

THERIOGENOLOGY CLINIC-I

1 (0-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Explain the importance of history taking for a clinical case.
2. Describe the protocol for approaching clinical cases at reproduction clinic

Clinic:

Steps to identify a clinical case of reproduction, Approach to clinical case and pre-requisites for handling, Palpation & identification of female reproductive system on table, Technique of rectal palpation in domestic animals, Identification of parts of reproductive tract in live animals, Identification of ovarian structures in live animals, Determination of stage of estrus cycle in live animals, Development of models for estrus detection, Selection of a bull for breeding, Functioning of Semen Production Units.

Recommended Books:

1. Zemjenis, R., 1970. Diagnostic & Therapeutic Techniques in Animal Reproduction. Williams & Wilkins Company, Baltimore
2. Morrow, D.A., 1986. Current Therapy in Theriogenology, II. W.B. Saunders Company, Philadelphia
3. Ahmad, M. and M.A. Saji, 1997. Manual for Breeding Soundness of Dairy Bulls for use in A.I. Livestock and Dairy development Department, 16-Cooper Road, Lahore

SEMESTER VII

BEEF AND MUTTON PRODUCTION

2 (1-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Describe current status of meat production in Pakistan.
2. Identify indigenous and exotic breeds,
3. Describe appropriate and cost effective management, feeding and processing system of meat production.
4. Establish a successful meat production unit through application of modern management techniques and practices.

Theory:

Status of meat production in Pakistan, issues and potential of meat industry in Pakistan, meat type breeds of farm animals, meat production systems, factors affecting carcass and meat quality; management of meat animals, feeding management for optimum growth, grazing systems, management and supplementary feeding, growth rate and fattening potential of male calves, feed additives, hormones and probiotics for growth, management during inclement weather. breeding and reproduction of meat animals, modern abattoirs,

slaughtering methods and post slaughter changes in carcass, carcass grades and spoilage of meat, meat hygiene, storage and preservation, Establishing commercial beef/mutton farms, record keeping, data handling and feasibility reports, keeping herd/flock healthy.

Practical:

Meat Production Systems, practical demonstrations on early feeding, raising orphan and multiple birth lambs/kids, Creep feeding, dehorning, castration and weaning; preparing beef animals for shows, dentition for age determination; practical tips for housing of beef animals, feasibility reports for beef/mutton production; ante-mortem inspection, Carcass evaluation, Carcass grades and cuts, Beef grades, Shearing and handling wool. Vaccination schedule for meat animals; maintenance of farm records; visit to farms, abattoir and market.

Textbook:

1. Alvi, A. S., 1991. Meat Production and Technology in Pakistan, Pakistan Agricultural Research Council, Islamabad.

Recommended Books:

1. Ensminger, M. E., 1996. Beef Cattle Science. The Interstate Printers and Publisher, Danville, Illinois, USA.
2. Mackintosh, J.B., 1983. Sheep production in Pakistan, PARC, Islamabad.
3. Anwar, A. H., 1996. Meat Hygiene and Inspection. Dept. Veterinary Parasitology, University of Agriculture, Faisalabad.
4. Ensminger, M.E. and R.O. Parker, 1986. Sheep and Goat Science. Interstate Printers and publishers Inc. Danville, Illinois. USA.
5. Steel, M., 1996. Goats. McMillan Education Ltd. London
6. Devendra, C. and George B. McLeroy, 1982. Goat and sheep production in the tropics. Longman Group, the University of Wisconsin – Madison.

VETERINARY PREVENTIVE MEDICINE-II

(3-0)

Learning outcomes:

At the end of the course, students will be able to:

1. Describe the etiology, epidemiology, and clinical manifestations of metabolic disorders, deficiency diseases, plant/chemical toxicities and animal poisons in livestock and pets.
2. Elucidate process of development of metabolic disorders and ill effects of nutritional deficiencies, plant/chemical toxins on animal's body.
3. Principles and tools for proper diagnosis and differential diagnosis of non-infectious diseases of animals.
4. Demonstration of treatment protocols for metabolic and deficiency diseases in veterinary practice and use of different specific antidotes against plant and chemical toxicities.
5. Describe interventions used to control and prevent disease, and improve animal at the individual and herd level.
6. Demonstrate knowledge and understanding of the infectious and non-infectious diseases of camels, dogs, cats and poultry.

Theory:

While etiology and pathogenesis are reviewed, emphasis will be given on clinical signs, diagnosis, differential diagnosis, treatment, control and prevention.

Metabolic diseases: (Parturient paresis, Downer cow syndrome, Lactation tetany of mares, Hypomagnesemic tetany, Ketosis, Pregnancy toxemia in sheep, Postparturient hemoglobinuria in cattle, Sporadic acute exertional rhabdomyolysis in horses, Atypical myopathy in grazing horses, Equine cushing's disease); *Diseases associated with nutritional deficiencies:* (Cobalt deficiency, Copper deficiency, Iodine deficiency, Iron deficiency, Zinc deficiency, Manganese deficiency, Selenium and vitamin E deficiency, Dietary deficiency of phosphorus, calcium and vitamin D); *Diseases associated with deficiencies of vitamins:* (Vitamin A deficiency, Vitamin K deficiency, Thiamin deficiency, Riboflavin deficiency, Nicotinic acid deficiency, Pyridoxine deficiency, Pantothenic acid deficiency, Folic acid deficiency, Vitamin B₁₂ deficiency); *Diseases associated with physical agents:* (Radiation injury, Lightning stroke and electrocution, Drowning, Frostbite); *Diseases associated with inorganic and farm chemicals:* (Lead poisoning, Arsenic poisoning, Selenium poisoning, Mercury poisoning, Copper poisoning, Sodium chloride poisoning, Zinc poisoning, Poisoning by anthelmintics, Organophosphates poisoning); *Diseases associated with toxins in plants and animals:* (Cyanogenic glycoside poisoning, Nitrate and nitrite poisoning, Bracken fern poisoning, Snakebite, Bee stings, Tick paralysis); *Poisoning by mycotoxins:* (Aflatoxicosis, Deg Nala disease); *Diseases associated with allergy:* (Autoimmune hemolytic anemia of the newborn, Pupura hemorrhagica); *Diseases of dogs and cats:* (Leptospirosis, Rabies, Canine distemper, Infectious canine hepatitis, Borreliosis, Canine ehrlichiosis, Lahore canine fever, Parvovirus infection, Feline panleukopenia, Feline calcivirus infection, Ringworms, Ecto and endo parasitism); *Diseases of camel:* (Trypanosomiasis, Filariasis, Mali, Kapauli, Contagious necrosis of skin, Kumree, Vail, Specific peritonitis, Meningitis, Camel pox, Influenza, Hemorrhagic disease, ecto and endo parasitism) *Diseases of poultry:* {(Viral diseases: Newcastle disease, Avian influenza, Fowl pox, Marek's disease, Lymphoid leucosis, Infectious bursal disease, Egg drop syndrome, Infectious laryngotracheitis, Infectious bronchitis, Hydropericardium syndrome, Inclusion body hepatitis, Avian infectious anemia, Femur head necrosis)}; {(Bacterial Diseases: Salmonellosis, Infectious coryza, Mycoplasmosis, Spirochaetosis, Fowl cholera, Colibacillosis, Staphylococcal, streptococcal and clostridial diseases)}; {(Fungal Diseases: Brooder's pneumonia, Thrush, Mycotoxicosis)}; {(Parasitic Diseases: Diseases caused by protozoa, nematodes, cestodes and arthropods)}; {(Nutritional Diseases: Deficiencies/imbbalances of vitamins, minerals, proteins and other nutrients)}; {(Miscellaneous Conditions: Poisoning and intoxications, Heat stress, Cannibalism)};

Textbook:

1. Radostitis, O.M., C.C. Gay, K.W. Hincheliff and P. D. Constable., 2007. Veterinary Medicine, 10th Ed. Saunders Elsevier, PA, USA.

Reference Books:

1. Kahn C.M. 2010. The Merck Veterinary Manual. 10th Ed. Merck & Company., INC, Whitehouse Station, N.J., USA.
2. Swayne D.E. (Ed.), 2013. Diseases of Poultry. 13th Edition. Wiley-Blackwell, USA.
3. Matin W.B. and I.D. Ait Isen, 2000. Diseases of Sheep, 3rd Ed. Blackwell Science, Oxford, UK.
4. Iqbal C.Z. and Akbar S.U.J., 2000. The Camel and its Diseases. Al Bayan Printing and Publishing Est. UAE.
5. Howard J.L, 1999. Current Veterinary Therapy, Food Animal Practice. W.B. Saunders, Co., U.S.A.
6. Rebhum, W.C., 1998. Diseases of Dairy Cattle, Williams and Wilkins, Baltimore, USA.
7. Smith B.P., 1996. Large Animal Internal Medicine. 2nd Ed. The Mosby Co. Philadelphia U.S.A.
8. Hungerford. T.G., 1991, Hungerford's Diseases of Livestock 9th Ed. McGraw-Hill Book Company, Sydney, Australia.
9. Larry P. Tilley and Francis W. K. Smith, Jr., 1997. The 5 Minutes Veterinary Consult Canine and Feline. William and Wilkins, M.D. USA.
10. Morgan, R.V., 1997. Handbook of Small Animal Practice. 3rd Ed. W.B. Saunders Company, PA, USA.

ANAESTHESIOLOGY AND INTENSIVE CARE

1 (0-1)

Learning outcomes:

At the end of the course, the student will be able to:

1. Describe different methods of general anaesthesia (injectable and inhalation).
2. Describe different sites and techniques of regional and local anaesthesia.
3. Monitor the surgical patient during intra and post-operative period.
4. Practically demonstrate induction and maintenance of anaesthesia in clinical practice in different animals.

Practical:

Introduction to Veterinary Anaesthesia, including Pre-anaesthetics and Anaesthetic agents and their uses; Pre-anaesthetic considerations; Types of anaesthesia (local, regional and general), and their clinical applications; Epidural and Paravertebral anaesthesia and their practical demonstration; Local nerve blocks (for dental, eye and horn surgeries and their practical demonstration); Local nerve blocks in limbs for lameness diagnosis and their practical demonstration. Stages of General Anaesthesia and patient monitoring during and after anaesthesia; Anaesthesia under field conditions; Practical demonstration of anaesthetic regimens for small and large animals (including dogs, cats, small ruminants, horses, donkeys, large ruminants and camels); Anaesthetic regimens for birds, exotics, and laboratory animals; Anaesthetic emergencies (cardiac arrest, respiratory failure, shock, acid base imbalance) and their management.

Recommended Books:

1. Tranquilli, W. J., J. C. Thurmon and K. A. Grimm. 2007. Lumb and Jones' Veterinary Anesthesia and Analgesia. 4th ed. Blackwell Publishing, USA.
2. Aldridge, P. and L. O'Dwyer. 2013. Practical Emergency and Critical Care Veterinary Nursing. John Wiley & Sons, Ltd., UK.
3. Venugopalan, A. 2000. Essentials of Veterinary Surgery. 8th ed. Oxford, New Delhi.
4. Harrari, J. 1996. Small Animal Surgery. Williams and Wilkins, Baltimore, USA.
5. Thrall, D.E. 1994. Textbook of Veterinary Diagnostic Radiology. 2nd ed. W. B. Saunders Co., Philadelphia, USA.
6. Turner, A. S. and C. W. McIlwraith. 1989. Techniques in Large Animal Surgery. 2nd ed. Lea & Febiger Philadelphia, USA.
7. Jennings. Jr. P. B. 1984. The Practice of Large Animal Surgery. W.B. Saunders Co., Philadelphia, USA.

OBSTETRICS AND GENITAL DISEASES

3 (2-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Describe causes and management of fetal deaths in early and late gestation
2. Describe causes of abortion
3. Evaluate causes and management of pre- and post-partum disorders
4. Describe the causes of infertility in animals

Theory:

Introduction and significance of obstetrics, Effect of climate on fertility, Effect of nutrition on fertility, Early embryonic mortality, Non-infectious causes of abortion, Infectious causes: bacterial, viral and protozoal diseases causing reproductive disorders in farm animals, Fetal mummification & maceration, Dropsy of fetal membranes & teratological defects, Uterine torsion, Genital prolapse, Causes and types of dystocia, Selection of obstetrical procedures, Diseases of puerperal period, Retention of fetal membranes, , Hormonal causes of infertility, Repeat Breeding, Anestrus, Uterine infections, Uterine cultures and treatment, Genetic and nutritional basis of infertility in male, Different types/forms of infertility in male, Principles of hormonal & antibiotic therapy, Small ruminants reproductive disorders, Equine reproductive disorders, Canine reproductive disorders.

Practical:

Overview of obstetrical anatomy, Normal/abnormal presentation, position and posture, Identification and usage of obstetrical instruments, Normal parturition mechanism in different species, Fetal and maternal dystocia: causes and treatment, Performance of mutation and forced extraction, Introduction and performance of fetotomy, Local, epidural and paravertebral anaesthesia, Caesarean section, Approach and handling of obstetrical cases, Induction of

parturition and abortion in farm animals, Handling of prolapse and torsion, Prevention and treatment of infertility in male and female, Injuries/diseases of the puerperal period.

Textbook:

1. Roberts, S.J., 1986. Veterinary Obstetrics and Genital Diseases. 2nd Ed., Edwards Brothers, Inc., Ann. Arbor, Michigan, U.S.A

Recommended Books:

1. Morrow, D.A., 1986. Current Therapy in Theriogenology, II. W.B. Saunders Company, Philadelphia
2. Youngquist, R.S. and W. Threlfall, 2007. Current Therapy in Large Animal Theriogenology. W.B. Saunders Company, Philadelphia

COMMERCIAL POULTRY PRODUCTION

2 (1-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Describe modern managemental tools in different production systems and housing types.
2. Describe different methods of processing of broiler meat.
3. Demonstrate optimum production and management of layer chicken on the floor and in the cages.
4. Perform disease prevention and control through proper implementation of biosecurity and vaccination procedures.
5. Describe procedures required to maintain health and welfare of the birds.

Theory:

Present status and future scope of commercial poultry farming in Pakistan; characteristics of different breeds/strains involved in the development of broiler and layers; housing requirements for broiler and layer production; selection and procurement of quality chicks; pre-brooding and brooding requirements for broiler and layer chicks; feeding and management practices of broiler production; sex separate raising of broilers and measuring broiler growing efficiency; integrated broiler farming; processing of broilers chicken; factor affecting growth rate and meat quality in broiler production; vices and their remedies in layer production; light and feed manipulation to attain sexual maturity; management of layer flock during laying; layer management in cages; factors affecting egg production; production standards; management of the flock in hot and cold environment; induced molting and its economics; trouble shooting in commercial poultry farming; waste disposal; record keeping.

Practical:

Typical characteristics of poultry birds for meat production; demonstration of various types of brooders; sanitary practices on the farm; selection and culling of birds; pre-brooding and brooding management; selection and grading of live birds; litter management; feeding strategies for broiler; monitoring of growth

performance of broilers viz. weekly feed consumption, weekly weight gain, mortality, feed to gain ratio and feed conversion ratio; processing techniques; carcass measurements and evaluating dressing percentage; giblet weights; sensory evaluation of broiler meat quality; biosecurity and its management; vaccination and vaccination schedule for common diseases; calculating economics of broiler production; debeaking, dubbing and toe clipping; identification of layer and non-layer; selection and culling procedures; catching and transportation of birds; cost benefit ratio of layer enterprises; induced molting techniques; managing flock during heat stress; use of computer in record keeping; visit to layer farm; feasibility report of broiler; feasibility report of 10,000 layer flock; record keeping.

Textbook:

1. North, M.O. and D.D. Bell. 2001. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, USA.

Recommended Books:

1. Ensminger, M.E., 1999. Poultry Science. The Interstate Printers and Publishers Inc., Danville, Illinois, U.S.A.
2. Austic, R.E. and M.C. Nesheim, 1990. Poultry Production. Lea and Febiger, Philadelphia, U.S.A.
3. Vegad, J.L., 2004. Poultry Diseases: A Guide for Farmers and Poultry Professionals. International Book Distributors Co. Lucknow, India.
4. Hurd, L.M., 2003. Modern Poultry Farming. Greenworld Publishers 8/217, Indira Nagar Lucknow-226 016 (UP).
5. Charles, T.B. and H.O. Stuart, 2011. Commercial Poultry Farming. 6th edition, Biotech Books, USA.
6. Sreenivasiah, P.V., 2006. Scientific Poultry Production. 3rd edition. International Book Distributing Co., UP India.
7. Haq, A. and M. Akhtar, 2004. Poultry Farming. Higher Education Commission, H-9, Islamabad, Pakistan.
8. Jadhav, N.V. and M.F. Siddiqi, 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.

BIO-STATISTICS

3 (2-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Define bio-statistics and describe its applications
2. Differentiate between continuous and discrete data
3. Define and explain probability, correlation, regression and salient statistical concepts
4. Perform statistical analysis pivotal to bio-statistics

Theory:

Introduction of bio-statistics, types of data (scales of measurements), frequency distribution for continuous and discrete data, visual representation of data, stem

and leaf display, box and whisker plots; measures of location and variability, moments, skewness, coefficient of skewness and Kurtosis, definitions and laws of probability, simple correlation and regression analysis, elementary ideas of sampling, distribution of means and proportions, Test of significance of means, proportion, difference between means and difference between proportions with their confidence Intervals. Experimental Design (Completely Randomized Design, Randomized Complete Block Design).

Practical:

The statistical packages Minitab and SPSS will be used for Measure of Location, Measure of Dispersion, Graphical Presentation, Regression and Correlation Analysis, Test of significance of Means, Proportion, Differentiate between Two Means, Proportions, CR Design and RCB Design.

Textbook:

1. Zar, J.H., 2003. Biostatistical Analysis, Fourth Edition, Pearson Education (Singapore) Prentice Hall International (UK) Limited. London, UK.

Recommended Books:

1. Muhammad F., 2000. Statistical Methods and Data Analysis, Kitab Markaz, Bhawana Bazar Faisalabad, Pakistan.
2. Choudhry, M. R., 2001. Modern Statistics (Vol-I & II). Polymer Publications, Urdu Bazaar, Lahore.
3. Steel, R. G. D, J. H. Torrie and D.A. Dickey, 1997. Principles and Procedures of Statistics: A Biometrical Approach. 3rd Edition. WCB McGraw-Hill, New York, USA.

MEDICINE CLINIC-II

1 (0-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Perform disease diagnosis and treatment of clinical cases of hepatobiliary, nervous, urinary and integumentary systems of large and small animals.
2. Collect samples of body fluid and tissues.
3. Demonstrate knowledge and skills in the interpretation of common diagnostic procedures and Lab reports.
4. Describe role of vaccination in diseases control and general vaccination schedule for different animal species.
5. Interact with community through small scale project development.
6. Develop of core competencies in clinical case handling and recording.

Clinic:

Exercises in diagnosis and treatment of clinical cases of diseases of hepatobiliary system, nervous system; urinary system, integumentary system in livestock and pets; Practice of sample collection, labeling, packaging and dispatch of biological materials (blood, serum, feces, skin scrapings, milk and other body fluids) for laboratory examination, Hematological evaluation and

interpretation, Evaluation of acid-base balance and interpretation, Fecal examination procedures and interpretations, Examination of skin scrapings and interpretation, Urine evaluation procedures and interpretation, Tests and their interpretation for hemoprotozoan diseases, Interpretation of blood chemistry profile in diseases, Paracentesis and interpretation of test results, Milk tests for mastitis and interpretation, Vaccines and vaccination in ruminants, equines and pets, Preparing and implementing projects for community development, Recording of minimum 15 cases under the supervision of teacher and making a presentation after consulting veterinary information resources like journals, books and internet. Study tours to livestock farms and Veterinary Hospitals.

Recommended Books:

1. Radostitis, O.M., C.C. Gay, K.W. Hincheliff and P. D. Constable, 2007. Veterinary Medicine, 10th Ed. Saunders Elsevier, PA, USA.
2. Kelly, W. R., 1984. Veterinary Clinical Diagnosis. 3rd Ed. Bailliere Tindall and Corsell, London, UK.
3. Kahn C.M., 2010. The Merck Veterinary Manual. 10th Ed. Merck & Company., INC, Whitehouse Station, N.J., USA.
4. Pinsent, P.J.N. and C.J. Fulle, 1997. Outline of Clinical Diagnosis in Horse. Blackwell Science, Oxford, UK.
5. Howard J.L, 1999. Current Veterinary Therapy, Food Animal Practice. W.B. Saunders, Co., U.S.A.
6. Hungerford. T.G., 1991, Hungerford's Diseases of Livestock 9th Ed. McGraw-Hill Book Company, Sydney, Australia.
7. Smith B.P., 1990. Large Animal Internal Medicine. The C.V. Mosby Company, Baltimore.

SURGERY CLINIC-II

1 (0-1)

Learning outcomes:

At the end of the course, students will be able to:

1. Perform different techniques for handling of animals for examination and treatment purposes
2. Protect themselves and the animals from serious injuries.
3. Perform different surgical exercises on clinical cases.
4. Perform management during post-operative period.

Clinic:

Physical and chemical restraint techniques in horses, ruminants, pets, history taking and clinical examination, routes of drug administration and catheterization in male and female animals, Bandages and bandaging techniques, Preparations used for topical dressing of wounds, management of wounds, galls, ulcers and abscesses, Trocarization in small and large animals, Hospitalization and care of sick animals. Students will be required to record a minimum of 10 cases (history taking, clinical findings, laboratory investigation, diagnosis, differential diagnosis treatment and discussion) in each clinical case under the supervision of a teacher.

Recommended Books:

1. Venugopalan, A. 2000. Essentials of Veterinary Surgery. 8th Ed. Oxford and IBH Publishers and Distributors, New Delhi, India.
2. Kumar, A. 1997. Veterinary Surgical Techniques. Vikas Publishing House, New Delhi, India.
3. Harari, J., 1993. Surgical Complications and Wound Healing in the Small Animal Practice, W. B. Saunders Co., Philadelphia, USA.
4. Kelly, W. R. 1984. Veterinary Clinical Diagnosis. 3rd Ed. Bailliere Tindall, London, UK.

THERIOGENOLOGY CLINIC - II**1 (0-1)****Learning outcomes:**

At the end of the course, students will be able to:

1. Describe the importance of breeding bull, its selection and clinical evaluation.
2. Basics for semen collection, evaluation and processing.

Clinic:

Method and importance of history questions in case handling, Breeding program in a herd, How to diagnose pregnancy in domestic animals, Breeding soundness examination of male, Preparation of Bull and Artificial Vagina for semen collection, Methods of semen collection (Techniques), Evaluation of semen (characters) and processing (storage methods), Preparation of extenders, Rectal palpation and passing of rod for Artificial Insemination.

Recommended Books:

1. Zemjenis, R., 1970. Diagnostic & Therapeutic Techniques in Animal Reproduction. Williams & Wilkins Company, Baltimore
2. Morrow, D.A., 1986. Current Therapy in Theriogenology, II. W.B. Saunders Company, Philadelphia
3. Ahmad, M. and M.A. Saji, 1997. Manual for Breeding Soundness of Dairy Bulls for use in A.I. Livestock and Dairy development Department, 16-Cooper Road, Lahore.

SEMESTER VIII**BREEDER AND HATCHERY MANAGEMENT****3 (2-1)****Learning outcomes:**

At the end of the course, students will be able to:

1. Describe modern managerial techniques for optimum and cost-effective production of broiler and layer breeder.
2. Describe techniques for optimum production, selection, fumigation of storage of hatching eggs.
3. Ensure disease prevention and control through proper implementation of biosecurity and vaccination procedures.