul style="list-style-type: none"> • Breeds of poultry and their characteristics. • Site selection for poultry form. 	15 hrs	-Birds of available breeds for identification -Reference books	Class room Laboratory Livestock farm
LU-3 Birds Management	<ul style="list-style-type: none"> • Demonstrate proper feeding and watering. • Able to manage broiler and layer flock. 	<ul style="list-style-type: none"> • Care and storage. • Incubation. • Care and management of 	15 hrs	-Egg storage trays for demonstration -Routine medicines used for poultry	Class room Laboratory Livestock farm

		broilers and layers.		birds - Reference books	
LU-4 Meat Production and Housing	<ul style="list-style-type: none"> • Should know space requirement of birds. • Able to select hatchable eggs for incubation. 	<ul style="list-style-type: none"> • Housing of poultry birds. • Feeding of poultry birds. • Incubation • Selection of hatchable eggs 	15 hrs	<ul style="list-style-type: none"> -Multimedia for classroom use -Removable markers and charts -Reference books 	Class room Laboratory Livestock farm
LU-5 Diseases Management	<ul style="list-style-type: none"> • Explain main diseases of poultry. • Should know vaccination schedule and treatment procedure. 	<ul style="list-style-type: none"> • Poultry health. • Prevention from their diseases. 	15 hrs	<ul style="list-style-type: none"> -Vaccines used for poultry birds -Medicines used for poultry birds -Reference books 	Class room Laboratory Livestock farm
LU-6 Poultry Genetics	<ul style="list-style-type: none"> • Demonstrate selection of good laying birds. • Able to cull nonproductive birds. 	<ul style="list-style-type: none"> • Selection of productive birds. • Culling of nonproductive birds. 	15 hrs	<ul style="list-style-type: none"> -Multimedia for classroom use -Removable markers and charts -Reference books 	Class room Laboratory Livestock farm

Note: A kit containing vaccines and medicines for poultry birds may be provided to participants

Practical: Identification of body parts of poultry birds, Identification of different breeds, Selection of eggs for breeding and their storage, Vaccination and medication of poultry birds, debeaking, Internship at poultry farm.

Module 9

Title: Treatment against diseased animals.

Objective of the Module: Demonstrate the diagnosis treatment of sick animals.

Duration: 60 hours Theory: 12 hours Practice: 48 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1	<ul style="list-style-type: none"> • Orientation to veterinary medicines 	<ul style="list-style-type: none"> • History of Veterinary Medicine. 	15 hrs	-Clinical medicines for	Class room Laboratory

Introduction of Veterinary Medicine	and animal diseases.	<ul style="list-style-type: none"> • Animal Health and Disease. 		animal treatment -Chemicals for laboratory analysis -Multimedia for classroom use	Livestock farm
<u>LU-2</u> Diseases Investigation	<ul style="list-style-type: none"> • Diagnose the disease and know the causes of disease. 	<ul style="list-style-type: none"> • Identification of Diseased Animals. • Different Animal Diseases and Causes. 	15 hrs	-Clinical medicines for animal treatment -Chemicals for laboratory analysis -Multimedia for classroom use -Reference books	Class room Laboratory Livestock farm
<u>LU-3</u> Economic Importance of Diseases	<ul style="list-style-type: none"> • Understand the economic losses being caused by that disease. • Can classify infectious and non-infectious diseases. 	<ul style="list-style-type: none"> • Economic importance of diseases. • Classification of diseases (infectious and non-infectious diseases). 	15 hrs	-Clinical medicines for animal treatment -Chemicals for laboratory analysis -Multimedia for classroom use	Class room Laboratory Livestock farm
<u>LU-4</u> Transmission of Diseases	<ul style="list-style-type: none"> • Able to explain the disease transmission from animal to humans and human to animals, and their control. 	<ul style="list-style-type: none"> • Transmission of diseases from animals to humans. • Transmission of diseases from humans to animals. • Prevention and control. 	15 hrs	-Clinical medicines for animal treatment -Chemicals for laboratory analysis -Multimedia for classroom use	Class room Laboratory Livestock farm
<u>LU-5</u> Principles of Treatment	<ul style="list-style-type: none"> • Understand the difference between these diseases clearly and then treat accordingly. 	<ul style="list-style-type: none"> • Indigestion. • Tympani. • Obstruction. • Diarrhea. 	15 hrs	-Clinical medicines for animal treatment -Chemicals for laboratory	Class room Laboratory Livestock farm

				analysis -Multimedia for classroom use	
LU-6 Principles of Treatment	<ul style="list-style-type: none"> • Can diagnose properly and then treat it accordingly. 	<ul style="list-style-type: none"> • Colic. • Pneumonia. • Milk fever. • Hematuria/Hemoglobinurial Red Water. 	15 hrs	<ul style="list-style-type: none"> -Clinical medicines for animal treatment -Chemicals for laboratory analysis -Multimedia for classroom use 	Class room Laboratory Livestock farm

Practical: Clinical examination of animals, Restraining of animals, Drug administration (parenteral, oral), pulse and respiration, temperature, enema.

Module 10

Title: Treatment against bacterial, viral, parasitic and fungal diseases for ill livestock.

Objective of the Module: Understand the disease causative organisms and treatment of animals accordingly.

Duration: 90 hours Theory: 18 hours Practice: 72 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Bacterial Diseases & Their Treatments	<ul style="list-style-type: none"> • Understand the symptoms of each disease diagnose it properly and then treat it accordingly. 	<ul style="list-style-type: none"> • Mastitis. • Hemorrhagic septicemia. • Black quarter. • Strangles. 	15 hrs	<ul style="list-style-type: none"> -Animals at farm -Clinical kit for animal treatment -Multimedia for classroom use -Reference books 	Class room Laboratory Livestock farm
LU-2 Bacterial Diseases & Their Treatments	<ul style="list-style-type: none"> • Know the causes of these diseases, diagnoses and treatment. 	<ul style="list-style-type: none"> • Glanders. • Enteritis. • Tuberculosis. • Enterotoxaemia. 	15 hrs	<ul style="list-style-type: none"> -Chemicals for laboratory analysis --Clinical kit for animal treatment 	Class room Laboratory Livestock farm

		<ul style="list-style-type: none"> • Infectious abortion (brucellosis, vibriosis, leptospirosis). 		<ul style="list-style-type: none"> -Multimedia for classroom use -Reference books 	
LU-3 Viral Diseases & Their Treatments	<ul style="list-style-type: none"> • Demonstrate vaccination schedule of these diseases. • Can diagnose and treat it properly. 	<ul style="list-style-type: none"> • Rabies. • Foot and mouth. • Pox. • Rinder pest. 	15 hrs	<ul style="list-style-type: none"> -Vaccines for large and small ruminants -Chemicals for laboratory analysis --Clinical kit for animal treatment -Multimedia for classroom use -Reference books 	Class room Laboratory Livestock farm
LU-4 Viral Diseases & Their Treatments	<ul style="list-style-type: none"> • Know the symptoms. • Diagnose and treat it properly. 	<ul style="list-style-type: none"> • Hepatitis. • Dysentery. Trypanosomiasis /surra. 	15 hrs	<ul style="list-style-type: none"> -Vaccines for large and small ruminants -Chemicals for laboratory analysis --Clinical kit for animal treatment -Multimedia for classroom use -Reference books 	Class room Laboratory Livestock farm
LU-5 Parasitic Diseases & Their Treatments	<ul style="list-style-type: none"> • Know the preventive measures to control these parasites. • Diagnose and treat these diseases. 	<ul style="list-style-type: none"> • Pruritis. • Endo-parasitism. • Coccidiosis. • Theileriasis. 	15 hrs	<ul style="list-style-type: none"> -Anti-parasitic medicines for demonstration -Chemicals for laboratory analysis --Clinical kit for animal treatment -Multimedia for classroom use -Reference books 	Class room Laboratory Livestock farm
LU-6	• Demonstrate preventive	• Babesiasis.	15 hrs	-Anti-parasitic	Class room

Parasitic Diseases & Their Treatments	measures. • Diagnose and treat these diseases.	• Ring worm. • Deg Nala.		medicines for demonstration -Chemicals for laboratory analysis --Clinical kit for animal treatment -Multimedia for classroom use -Reference books	Laboratory Livestock farm
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Practical: Care of diseased animal, storage of medicines and vaccines, collection of samples (milk, urine, faeces, pus), record keeping of hospital data, Importance and uses of disinfectants.

Module 11

Title: Perform Minor Veterinary Surgery

Objective of the Module: Demonstrate minor surgeries and post operative care.

Duration: 90 hours Theory: 18 hours Practice: 72 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction of Veterinary Surgery	• Understand and treat the wounds.	• Importance of surgery wound and its types. • Treatment of wounds.	15 hrs	-Surgical instruments -Suturing threads -Bandages -Clinical medicines -Thermometer -Reference books	Class room Laboratory Livestock farm
LU-2 Treatments of Different Ailments	• Can operate and treat different ailments of livestock.	• Tumor. • Ulcer. • Abscess. • Hernia.	15 hrs	-Surgical instruments -Suturing threads -Bandages -Clinical medicines -Thermometer -Reference books	Class room Laboratory Livestock farm
LU-3 Hemorrhage Arrest	• Explain how to sterilize surgical instruments.	• Methods of hemorrhage arrest.	15 hrs	-Surgical instruments	Class room Laboratory

and Sterilization		<ul style="list-style-type: none"> • Sterilization of surgical instruments. 		<ul style="list-style-type: none"> -Suturing threads -Bandages -Clinical medicines -Autoclave for sterilization -Reference books 	Livestock farm
LU-4 Preparation of Patient	<ul style="list-style-type: none"> • Demonstrate surgery site preparation and material required for surgery. 	<ul style="list-style-type: none"> • Preparation of patient and site for surgery. • Suture material and its types. 	15 hrs	<ul style="list-style-type: none"> -Surgical instruments -Suturing threads -Bandages -Clinical medicines -Reference books 	Class room Laboratory Livestock farm
LU-5 Post Operative Care	<ul style="list-style-type: none"> • Understand the post operative care and treatment. 	<ul style="list-style-type: none"> • Post operative care of animals. • Lameness and its treatment. 	15 hrs	<ul style="list-style-type: none"> -Surgical instruments -Suturing threads -Bandages -Clinical medicines -Thermometer -Reference books 	Class room Laboratory Livestock farm
LU-6 Diagnosis and Surgical Treatment	<ul style="list-style-type: none"> • Able to explain hoof infection and its treatment. • Demonstrate first aid to fractured bone. 	<ul style="list-style-type: none"> • Diagnosis and treatment of hoof infections. • Bone fracture and its first aid. 	15 hrs	<ul style="list-style-type: none"> -Surgical instruments -Suturing threads -Plaster bandages -Bandages -Clinical medicines -Reference books 	Class room Laboratory Livestock farm

Note: Animal treatment kit for the participants

Practical: Principles and methods of wound dressings, introduction to the suture material. Wound suturing, administration of drug by injection, oral drug administration in animals including stomach tube method, Care and use of routine instruments, Helping the animal in dystokia and complication of parturition, preparation of animal for operation, post operative care of the animal, first aid in bone fracture, treatment of snake bite..

Module 12

Title: Managing Animal Nutrition

Objective of the Module: Understand nutrient requirement of animals and, balanced and economical ration formulation.

Duration: 150 hours Theory: 30 hours Practice: 120 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction of Animal Nutrition	<ul style="list-style-type: none">• Orientation to animal nutrition• Able to identify different feed resources.• Apply this Classification when formulating a ration.	<ul style="list-style-type: none">• Basic terms used in animal nutrition.• Feed resources and their classification.	25 hrs	-Samples of all feed ingredients for identification	Class room Laboratory Livestock farm
LU-2 Introduction to Essential Nutriment	<ul style="list-style-type: none">• Able to explain the nutrient availability to animals.• Can explain the nutrient requirement for growing and lactating animals.• Nutrient classification may be used for ration formulation.	<ul style="list-style-type: none">• Digestive processes in different species of farm animals and poultry.• Introduction to essential nutriment and their classification.• Nutrition in relation to maintenance, growth and production.	25 hrs	-Multimedia for classroom -Chemicals for laboratory -Samples of essential nutrients for identification -Reference books	Class room Laboratory Livestock farm
LU-3 Digestion and absorption of nutrients	<ul style="list-style-type: none">• Able to explain digestion and absorption process of different nutrients in ruminants and poultry.	<ul style="list-style-type: none">• Digestion.• Absorption and utilization of protein. Carbohydrate and fat in different classes of animals	25 hrs	-Multimedia for classroom -Chemicals for laboratory -Samples of essential nutrients for identification	Class room Laboratory Livestock farm

				-Reference books	
LU-4 Minerals and Vitamins	<ul style="list-style-type: none"> • Can demonstrate the role of minerals and vitamins for growth and production of livestock and poultry. • Can explain the nutrient requirements for livestock and poultry. 	<ul style="list-style-type: none"> • Sources of minerals and vitamins. • Role of minerals and vitamins in different classes of livestock and poultry. • Nutrients requirement of cattle, buffalo, sheep, goat, camel and horses for maintenance, growth production and reproduction. 	25 hrs	<ul style="list-style-type: none"> -Multimedia for classroom -Chemicals for laboratory - of essential nutrients f identification -Reference books 	Class room Laboratory Livestock farm
LU-5 Nutritional Management of Dairy Animals	<ul style="list-style-type: none"> • Can explain the reasons for low intake and digestion. • Able to demonstrate the nutrient requirements of small and large ruminants. • Demonstrate least cost feed formulation. 	<ul style="list-style-type: none"> • Introduction to factors affecting feed intake and digestibility. • Feeding management of dairy animals at different physiological stages. • Importance of nutrients composition of ingredient used in feed formulation. • Feeding practices of small ruminants. 	25 hrs	<ul style="list-style-type: none"> -Multimedia for classroom -Chemicals for laboratory use -Feed ingredients for ration formulation -Reference books 	Class room Laboratory Livestock farm
LU-6 Feeding Problems and Nutritional Disorders	<ul style="list-style-type: none"> • Can explain use of non conventional feed resources to livestock. • Understand nutritional 	<ul style="list-style-type: none"> • Introduction of non-conventional feed resources. • Principles of 	25 hrs	<ul style="list-style-type: none"> -Multimedia for classroom -Chemicals for 	Class room Laboratory Livestock farm

	deficiency diseases and their cure. <ul style="list-style-type: none"> • Demonstrate toxic compounds of feed ingredients. 	supplementation. <ul style="list-style-type: none"> • Feeding problems and nutritional disorders in livestock and poultry. • Identification of toxic compounds of feed stuffs and detoxification. 		laboratory use <ul style="list-style-type: none"> -Samples of essential nutrients f identification -Reference books 	
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Practical: Identification and physical characteristics of different feed stuffs, Formulation of least cost balanced rations for different classes of farm animals and poultry, introduction of different components of feed mill and feed preparation, treatment of crop residues, preparation of multi nutrients feed block. Use of feed additives, antibiotics, antioxidants and enzymes.

Module 13

Title: Managing Animal Reproduction

Objective of the Module: Demonstrate heat detection, insemination, pregnancy diagnosis and treatment of reproductive disorders.

Duration: 120 hours Theory: 24 hours Practice: 96 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Female Reproductive System	<ul style="list-style-type: none"> • Explain organs of female reproductive system. • Demonstrate importance and functions of hormones secreted from different parts of body to be used in reproductive process. 	<ul style="list-style-type: none"> • Functional anatomy of female reproductive system. • Endocrinology of reproduction. • Hormones of the hypothalamus, pituitary, ovary, testis, uterus and placenta. 	20 hrs	<ul style="list-style-type: none"> -Animals at the farm -Pull over dress (Dangries for all participants and teachers) -Disposable long gloves for animal palpation -Multimedia facility -Reference books 	Class room Laboratory Livestock farm
LU-2 Puberty and Breeding	<ul style="list-style-type: none"> • Can explain the factors affecting the puberty in the dairy animals 	<ul style="list-style-type: none"> • Factors affecting onset of puberty in dairy animals. 		<ul style="list-style-type: none"> -Animals at the farm -Multimedia in 	Class room Laboratory Livestock farm

Seasons	<ul style="list-style-type: none"> • Know the breeding season of different livestock species. 	<ul style="list-style-type: none"> • Breeding season • Physiology of estrus cycle and its phases: pro-estrus, estrus, met-estrus and di-estrus. 		<p>classroom</p> <ul style="list-style-type: none"> -Reference books 	
LU-3 Estrus Cycle	<ul style="list-style-type: none"> • Know the estrus signs and can detect the animal in heat. 	<ul style="list-style-type: none"> • Behavioral signs of estrus • Physiological changes in the ovaries and uterus during estrus cycle. • Methods of estrus detection. • Estrus detection aids. 	20 hrs	<ul style="list-style-type: none"> -Animals at the farm -Disposable long gloves for palpation -Long rubber shoes -Insemination kit -Reference books 	Class room Laboratory Livestock farm
LU-4 Insemination and Pregnancy Management	<ul style="list-style-type: none"> • Demonstrate pregnancy diagnosis • Know the management practices at the time of parturition • Can explain and treat postpartum diseases 	<ul style="list-style-type: none"> • Time of insemination/service • Pregnancy diagnosis methods. • Care and management of dairy animals at parturition. • Diseases and accidents of postpartum period: uterine prolapse, retention of fetal membrane, postpartum infections. 	20 hrs	<ul style="list-style-type: none"> -Animals at the farm -Disposable long gloves for palpation -Long rubber shoes -Insemination kit -Reference books 	Class room Laboratory Livestock farm
LU-5 Reproductive Problems	<ul style="list-style-type: none"> • Understand the use of artificial insemination. • Demonstrate how to inseminate the animal. 	<ul style="list-style-type: none"> • Management of reproductive problems of non pregnant females. 	20 hrs	<ul style="list-style-type: none"> -Animals at the farm -Disposable long 	Class room Laboratory Livestock farm

		<ul style="list-style-type: none"> • Modern concept of artificial insemination and its historical background. • History, development and scope of artificial insemination in Pakistan and its future vision. • Advantages and limitations of artificial insemination. 		<p>gloves for palpation</p> <ul style="list-style-type: none"> -Long rubber shoes -Insemination kit -Chemicals for semen processing and preservation -Reference books 	
<p>LU-6</p> <p>Male Reproductive System</p>	<ul style="list-style-type: none"> • Should know how to collect semen. • Should know preservation of semen by using extenders • Understand storage, transportation and thawing of deep frozen semen. • Can handle liquid and frozen semen in the field. 	<ul style="list-style-type: none"> • Functional anatomy of male reproductive system. • Criteria for the selection of breeding bull. • Semen and seminal plasma. • Methods of semen collection. • Gross and microscopic examination of semen. • Extenders used for semen preservation. • Advance techniques in semen preservation for long term use. • Storage, transport and thawing of deep frozen semen. 	20 hrs	<ul style="list-style-type: none"> -Animals at the farm -Disposable long gloves for palpation -Long rubber shoes Insemination kit -Semen collection kit -Liquid nitrogen cylinders -Reference books 	<p>Class room</p> <p>Laboratory</p> <p>Livestock farm</p>

		<ul style="list-style-type: none"> • Handling of liquid and frozen semen in the field • Common reproductive diseases affecting male animals. • Factors affecting conception rate in artificial insemination. 			
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Note: Artificial insemination kit for the participants

Practical: Palpation of male and female reproductive organs, Recording external and internal changes during estrus in dairy animals, Estrus detection through rectal palpation, Diagnosis of pregnancy through rectal palpation, Infertility examination of dairy animals, Preparation of breeding bull for semen collection, Preparation of semen extenders, Collection of semen, Handling and extension of semen, Preparation of insemination equipments, Practice of artificial insemination, Clinical case recording.

Module 14

Title: Manage breeding and genetics of Livestock

Objective of the Module: Demonstrate heat detection, insemination, pregnancy diagnosis and treatment of reproductive disorders.

Duration: 40 hours Theory: 8 hours Practice: 32 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<u>LU-1</u> Breeding Management	<ul style="list-style-type: none"> • Detect the animal in heat • Inseminate or breed the animal at proper time. • Know the effect of environmental stress on onset of heat. 	<ul style="list-style-type: none"> • Heat detection. • Methods of animal breeding. • Effects of environmental and genetic variations. 	20 hrs	Animals at the farm Good set of data Good computer for data analysis Reference books	Class room Laboratory Livestock farm
<u>LU-2</u>	<ul style="list-style-type: none"> • Demonstrate the 	<ul style="list-style-type: none"> • Concept of proven 	20 hrs	Computer and good software	Class room Laboratory

Selection of Animals	importance of proven sire/bull to be used for breeding. • Able to maintain the progeny record to select the best animals.	breeding sire/bull. • Progeny testing.		programs for data analysis Good quality animals at the farm	Livestock farm
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Practical: Demonstration on identification of different breeds of animals, Record keeping by using software / computer, Selection of good quality breed's males and females for further breeding.

Module 15

Title: Economics of livestock production and marketing

Objective of the Module: Develop annual business plan and marketing strategies.

Duration: 90 hours Theory: 18 hours Practice: 72 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Introduction to livestock economics	• Orientation to agriculture/livestock economics	• Basic terms used in livestock economics	15 hrs	Calculators, computers/ computer programs Reference books	
LU-2 Marketing system of Livestock and its produce in Pakistan	• Be able to understand marketing of livestock, its products and bi-products.	• Animal marketing • Milk marketing • Beef and Mutton marketing • Hide and skin marketing	15 hrs	Calculators, computers/ computer programs Vehicles for timely access to market Reference books	Class room Laboratory Livestock farm
LU-3 Application of economic principles in development of annual business plan	• Be able to develop annual business plan. • Able to decide the type and number of animals	• Development of annual business plan • Determine the type and number of animals according to resource availability	15 hrs	Calculators, computers/ computer programs Vehicles for timely access to market Reference books	Class room Laboratory Livestock farm

<p>LU-4 Problems of livestock marketing systems and its impact on the economy</p>	<ul style="list-style-type: none"> • Can demonstrate the live marketing problems • Be able to understand the negative impact of marketing problems on farmer/national economy 	<ul style="list-style-type: none"> • Livestock marketing problems • Negative impact on economy 	15 hrs	Calculators, computers/ computer programs Vehicles for timely access to market Reference books	Class room Laboratory Livestock farm
<p>LU-5 International marketing systems and their advantages over conventional marketing systems of Pakistan</p>	<ul style="list-style-type: none"> • Should have knowledge about the international marketing system • Should be able to compare the international and conventional marketing system 	<ul style="list-style-type: none"> • International marketing systems of livestock. • Advantages of international marketing system over conventional system. 	15 hrs	System for access to international markets Vehicles for timely access to market Reference books	Class room Laboratory Livestock farm
<p>LU-6 Cost-benefits analysis sheet and net return per unit adult animal</p>	<ul style="list-style-type: none"> • Should be able to prepare cost-benefits analysis sheet • Able to calculate net return per unit adult animal 	<ul style="list-style-type: none"> • Cost-benefits analysis sheet. • How to calculate net return per unit adult animal. 	15 hrs	Calculators, computers/ good computing programs Reference books	Class room Laboratory Livestock farm

Practical:

i) Calculation of production cost and profit, ii) Survey of animal markets iii) Calculation of cost-benefit ratio, iv) Visits to commercial livestock farms, Preparation of balance sheet.

Module 16

Title: Maintain farm machinery and equipment

Objective of the Module: Understand the operation of farm machinery and its maintenance.

Duration: 60 hours Theory: 12 hours Practice: 48 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<u>LU-1</u> Manage various kinds of farm machinery	<ul style="list-style-type: none">• Able to know good models/designs of various kinds of farm machinery, their prices and availability in order to get appropriate machinery on economical rates	<ul style="list-style-type: none">• Tractors/Trolleys• Tube-wells/ pumps• Land preparation and sowing/ drilling machines• Threshers• Combined harvesters• Sprayers/ Dusting machines• Seed cleaners/ separators	15 hrs	All equipment/ machines given in column 03 of this row Sufficient field area for practical Reference books	Class room Laboratory Livestock farm
<u>LU-2</u> Primary & secondary tillage for proper seedbed preparation	<ul style="list-style-type: none">• Able to manage proper land preparation of various kinds of soils for various kinds of fodder crops using proper tilling machines/ tools	<ul style="list-style-type: none">• Cultivators• Chisel Plow• Moldboard• Rotavator• Disc Plow• Zero-till• Diggers/ Ridgers• Others	15 hrs	All equipment/ machines given in column 03 of this row Sufficient field area for practical Reference books	Class room Laboratory Livestock farm
<u>LU-3</u> Harvesting and threshing machinery	<ul style="list-style-type: none">• Able to know/operate/ maintain various machines involved in harvest of various fodder crops	<ul style="list-style-type: none">• Various machines/ models suitable for different cereal crops• Harvester/ threshers for other crops	15 hrs	All equipment/ machines given in column 03 of this row Sufficient field area for practical Reference books	Class room Laboratory Livestock farm

<p>LU-4</p> <p>Care/repair/maintenance and calibration of machinery</p>	<ul style="list-style-type: none"> • Able to understand mechanisms and working of these machines and able to maintain and do minor repair/ calibration of machines and their tools 	<ul style="list-style-type: none"> • Tractors • Tillage machines • Harvesters • Threshers • Seeding/ other drills 	<p>15 hrs</p>	<p>All equipment/ machines given in column 03 of this row</p> <p>Sufficient field area for practical</p> <p>Fertilizers</p> <p>Reference books</p>	<p>Class room</p> <p>Laboratory</p> <p>Livestock farm</p>
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Practical:

i) Identification of various farm machinery, equipments, and tools. Demonstration on working/ operation of various equipment, iii) Study of farm field operation of selected farm machines, iv) Calibration of seed drills, planters, sprayer, fertilizer distributors, v) Minor repair of tractor and other implements, and vi) Determination of farm machinery requirement for various sizes of farms. Demonstration on chopper machine for silage preparation. Demonstration on milking machine.

4. Assessment Template

Module 1: Identification of body parts of domestic animals

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
<u>LU-1</u> Introduction to Anatomy	2 hrs	8 hrs	<ul style="list-style-type: none"> • History. • Definitions. • Importance. 	<ul style="list-style-type: none"> -Round table discussion -Presentation -Team discussion 	
<u>LU-2</u> Skeletal System	2 hrs	8 hrs	<ul style="list-style-type: none"> • Types. • Functions. • Comparative studies of skeletons of domestic animals. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation or Team discussion 	
<u>LU-3</u> Joints	2 hrs	8 hrs	<ul style="list-style-type: none"> • Types. • Movements. • Functions. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation or Team discussion 	
<u>LU-4</u> Respiratory and Blood Vascular System.	2 hrs	8 hrs	<ul style="list-style-type: none"> • Anatomical comparisons of respiratory and blood vascular systems of domestic animals. 	<ul style="list-style-type: none"> -Presentation or Team discussion 	
<u>LU-5</u> Digestive System	2 hrs	8 hrs	<ul style="list-style-type: none"> • Anatomical comparisons of digestive systems of domestic animals. 	<ul style="list-style-type: none"> -Presentation or Team discussion 	
<u>LU-6</u> Reproductive System	2 hrs	8 hrs	<ul style="list-style-type: none"> • Female reproductive organs. • Male reproductive organs. 	<ul style="list-style-type: none"> -Presentation or Team discussion -Presentation 	

Module 2: Scope of Physiology in Ruminants

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction of Physiology	3 hrs	12 hrs	<ul style="list-style-type: none"> • History. • Definition. • Functions and importance. 	-Team discussion -Presentation Team discussion	
LU-2 Functions of Digestive System of Ruminants	3 hrs	12 hrs	<ul style="list-style-type: none"> • Functions in domestic animals. • Ruminant and non ruminant stomach. • Microbial fermentation in ruminants. • Digestion and absorption in small and large intestine. 	-Team discussion -Presentation -Team discussion -Round table discussion	
LU-3 Respiratory System.	3 hrs	12 hrs	<ul style="list-style-type: none"> • Physiology of respiration. • Function of lungs in respiration. 	-Presentation or Team discussion -Round table discussion	
LU-4 Functions of Reproductive System	4 hrs	16 hrs	<ul style="list-style-type: none"> • Functions of uterus, uterine horns and ovaries. • Functions of male reproductive organs. 	-Team discussion -Presentation	

Module 3: Prescribe, prepare and administer medicine in correct proportions.

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction of Pharmacology	4 hrs	16 hrs	<ul style="list-style-type: none"> • Definitions. • Branches. • Drug sources. • Drug residues. 	-Team discussion -Presentation -Team discussion -Presentation	

LU-2 Drug Administration in Animals	4 hrs	16 hrs	<ul style="list-style-type: none"> • Routes. • Methods. • Advantages and disadvantages. 	<ul style="list-style-type: none"> -Presentation -Presentation -Team discussion 	
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Module 4: Livestock care and management

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction to Livestock	6 hrs	24 hrs	<ul style="list-style-type: none"> • History and importance of food animals. • Important breeds of animals. • Identification of good quality animals. • Construction and management of animal sheds on scientific basis in order to avoid diseases and external parasites. 	<ul style="list-style-type: none"> -Round table discussion -Presentation -Presentation -Team discussion 	
LU-2 Management of young calves, tagging and Casting of animals	6 hrs	24 hrs	<ul style="list-style-type: none"> • Care and management of neonates and pregnant animals. • Animals breeding procedures. • Tagging and tattooing of animals. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Round table discussion 	
LU-3 Production Management of dairy and beef animals	6 hrs	24 hrs	<ul style="list-style-type: none"> • Dipping/spraying of animals to control external parasites. • Flushing and shearing. • Hygienic milk production and handling. • Quality and economical beef production 	<ul style="list-style-type: none"> -Team discussion -Team discussion -Round table discussion -Presentation 	

<u>LU-4</u> Management of sheep and goat for milk and mutton production.	6 hrs	24 hrs	<ul style="list-style-type: none"> • Dipping/spraying of animals to control external parasites. • Flushing and shearing. • Hygienic milk production and handling. • Quality and economical mutton production 	<ul style="list-style-type: none"> -Team discussion -Team discussion -Round table discussion -Presentation 	
<u>LU-5</u> Record Keeping	5 hrs	20 hr	<ul style="list-style-type: none"> • Preparation of herd book. • Methods of selection of better animals. 	<ul style="list-style-type: none"> -Team discussion -Presentation 	
<u>LU-6</u> Fodder production and preservation	6 hrs	24 hrs	<ul style="list-style-type: none"> • Fodder classification according to sowing season • Importance of hay and silage. • Use of various agro-industrials by products in livestock and poultry. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation 	

Module 5: Examine animals to detect illness

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
<u>LU-1</u> Introduction to Pathology	3 hrs	12 hrs	<ul style="list-style-type: none"> • History. • Definitions. • Branches. • Importance. 	<ul style="list-style-type: none"> -Team discussion -Team discussion -Presentation -Team discussion 	
<u>LU-2</u>	3 hrs	12 hrs	<ul style="list-style-type: none"> • Postmortem of various animals. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	

Postmortem			<ul style="list-style-type: none"> • Significance. • Forensic autopsy. • Clinical autopsy. 	<ul style="list-style-type: none"> -Team discussion -Presentation 	
LU-3 Lesions	3 hrs	12 hrs	<ul style="list-style-type: none"> • Types. • Causes. • Internal lesions and their pathogenesis. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation 	
LU-4 Inflammation	3 hrs	12 hrs	<ul style="list-style-type: none"> • Types. • Causes. • Exudative components. • Cellular components. • Inflammatory disorders. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Team discussion -Presentation -Team discussion 	
LU-5 Ulcer	3 hrs	12 hrs	<ul style="list-style-type: none"> • Types. • Causes. • Pathogenesis and diagnosis. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation 	

Module 6: Vaccination of livestock and diagnosis of Microbial diseases.

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction to Microbiology	3 hrs	12 hrs	<ul style="list-style-type: none"> • Microorganisms and their types. • Introduction and importance of bacteria. • Virus and fungi. • Pathogenesis of microbial diseases. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Team discussion 	
LU-2 Microbiology of Different Diseases	4 hrs	16 hrs	<ul style="list-style-type: none"> • Important infectious diseases of livestock and poultry in Pakistan. • Hemorrhagic Septicemia. • Black quarter. • Enterotoxaemia. • Anthrax. • Mastitis. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion 	

			<ul style="list-style-type: none"> • Pleuro-pneumonia. 	-Team discussion	
LU-3 Microbiology of Different Diseases	4 hrs	16 hrs	<ul style="list-style-type: none"> • Important infectious diseases of livestock and poultry in Pakistan. • Gas gangrene. • Abortion. • Post parturient hemoglobin urea. • Foot and mouth disease. • Rinder pest. • New Castle Disease. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion -Team discussion 	
LU-4 Microbiology of Different Diseases	3 hrs	12 hrs	<ul style="list-style-type: none"> • Important infectious diseases of livestock and poultry in Pakistan. • Gumboro. • Hydro pericardium syndrome. • Plorum and Cough. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
LU-5 Vaccines	3 hrs	12 hrs	<ul style="list-style-type: none"> • Vaccines and vaccination. • Their storage. • Transportation and uses. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Team discussion 	
LU-6 Vaccines Production	3 hrs	12 hrs	<ul style="list-style-type: none"> • Vaccines availability. • Import. • Management and vaccination schedules in different animals. 	<ul style="list-style-type: none"> Team discussion -Presentation -Team discussion 	

Module 7: Taking preventative measures against parasites, diagnosis of parasitic diseases

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1	4 hrs	16 hrs	<ul style="list-style-type: none"> • Types of parasites. • Endo-parasites. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	

Introduction of Parasitology			<ul style="list-style-type: none"> • Ecto-parasites. • Protozoa. • Coccidiosis • Amoebiasis. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
LU-2 Parasitic Infestation of Different Systems	4 hrs	16 hrs	<ul style="list-style-type: none"> • Gastro-enteritis due to parasites. • Parasites of lungs. • Blood and other organs. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Team discussion 	
LU-3 Diseases	4 hrs	16 hrs	<ul style="list-style-type: none"> • Disease produced by : • Tick • Lice. • Flies. • Fleas. • Other ecto-parasites. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Team discussion -Team discussion -Presentation -Team discussion 	
LU-4 Dewormers	4 hrs	16 hrs	<ul style="list-style-type: none"> • Pharmaceutical classes. • Natural dewormers. • Methods. • Significance. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
LU-5 Anti-parasitic Drugs	4 hrs	16 hrs	<ul style="list-style-type: none"> • Anti-parasitic drugs against internal and external parasites. • Preventive measures against parasites. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	

Module 8: Poultry Management

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction of Poultry	3 hrs	12 hrs	<ul style="list-style-type: none"> • Definition of poultry. • Importance of poultry industry in Pakistan. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	

			<ul style="list-style-type: none"> • Present and future of poultry industry. 	-Presentation	
<u>LU-2</u> Breeds and Site Selection	3 hrs	12 hrs	<ul style="list-style-type: none"> • Breeds of poultry and their characteristics. • Site selection for poultry form. 	-Presentation -Team discussion	
<u>LU-3</u> Birds Management	3 hrs	12 hrs	<ul style="list-style-type: none"> • Care and storage. • Incubation. • Care and management of broilers and layers. 	-Presentation -Team discussion -Presentation	
<u>LU-4</u> Meat Production and Housing	3 hrs	12 hrs	<ul style="list-style-type: none"> • Housing of poultry birds. • Feeding of poultry birds. • Incubation • Selection of hatch able eggs 	-Presentation -Team discussion -Presentation -Team discussion	
<u>LU-5</u> Diseases Management	3 hrs	12 hrs	<ul style="list-style-type: none"> • Poultry health. • Prevention from their diseases. 	-Presentation -Team discussion	
<u>LU-6</u> Poultry Genetics	3 hrs	12 hrs	<ul style="list-style-type: none"> • Selection of productive birds. • Culling of nonproductive birds. 	-Presentation -Team discussion	

Module 9: Treatment against diseased animals

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
<u>LU-1</u>	3 hrs	12 hrs	<ul style="list-style-type: none"> • History of Veterinary Medicine. • Animal Health and Disease. 	-Presentation -Team discussion	

Introduction of Veterinary Medicine					
LU-2 Diseases Investigation	3 hrs	12 hrs	<ul style="list-style-type: none"> • Identification of Diseased Animals. • Different Animal Diseases and Causes. 	-Presentation -Team discussion	
LU-3 Economic Importance of Diseases	3 hrs	12 hrs	<ul style="list-style-type: none"> • Economic importance of diseases. • Classification of diseases (infectious and non-infectious diseases). 	-Presentation -Team discussion	
LU-4 Transmission of Diseases	3 hrs	12 hrs	<ul style="list-style-type: none"> • Transmission of diseases from animals to humans. • Transmission of diseases from humans to animals. • Prevention and control. 	-Team discussion -Presentation -Team discussion	
LU-5 Principles of Treatment	3 hrs	12 hrs	<ul style="list-style-type: none"> • Indigestion. • Tympani. • Obstruction. • Diarrhea. 	-Presentation -Team discussion -Presentation -Team discussion	
LU-6 Principles of Treatment	3 hrs	12 hrs	<ul style="list-style-type: none"> • Colic. • Pneumonia. • Milk fever. • Hematuria/Hemoglobinurial Red Water. 	-Presentation -Team discussion -Presentation -Team discussion	

Module 10: Treatment against bacterial, viral, parasitic and fungal diseases for ill livestock.

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Bacterial Diseases & Their Treatments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Mastitis. • Hemorrhagic septicemia. • Black quarter. • Strangles. 	-Presentation -Team discussion -Presentation -Team discussion	

LU-2 Bacterial Diseases & Their Treatments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Glanders. • Enteritis. • Tuberculosis. • Enterotoxaemia. • Infectious abortion (brucellosis, vibriosis, leptospirosis). 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion -Round table discussion 	
LU-3 Viral Diseases & Their Treatments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Rabies. • Foot and mouth. • Pox. • Rinder pest. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
LU-4 Viral Diseases & Their Treatments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Hepatitis. • Dysentery. • Trypanosomiasis /surra. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Team discussion 	
LU-5 Parasitic Diseases & Their Treatments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Pruritis. • Endo-parasitism. • Coccidiosis. • Theileriasis. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
LU-6 Parasitic Diseases & Their Treatments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Babesiasis. • Ring worm. • Deg Nala. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Team discussion 	

Module 11: Perform Minor Veterinary Surgery

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction of Veterinary Surgery	3 hrs	13 hrs	<ul style="list-style-type: none"> • Importance of surgery wound and its types. • Treatment of wounds. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	
LU-2 Treatments of Different Ailments	3 hrs	12 hrs	<ul style="list-style-type: none"> • Tumor. • Ulcer. • Abscess. • Hernia. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	

LU-3 Hemorrhage Arrest and Sterilization	3 hrs	12 hrs	<ul style="list-style-type: none"> • Methods of hemorrhage arrest. • Sterilization of surgical instruments. 	-Presentation -Team discussion	
LU-4 Preparation of Patient	3 hrs	12 hrs	<ul style="list-style-type: none"> • Preparation of patient and site for surgery. • Suture material and its types. 	-Presentation -Team discussion	
LU-5 Post Operative Care	3 hrs	12 hrs	<ul style="list-style-type: none"> • Post operative care of animals. • Lameness and its treatment. 	-Presentation -Team discussion	
LU-6 Diagnosis and Surgical Treatment	3 hrs	12 hrs	<ul style="list-style-type: none"> • Diagnosis and treatment of hoof infections. • Bone fracture and its first aid. 	-Presentation -Team discussion	

Module 12: Managing Animal Nutrition

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction of Animal Nutrition	5 hrs	20 hrs	<ul style="list-style-type: none"> • Basic terms used in animal nutrition. • Feed resources and their classification. 	-Presentation -Team discussion	
LU-2 Introduction to Essential Nutriment	5 hrs	20 hrs	<ul style="list-style-type: none"> • Digestive processes in different species of farm animals and poultry. • Introduction to essential nutriment and their classification. • Nutrition in relation to maintenance, growth and production. 	-Presentation -Team discussion -Presentation	
LU-3 Digestion and absorption of nutrients	5 hrs	20 hrs	<ul style="list-style-type: none"> • Digestion. • Absorption and utilization of protein, Carbohydrate and fat in different classes of animals 	-Presentation -Team discussion	

<u>LU-4</u> Minerals and Vitamins	5 hrs	20 hrs	<ul style="list-style-type: none"> • Sources of minerals and vitamins. • Role of minerals and vitamins in different classes of livestock and poultry. • Nutrients requirement of cattle, buffalo, sheep, goat, camel and horses for maintenance, growth production and reproduction. 	-Presentation -Team discussion -Presentation	
<u>LU-5</u> Nutritional Management of Dairy Animals	5 hrs	20 hrs	<ul style="list-style-type: none"> • Introduction to factors affecting feed intake and digestibility. • Feeding management of dairy animals at different physiological stages. • Importance of nutrients composition of ingredient used in feed formulation. • Feeding practices of small ruminants. 	-Presentation -Team discussion -Presentation -Team discussion	
<u>LU-6</u> Feeding Problems and Nutritional Disorders	5 hrs	20 hrs	<ul style="list-style-type: none"> • Introduction of non-conventional feed resources. • Principles of supplementation. • Feeding problems and nutritional disorders in livestock and poultry. • Identification of toxic compounds of feed stuffs and detoxification. 	-Presentation -Team discussion -Presentation -Team discussion	

Module 13: Managing Animal Reproduction

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
<u>LU-1</u> Female Reproductive System	4 hrs	16 hrs	<ul style="list-style-type: none"> • Functional anatomy of female reproductive system. • Endocrinology of reproduction. • Hormones of the hypothalamus, pituitary, ovary, testis, uterus and placenta. 	<ul style="list-style-type: none"> -Team discussion -Presentation -Team discussion 	
<u>LU-2</u> Puberty and Breeding Seasons	4 hrs	16 hrs	<ul style="list-style-type: none"> • Factors affecting onset of puberty in dairy animals. • Breeding season • Physiology of estrus cycle and its phases: pro-estrus, estrus, met-estrus and di-estrus. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation 	
<u>LU-3</u> Estrus Cycle	4 hrs	16 hrs	<ul style="list-style-type: none"> • Behavioral signs of estrus • Physiological changes in the ovaries and uterus during estrus cycle. • Methods of estrus detection. • Estrus detection aids. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
<u>LU-4</u> Insemination and Pregnancy Management	4 hrs	16 hrs	<ul style="list-style-type: none"> • Time of insemination/service • Pregnancy diagnosis methods. • Care and management of dairy animals at parturition. • Diseases and accidents of postpartum period: uterine prolapse, retention of fetal membrane, postpartum infections. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion 	
<u>LU-5</u> Reproductive Problems	4 hrs	16 hrs	<ul style="list-style-type: none"> • Management of reproductive problems of non pregnant females. • Modern concept of artificial insemination and its historical background. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	

			<ul style="list-style-type: none"> • History, development and scope of artificial insemination in Pakistan and its future vision. • Advantages and limitations of artificial insemination. 	<ul style="list-style-type: none"> -Presentation -Team discussion 	
<u>LU-6</u> Male Reproductive System	4 hrs	16 hrs	<ul style="list-style-type: none"> • Functional anatomy of male reproductive system. • Criteria for the selection of breeding bull. • Semen and seminal plasma. • Methods of semen collection. • Gross and microscopic examination of semen. • Extenders used for semen preservation. • Advance techniques in semen preservation for long term use. • Storage, transport and thawing of deep frozen semen. • Handling of liquid and frozen semen in the field • Common reproductive diseases affecting male animals. • Factors affecting conception rate in artificial insemination. 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion -Presentation 	

Module 14: Manage breeding and genetics of Livestock

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Principles of Breeding Management	4 hrs	16 hrs	<ul style="list-style-type: none"> • Methods of animal breeding. • Effects of environmental and genetic variations. 	-Presentation -Team discussion	
LU-2 Selection of Animals	4 hrs	16 hrs	<ul style="list-style-type: none"> • Concept of rearing proven breeding sires/bulls. • Progeny testing. 	-Presentation -Team discussion	

Module-15: Economics of livestock production and marketing

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Introduction to livestock economics	3 hrs	12 hrs	<ul style="list-style-type: none"> • Basic terms used in livestock economics 	-Round table discussion	
LU-2 Marketing system of Livestock and its produce in Pakistan	3 hrs	12 hrs	<ul style="list-style-type: none"> • Animal marketing • Milk marketing • Beef and Mutton marketing • Hide and skin marketing 	-Presentation -Team discussion -Presentation -Team discussion	
LU-3 Application of economic principles in development of annual business plan	3 hrs	12 hrs	<ul style="list-style-type: none"> • Development of annual business plan • Determine the type and number of animals according to resource availability 	-Presentation -Team discussion	
LU-4 Problems of livestock marketing systems and its impact on the	3 hrs	12 hrs	<ul style="list-style-type: none"> • Livestock marketing problems • Negative impact on economy 	-Round table discussion -Presentation	

economy					
LU-5 International marketing systems and their advantages over conventional marketing systems of Pakistan	3 hrs	12 hrs	<ul style="list-style-type: none"> • International marketing systems of livestock? • Advantages of international marketing system over conventional system? 	-Presentation -Team discussion	
LU-6 Cost-benefits analysis sheet and net return per unit adult animal	3 hrs	12 hrs	<ul style="list-style-type: none"> • Cost-benefits analysis sheet. • How to calculate net return per unit adult animal. 	-Presentation -Team discussion	

Module-16: Maintenance of farm machinery and equipment

Learning Units	Theory Days/hours	Workplace Days/hours	Recommended formative assessment	Recommended Methodology	Scheduled Dates
LU-1 Manage various kinds of farm machinery	3 hr	12 hr	<ul style="list-style-type: none"> • Tractors/Trolleys • Tube-wells/ water pumps • Land preparation and sowing/ drilling machines • Threshers • Combined harvesters • Sprayers/ Dusting machines • Seed cleaners/ separators 	-Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion -Round table discussion	
LU-2 Primary & secondary tillage for proper seedbed preparation	3 hr	12 hr	<ul style="list-style-type: none"> • Cultivators • Chisel Plow • Moldboard • Rotavator • Disc Plow • Zero-till • Diggers/ Ridgers • Others 	-Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion -Presentation -Team discussion	

LU-3 Harvesting and threshing machinery	3 hr	12 hr	<ul style="list-style-type: none"> • Various machines/ models suitable for different cereal crops • Harvester/ threshers for other crops 	<ul style="list-style-type: none"> -Presentation -Team discussion 	
LU-4 Care/repair/maintenance and calibration of machinery	3 hr	12 hr	<ul style="list-style-type: none"> • Tractors • Tillage machines • Harvesters • Threshers • Seeding/ other drills 	<ul style="list-style-type: none"> -Presentation -Team discussion -Presentation -Team discussion -Round table discussion 	

Supportive notes

- Assessment context
- Critical aspects
- Assessment condition
- Resources required for assessment