

# CURRICULUM

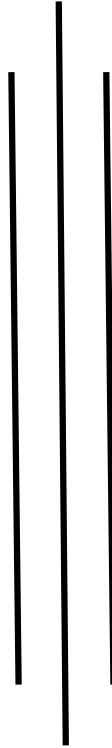
*F*  
*O*  
*R*

**Technical School Leaving Certificate**

*In*

**Livestock Production /Animal Health**

(Post SLC Program)



**Council for Technical Education and Vocational Training**

**CURRICULUM DEVELOPMENT DIVISION**

**Sanothimi, Bhaktapur**

**First Revision, 2010**

## Table of Contents

|   |    |
|---|----|
| 1. Introduction: .....                                | 3  |
| 2. Aim: .....   | 3  |
| 3. Objectives: .....                                  | 3  |
| 4. Programme Description: .....                       | 3  |
| 5. Target group: .....                                | 3  |
| 6. Target location: .....                             | 4  |
| 7. Group size: .....                                  | 4  |
| 8. Entry criteria: .....                              | 4  |
| 9. Medium of Instruction: .....                       | 4  |
| 10. Course Duration: .....                            | 4  |
| 11. Pattern of Attendance: .....                      | 4  |
| 12. Teacher and Student Ratio: .....                  | 4  |
| 13. Instructional Media and Materials: .....          | 5  |
| 14. Teaching Learning Methodologies: .....            | 5  |
| 15. Evaluation Details: .....                         | 5  |
| 16. Grading Overall marks .....                       | 6  |
| 17. Certificate Requirements: .....                   | 6  |
| 18. Career Path: .....                                | 7  |
| 19. Course Structure .....                            | 7  |
| Animal Health I .....                                 | 8  |
| Animal Health II .....                                | 13 |
| Livestock Production and Management I .....           | 17 |
| Cattle/ Buffalo and Yak/ Chauri Production .....      | 17 |
| Sheep and goat Production .....                       | 22 |
| Livestock Production and Management II .....          | 26 |
| Poultry production .....                              | 26 |
| Swine production .....                                | 31 |
| Rabbit, Dog and Laboratory Animals (Optional I) ..... | 35 |
| Fish Production (optional II) .....                   | 39 |
| Horse and Mule Production (Optional III) .....        | 42 |
| Animal Nutrition and Fodder Production .....          | 45 |
| Dairy and dairy products .....                        | 50 |
| Entrepreneurship skills .....                         | 53 |
| Extension and Community Development .....             | 56 |
| Content Experts .....                                 | 64 |

**1. Introduction:**

This course is designed for those who have passed SLC examination. This curriculum is designed for lower level human resources in the field of Livestock Production / Animal health services equipped with knowledge, skills and attitude necessary for this level of technicians so as to meet the demand of such technician in the country

**2. Aim:**

The aim of the programme is to produce Livestock Production /Animal Health Junior Technical Assistant (JTA) to provide services to the people & livestock sector of country.. At the end of their training they may go for job at government, non-government, private sector or own business.

**3. Objectives:**

After completing this curricular program, the students will be able:

1. to keep livestock, poultry, fish as their own enterprise or they can go for job to the government semi government, private or public sector
2. to explain sign symptoms and preventive measures of common diseases of kept animals
3. to produce hygienic milk, meat and other production from livestock, poultry and fish
4. to cultivate fodder and grass for livestock
5. to develop scheme for livestock enterprise
6. to run livestock farm as a assistant

**4. Programme Description:**

This course is based on the job required to be performed by a livestock sector in Nepal. This course intends to provide knowledge about following basic level Junior Technical Assistant. It especially provides the knowledge and skills focussing on livestock production and management, poultry production, Dairy science, Animal nutrition, Animal health, as provisioned by the government of Nepal. It also deals with Extension and Communication and Entrepreneurship skill for to start their own business

**5. Target group:**

The target group for this training will be all the interested individuals of the country with academic qualification of SLC pass.

**6. Target location:**

The target location of this training program will be all over Nepal.

**7. Group size:**

The group size of this training program will be not more than 40.

**8. Entry criteria:**

Individuals who meet the following criteria will be allowed to enter into this program:

- Should have passed SLC
- Should pass entrance examination administered by CTEVT
- Final selection will be made on the basis of merit list.
- Candidates should submit the following documents at the time of application
  - SLC pass mark sheet
  - Character certificate
  - Citizenship certificate (for the name, parents' name, age, date of birth and address verification purpose only)
- Special quota for different category of students will be as per the policy of CTEVT
- Preference will be given to female, Dalit, Janjati, Conflict affected people and Disadvantaged Groups ( DAGs)

**9. Medium of Instruction:**

The medium of instruction will be in English and/or Nepali language.

**10. Course Duration:**

This course will be completed within one year/ 39 weeks/ 1560 hours. In addition, 3 months on-the-job assignment should also be completed for issuing successful completion of the course.

**11. Pattern of Attendance:**

The students should have at list 80% attendance in theory classes and 90% in practical/ performance to be eligible for internal assessments and final examinations.

**12. Teacher and Student Ratio:**

- Overall ratio of teacher and student must be 1:10 (at the institution level).
- Teacher and students ratio for theory class should be as per nature of classroom
- Teacher and student ratio for practical should be 1:10
- Minimum 75% of the teachers must be fulltime.

**13. Instructional Media and Materials:**

The following instructional media and materials are suggested for the effective instruction and demonstration.

- Printed Media Materials (Assignment sheets, Case studies, Handouts, Information sheets, Individual training packets, Procedure sheets, Performance Check lists, Textbooks etc.).
- Non-projected Media Materials (Display, Models, Photographs, Flip chart, Poster, Writing board etc.).
- Projected Media Materials (Opaque projections, Overhead transparencies, Slides etc.).
- Audio-Visual Materials (Audiotapes, Films, Slide-tape programs, Videodiscs, Videotapes etc.).
- Computer-Based Instructional Materials (Computer-based training, Interactive video etc.)

**14. Teaching Learning Methodologies:**

The methods of teaching for this curricular program will be a combination of several approaches. Such as Illustrated Lecture, Group Discussion, Demonstration, Simulation, Guided practice, Practical experiences, Fieldwork, Laboratory observation, Field visit, Report writing, Term paper presentation, Case analysis, Tutoring, Role-playing, and Other Independent learning.

- Theory: Lecture, Discussion, Assignment, Group work.
- Practical: Demonstration, Observation and Self-practice.
- On the Job Training

**15. Evaluation Details:**

1. Continuous evaluation of the students' performance is to be done by the related instructor/ trainer to ensure the proficiency over each competency under each area of a subject specified in the curriculum.

2. Related technical knowledge learnt by students will be evaluated through written tests.
3. Students must score a minimum of 40% marks in theory test and 60% in practical test in all subjects.
4. There will be at list three internal assessments and one final examination in each subject. Moreover, the mode of an assessment and an examination will include both theory and practical or as per the nature of instruction as mentioned in the course structure.
5. Students should pass internal assessments both in theory and practical tests in all subjects for attending final examination.
6. The ratio between the theory and practical tests will be 20:80 in all subjects.
7. Out of 100%, 50% weightage is allotted for the internal assessments and the remaining is allotted for the final examination
8. On-the-job training has to be evaluated keeping **300** as full marks. The evaluation of the performance of the student is to be carried out by the **three** agencies with equal marks; **1. Concerned institute 2. Industry/organization where the student worked and the 3. CTEVT** unless otherwise directed by Technical Division of the CTEVT. Here also the student has to score 60% or above for successful completion of the course.

16. **Grading system**

The grading system will be as follows:

| <u>Grading System</u> | <u>Overall marks</u>        |
|-----------------------|-----------------------------|
| Distinction           | 80% or above                |
| First division        | 75% or above                |
| Second division       | 65% or above                |
| Third division        | Pass aggregate to below 65% |

17. **Certificate Requirements:**

The council for technical education and vocational training will award certificate in **“Technical School Leaving Certificate in Livestock Production and Management/Animal Health”** to those students who successfully complete the requirements as prescribed by the curriculum.

**18. Career Path:**

The graduate will be eligible for the position equivalent to Non-gazetted 2nd class/level 4 (technical) as Junior Technical Assistant in the field of Livestock Production and Management /Animal Health or as prescribed by the Public Service Commission.

**19. Course Structure****TSLC in Livestock Production and Management /Animal Health**

| S.N                         | Subjects                               | Nature       | Hours/<br>Week               | Theory & Practical hours |                          |                             | Full<br>Marks     |
|-----------------------------|--|--------------|------------------------------|--------------------------|--------------------------|-----------------------------|-------------------|
|                             |  |              |                              | Total<br>Hours<br>(T+P)  | Total<br>Theory<br>Hours | Total<br>Practical<br>Hours |                   |
| 1.                          | Extension and Community Development    | T+P          | 6                            | 234                      | 48                       | 186                         | 150               |
| 2.                          | Entrepreneurship Development           | T+P          | 4                            | 156                      | 32                       | 124                         | 100               |
| 3.                          | Animal Health I                        | T+P          | 6                            | 234                      | 48                       | 186                         | 150               |
| 4.                          | Animal Health II                       | T+P          | 6                            | 234                      | 48                       | 186                         | 150               |
| 5.                          | Livestock Production and Management I  | T+P          | 4                            | 156                      | 32                       | 124                         | 100               |
| 6.                          | Livestock Production and Management II | T+P          | 6                            | 234                      | 48                       | 186                         | 150               |
| 7.                          | Animal Nutrition and Fodder production | T+P          | 4                            | 156                      | 32                       | 124                         | 100               |
| 8.                          | Dairy and dairy product                | T+P          | 4                            | 156                      | 32                       | 124                         | 100               |
|                             |  | <b>Total</b> | <b>40</b>                    | <b>1560</b>              | <b>320</b>               | <b>1240</b>                 | <b>1000</b>       |
| <b>On the Job Training</b>  |  |              | <b>Nature of Instruction</b> |                          | <b>Duration(Hrs.)</b>    |                             | <b>Full marks</b> |
| On -the -Job Training (OJT) |  |              | Practical                    |                          | 480                      |                             | 300               |
| <b>Grand total</b>          |  |              |                              |                          | <b>2040</b>              |                             | <b>1300</b>       |

**T = Theory, P = Practical**

## Animal Health I

**Total Hours: 234 hrs**

**Theory: 48 hrs**

**Practical: 186 hrs**

### **Description:**

This course provides skills and knowledge related to the structure and functions of the different organs/ body system; assist to diagnose and treat common systematic diseases and ailments of farm animals and birds. It also provides basic knowledge and skills of clinical examination, first aids, PM findings, disposal of dead birds, sterilization and administration of drugs

### **Objectives:**

Upon completion of this course students will be able to:

1. Identify different organs of body system
2. Explain function of different organs/ systems
3. Assist to treat diseases and ailments of different body systems
4. Differentiate healthy and sick animals
5. Assist to perform clinical examination of animals and birds
6. Administer drugs
7. Assist in PM examination
8. Identify locally available medicinal plant and their use

| <b>S<br/>N</b> | <b>Tasks Statements</b>                           | <b>Related Technical Knowledge</b>   | <b>Time<br/>(Hrs)</b> |
|----------------|---|--|-----------------------|
| 1              | Define anatomy of farm animals                    | Definition of anatomy<br>Anatomical terms<br>Definition of physiology<br>Importance of studying anatomy and physiology of farm animals   | 3                     |
| 2              | Identify parts of skeletal system of farm animals | Definition of skeleton<br>Classification of bones: according to the shape and location<br>Teeth and dentition, aging by dentition<br>Well labeled diagram of skeleton of cow and chicken<br>General function of skeletal system<br>List of major diseases and ailments related to the system | 3                     |
| 3              | Introduce arthritis in animals                    | Introduction, causes, sign and symptoms and prevention of arthritis  | 3                     |
| 4              | Treat simple fracture of limbs                    | Introduction, causes, symptoms, treatment of fracture by using splint and plaster of Paris bandage.  | 4                     |
| 5              | Explain muscular system of animals                | Definition of muscular system<br>Types of muscles: Skeletal, smooth and cardiac muscles and their functions  | 2                     |
| 6              | Treat simple fresh wound                          | Definition, type, treatment of simple fresh wound<br>Suturing and suturing techniques  | 7                     |



|    |   |  |   |
|----|---|--|---|
| 7  | Explain myositis  | Definition, type, management of myositis case<br>Suturing and suturing techniques  | 2 |
| 8  | Identify parts of respiratory system of animal and birds  | Introduction of respiratory system<br>Well labeled diagram of the respiratory organs : mammals and birds   | 2 |
| 9  | Introduce pneumonia                                       | Introduction, causes, symptoms and prevention pneumonia  | 3 |
| 10 | Explain circulatory system of animals                     | Introduction of circulatory system<br>Heart: structure and function<br>Blood vessels: structure and function<br>Circulation of blood<br>Blood: composition and function<br>List of major diseases and ailments related to the system | 3 |
| 11 | Introduce anemia  | Introduction, causes, sign and symptoms and prevention anemia  | 3 |
| 12 | Collect blood sample                                      | Site of blood collection from different animal species, purpose of blood sample collection, anticoagulants, blood collection techniques, smear preparation, serum separation, dispatch of samples                                    | 5 |
| 13 | Identify parts of male reproductive system                | Introduction of reproductive system<br>Well labeled diagram of reproductive organs of a bull<br>Study of slaughter house specimen<br>Function of major organs<br>List of major diseases and ailments related to the system           | 5 |
| 14 | Identify parts of female reproductive system of a cow/hen | Well labeled diagram of reproductive organs of a cow and hen,; function of major organs<br>Study of slaughter house specimen<br>List of major diseases and ailments related to the system  | 5 |
| 15 | Explain causes of infertility                             | Introduction, different causes, symptoms and prevention of infertility in farm animals;<br>counseling to the farmers   | 4 |
| 16 | Assist correction of dystocia                             | Introduction, causes, types ,sign and symptoms, correction techniques of dystocia, precaution to be taken  | 5 |
| 17 | Assist correction of prolapsed uterus/vagina              | Introduction, causes, correction techniques, precaution to be taken  | 6 |
| 18 | Assist correction of retained placenta                    | Introduction, causes, correction techniques, precaution to be taken  | 6 |
| 19 | Introduce abortion  | Introduction and causes of abortion, precaution to be taken  | 3 |
| 20 | Identify parts of digestive system of ruminants           | Introduction of digestive system<br>Well labeled diagram of ruminant digestive system<br>Function of major organs<br>List of major diseases and ailments related to the  | 5 |

|    |   |   |   |
|----|---|---|---|
|    |   | system  |   |
| 21 | Treat bloat /tympany                                | Introduction, causes, types ,sign and symptoms, treatment of tympany/bloat  | 3 |
| 22 | Identify parts of digestive system of non-ruminants | Well labeled diagram of non- ruminant digestive system<br>Function of major organs<br>List of major diseases and ailments related to the system   | 4 |
| 23 | Identify parts of digestive system of a fowl        | Well labeled diagram of the digestive organs of a fowl<br>Function of major organs  | 3 |
| 24 | Treat indigestion / impaction                       | Introduction, causes, sign and symptoms, treatment of indigestion /impaction  | 3 |
| 25 | Treat diarrhea/dysentery                            | Introduction, causes, sign and symptoms, treatment of diarrhea/dysentery  | 3 |
| 26 | Explain colic                                       | Introduction, types, causes, sign and symptoms, treatment of colic  | 2 |
| 27 | Identify parts of urinary system                    | Introduction of urinary system<br>Well labeled diagram of urinary system<br>Function of major organs<br>Major diseases and ailments related to the system   | 4 |
| 28 | Introduce urolithiasis                              | Introduction, cause and treatment of urolithiasis   | 4 |
| 29 | Differentiate haematuria / haemoglobinuria          | Introduction, cause and treatment haematuria/ haemoglobinuria   | 3 |
| 30 | Explain nervous system(NS)                          | Introduction of nervous system<br>Well labeled diagram of neuron<br>Classification of neuron: according to structure- unipolar, bipolar, multipolar; according to function- sensory , motor, mixed neuron<br>Central NS, Peripheral NS, Autonomic NS<br>General function of NS<br>Major diseases and ailments related to the system | 5 |
| 31 | Introduce paralysis                                 | Introduction, causes and treatment of paralysis   | 2 |
| 32 | Explain structure of mammary gland                  | Mammary gland of a cow<br>Well labeled diagram of mammary gland and milk ducts<br>Disease related to mammary gland  | 3 |
| 33 | Explain structure of eye/ ear                       | Well labeled diagrams   | 5 |
| 34 | Explain conjunctivitis                              | Introduction, cause and treatment of conjunctivitis   | 4 |
| 35 | Explain ootitis                                     | Introduction, cause and treatment of ootitis  | 4 |
| 36 | Introduce health/ disease                           | Definition of health and disease<br>Differentiation between healthy and sick animal<br>Classification of disease: based on cause of disease, based on duration , based on intensity and spread of disease, based on organ or system affected<br>Importance of prevention versus treatment   | 5 |
| 37 | Assist in clinical                                  | History taking  | 7 |

|    |   |   |   |
|----|---|---|---|
|    | examination of animals                                  | Examination of sick animal: General inspection, physical examination,(temperature, pulse, respiration), examination of body parts (palpation, percussion, auscultation)<br>Examination of environment                           |   |
| 38 | Assist to diagnose diseases                             | Causes of diseases<br>Infectious: bacteria, virus, protozoa, parasites, fungus<br>Non infectious: injury, malnutrition, poisoning, Metabolic disorders, polluted environment, systemic disorders.<br>Zoometric, acute, chronic. | 5 |
| 39 | Explain resistance/immunity                             | Immunity: active immunity, passive immunity , disease susceptibility  | 3 |
| 40 | Maintain healthy stock                                  | Proper feeding, routine treatment against parasites, sanitation, rotation in grazing , isolation of sick animal, use of vaccines and biological   | 3 |
| 41 | Identify common instruments used in veterinary practice | Identification, use and maintenance of most common veterinary instruments   | 6 |
| 42 | Sterilize equipments                                    | Definition, concept and methods of sterilization  | 4 |
| 43 | Disinfect barn and poultry farm                         | Use of common antiseptics and disinfectants   | 4 |
| 44 | Describe the role of veterinary drugs                   | Introduction<br>Classification of vet drugs<br>Common vet drugs available in local market<br>Generic names versus brand names<br>Safe use of chemicals and medicines  | 7 |
| 45 | Make some formulatory in laboratory                     | Method of preparation of tincture iodine, golden lotion, iodine ointment, eye lotion, turpentine liniment, boric acid ointment, zinc oxide ointment   | 4 |
| 46 | Follow prescription                                     | Introduction, writing a prescription<br>Reading of prescription<br>Recommended dosage<br>Use of alternatives in case of unavailability of prescribed drugs  | 4 |
| 47 | Store medicines   | Read labels and follow directions<br>Store medicines: protection from direct sun light, moisture, vermin<br>Keeping old stock up/ outer face in store   | 2 |
| 48 | Explain side effects of drugs                           | Allergic reactions of drugs<br>Restriction of use of antibiotics in ruminants<br>Antimicrobial resistance   | 2 |
| 49 | Calculate dosage of drug                                | Determine approximate weight of animals<br>Calculate the dosages of drugs, vaccines and biological.<br>Concept of drug measurements ( $\mu\text{g}$ , mg, ml, L, g, I.U.); use of conversion table.                             | 2 |
| 50 | Administer drugs orally                                 | Route of drug administration<br>Feeding of tablet, bolus, powder, capsule,  | 4 |

|    |  |  |            |
|----|--|--|------------|
|    |  | electuary, liquid with feed, grasses, water<br>Drenching of liquid with drenching pipe/<br>drenching gun/ using stomach tubes<br>Precaution to be taken during drenching                           |            |
| 51 | Administer drugs by injection                                  | Cleaning syringes and needles, filling syringes, mixing medicines, intra-muscular, sub-cutaneous and intravenous injections.   | 8          |
| 52 | Administer drugs locally                                       | Use of ointment, lotion, liniments, pessaries, topical use of antiseptic, eye and ear drops.   | 2          |
| 53 | Prepare for field trip   | Medicines and equipment needed for field trips<br>Prepare bag / backpack with necessary equipment and medicines for field trip   | 2          |
| 54 | Perform first aid  | Definition of first aid<br>First aid for the following cases: fractures, burns, common poisonings, bleeding, acute clinical diseases   | 4          |
| 55 | Assist to perform post-mortem (PM) of poultry                  | Principle, material required, procedure of PM examination  | 4          |
| 56 | Explain PM of livestock  | Principle, material required, procedure of PM examination  | 2          |
| 57 | Assist to prepare PM report                                    | Identification the internal organs, gross pathological lesions, preparation of brief report regarding findings<br>Dispatch of samples/ specimen with PM report                                     | 2          |
| 58 | Dispose specimens/ dead birds/ chemicals/ drugs / other wastes | Types of vet hospital waste/<br>Method of waste disposal   | 2          |
| 59 | Explain Litchi heart disease of poultry                        | Introduction, method of diagnosis, treatment, prevention and control   | 3          |
| 60 | Identify locally available medicinal plant                     | Morphology of locally used medicinal plant<br>Plant parts used for medicinal purpose<br>Used in commonly disease and disorder<br>Methods of preparation<br>Dose and frequency<br>Precaution during | 12         |
|    |  | <b>Total</b>   | <b>234</b> |

## Animal Health II

**Total hours : 234 hrs**  
**Theory : 48 hrs**  
**Practical : 186 hrs**

### **Description:**

This course provides skills and knowledge of identification of external parasites, internal parasites their eggs, etiology, symptoms diagnosis, treatment, prevention and control of parasitic, bacterial, viral, protozoa, fungal diseases of livestock and poultry.

### **Objectives:**

Upon completion of this course students will be able to :

1. Identify external parasites of livestock and poultry
2. Identify internal parasites of livestock and poultry
3. Explain etiology, symptoms, diagnosis and treatment of parasitic disease livestock and poultry
4. Explain etiology, symptoms, diagnosis and treatment of bacterial disease livestock and poultry
5. Explain etiology, symptoms, diagnosis and treatment of viral disease livestock and poultry
6. Explain etiology, symptoms, diagnosis and treatment of protozoal disease livestock and poultry
7. Explain etiology, symptoms, diagnosis and treatment of fungal disease livestock and poultry
8. Explain etiology, symptoms, diagnosis and treatment of metabolic disease livestock and poultry
9. Explain causes and treatment of common poisoning in livestock

| <b>S. N</b> | <b>Tasks Statements</b>              | <b>Related Technical Knowledge</b>  | <b>Time (hrs)</b> |
|-------------|--------------------------------------|---|-------------------|
| 1           | Introduce parasite and parasitology. | Parasite and parasitology<br>Types of parasites: external and internal parasites<br>Types of host : definitive host and intermediate host | 3                 |
| 2           | Identify/treat external parasites    | Introduction, types, general symptoms and treatment of lice, ticks, mite and leech infestation.   | 5                 |
| 3           | Introduce helminth parasites         | Common helminth parasites of cattle, buffalo, horse, sheep, goat, pig, dog and poultry.<br>Effects of helminths on host.                  | 5                 |
| 4           | Identify/treat liver fluke           | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control of liver fluke disease.                                 | 4                 |
| 5           | Identify/treat paramphistomum        | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control of paramphistomiasis.                                   | 4                 |
| 6           | Explain/treat <i>moniziasis</i>      | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control   | 5                 |

|    |  |   |    |
|----|--|---|----|
| 7  | Explain Gid (study)                            | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control   | 4  |
| 8  | Explain pork tapeworm                          | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control   | 4  |
| 9  | Explain hydatidosis                            | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control   | 4  |
| 10 | Explain dog tapeworm                           | Introduction, morphology, lifecycle, diagnosis, treatment, prevention and control   | 4  |
| 11 | Identify/treat small round worm                | Introduction, general life cycle of small round worm<br>Type of small round worms<br>Symptoms, diagnosis, prevention and control                        | 8  |
| 12 | Handle simple microscope                       | Parts of Microscope, general cleaning and handling procedures   | 4  |
| 13 | Collect sample, store and dispatch             | Collection, storage and dispatch of blood, urine, feces, milk sample, skin scrapping from livestock and pet   | 6  |
| 14 | Examine feces                                  | Fecal examination by different techniques: direct smear, sedimentation, floatation method<br>Identify helminthes eggs: trematodes, custodies, nematodes | 10 |
| 15 | Introduce/treat hemorrhagic septicemia disease | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 5  |
| 16 | Introduce black quarter                        | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4  |
| 17 | Introduce anthrax                              | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4  |
| 18 | Introduce tetanus                              | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4  |
| 19 | Introduce tuberculosis                         | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4  |
| 20 | Introduce foot rot                             | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4  |
| 21 | Assist to treat mastitis                       | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 5  |
| 22 | Introduce actinomycosis                        | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of  | 4  |

|    |   |   |   |
|----|---|---|---|
|    |   | treatment, prevention and control.  |   |
| 23 | Introduce actinobacillosis                | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 24 | Introduce/treat calf scour                | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 25 | Introduce atrophic rhinitis of swine      | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 26 | Introduce/prevent foot and mouth disease  | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 27 | Introduce rinderpest                      | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 28 | Introduce orf                             | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 29 | Introduce ephemeral fever                 | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 30 | Introduce swine fever                     | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 31 | Introduce rabies                          | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 32 | Introduce parvo – enteritis               | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 33 | Introduce swine – influenza               | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 34 | Introduce peste des petits ruminant (PPR) | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 35 | Introduce bird Flu                        | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 36 | Introduce babesiosis                      | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 37 | Introduce/treat coccidiosis in calf       | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 5 |
| 38 | Introduce/treat milk fever                | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control. | 4 |
| 39 | Introduce ketosis                         | Introduction, etiology, mode of   | 5 |

|    |   |   |            |
|----|---|---|------------|
|    |   | transmission, symptoms, diagnosis, line of treatment, prevention and control.   |            |
| 40 | Introduce fowl cholera  | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 3          |
| 41 | Introduce pullorum  | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 3          |
| 42 | Introduce chronic respiratory disease                               | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 3          |
| 43 | Introduce fowl typhoid  | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 3          |
| 44 | Introduce Newcastle diseases  | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 3          |
| 45 | Introduce marek's disease   | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 3          |
| 46 | Introduce gumboro disease   | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4          |
| 47 | Introduce infectious bronchitis                                     | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4          |
| 48 | Introduce/treat coccidiosis in poultry                              | Introduction, etiology, mode of transmission, symptoms, diagnosis, line of treatment, prevention and control.   | 4          |
| 49 | Prepare for vaccination camp  | Definition and uses of vaccines<br>Planning, organizing and running a vaccination campaign; maintain cold chain and vaccine handling, quality control | 4          |
| 50 | Prepare vaccination schedule of livestock pet / poultry             | Vaccination schedule for livestock and pet<br>Vaccination schedule for layers broilers and breeders   | 6          |
| 51 | Explain burn  | Introduction, types, causes, symptoms, first aid of burn  | 3          |
| 52 | Explain yoke gall/Sore neck   | Introduction, causes, symptoms, first aid of yoke gall  | 3          |
| 53 | Explain vomiting  | Introduction, causes, first aid of vomiting   | 3          |
| 54 | Introduce government rules and regulations related to animal health | Government acts, rules, regulations and orders related to animal health and livestock production.   | 4          |
|    |   |   |            |
|    |   | <b>Total</b>  | <b>234</b> |



**Livestock Production and Management I**  
Cattle/ Buffalo and Yak/ Chauri Production

Total Hours : 78 hrs  
Theory : 16 hrs  
Practical : 62 hrs

**Description:**

This part of course is designed to provide basic skills and knowledge of cattle and buffalo farming including breeds of cattle and buffalo, housing, care and manage of newly born calves, pregnant/lactating female, breeding bull, replacement stock for commercial farming and marketing of live animal and milk. It is **suggested** that school of high altitude should teach Yak & Chauri based.

**Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of cattle and buffalo farming in Nepal
2. explain different breeds of cattle / buffalo and yak/ chauri
3. design shed for commercial farming
4. care/ manage newly born calves, pregnant/lactating female, breeding bull, replacement stock
5. Explain cattle and buffalo breeding
6. Explain feeds and feeding of cattle / buffalo and yak/ chauri
7. Market live animal and milk

| S.N | Skill  | Related technical knowledge  | Time (Hrs) |
|-----|--|--|------------|
| 1   | Introduce livestock farming  | Introduction of animal husbandry<br>Scope of livestock production in Nepal<br>Role of livestock in National economy<br>Present status, problem, prospect and strategy for Livestock production | 2          |
| 2   | Study animal behavior  | Importance of study of animal behavior<br>Feeding behavior<br>Breeding behavior<br>Behavior during sick<br>Excitement by seeing strangers  | 1          |
| 3   | Explain role of cattle / buffalo / yak/ chauri production in Nepal | History of cattle/ buffalo production<br>Strategy of cattle and buffalo production in Nepal  | 1          |
| 4   | Explain relationship between agriculture/forestry and livestock    | Concept of agro forestry, interrelation between livestock and agriculture, silvipature, lease hold forest, role of community forest in livestock production                                    | 1          |
| 5   | Explain social problems for cattle/buffalo& yak/chauri production  | Social problems in cattle/buffalo farming<br>Legal prohibition for slaughtering of cattle<br>Socio environmental problems  | 1          |
| 6   | Classify cattle / buffalo & yak/chauri breed on the basis of use   | Zoological classification of cattle/buffalo<br>Milch breed, Dual purpose, Draft purpose  | 1          |
| 7   | Identify external body parts of cattle/buffalo &                   | Objectives to study external body parts<br>Identification of body parts on live animal and   | 1          |

|    |  |  |   |
|----|--|--|---|
|    | yak/chaury   | with help of well labeled diagram of live animal   |   |
| 8  | Identify local breeds of cattle                      | Breed characteristics of Pahadi, Achhami, Lulu, Chauri, Yak, Nak   | 1 |
| 9  | Identify improved breeds of cattle                   | Breed characteristics of Milch breed-Jersey, Holstein, Brown Swiss, Red Sindhi, Sahiwal<br>Dual Purpose: Hariyana, Nelore, Tharparkar<br>Draft breed: Amritmall, Khilari, Hallikar   | 4 |
| 10 | Identify local breeds of buffalo                     | Breed characteristics of Lime, Parkote   | 1 |
| 11 | Identify improved breeds of buffalo                  | Breed characteristics of Murrah, Jafarbadi, Surti, Mehsana   | 2 |
| 12 | Handle calf for treatment                            | Introduction<br>Objectives of restraining<br>Restraining by casting<br>Restraining by catching<br>Precaution to be taken   | 2 |
| 13 | Restrain adult cattle by casting                     | Introduction of casting<br>Purpose of casting<br>Length and thickness of casting rope<br>Casting methods: Burly method, Reef's method  | 2 |
| 14 | Restrain buffalo by casting                          | Introduction of casting<br>Length and thickness of casting rope<br>Casting methods: Rope squeeze method  | 2 |
| 15 | Restrain adult cattle/ buffalo by using Travis/Crate | Introduction<br>Size of trevis: Length, height etc<br>Preparation of Travis by local materials   | 1 |
| 16 | Restrain by using locally made Damlo                 | Preparation of Damlo by using local material<br>Casting by Damlo   | 1 |
| 17 | Collect manure                                       | Composition of cattle/buffalo dung as manure<br>Importance of cattle/buffalo manure for improving soil quality/ fertility<br>Methods of collection/ composting<br>Demonstration of compost manure<br>Protection from leaching and evaporation<br>Application of manure | 2 |
| 18 | Castrate male calf by close method                   | Introduction of castration<br>Importance of castration of bull<br>Proper age of castration<br>Handling during castration<br>Tools, materials, equipments used in castration<br>Precaution during castration<br>Use of antiseptic<br>Advice to the farmer               | 2 |
| 19 | Calculate live weight by body measurement            | Importance of body weight calculation<br>Principle of body wt .calculation   | 2 |

|    |   |   |   |
|----|---|---|---|
|    | of cattle/buffalo&<br>yak/chaori                            | Methods of body measurements<br>Calculation of live wt. by using formulas<br>Tools and equipment used<br>Live wt. estimation according to age, lifting<br>weighing and other method.  |   |
| 20 | Perform branding for<br>identification                      | Introduction of branding<br>Importance and principle of branding<br>Handling method for branding<br>Tools equipments used in branding<br>Formula used for numbering<br>Methods of branding<br>Other temporary marking system if in used       | 1 |
| 21 | Perform hoof trimming                                       | Introduction of hoof trimming<br>Importance and principle of hoof trimming<br>Handling method of hoof trimming<br>Tools equipments of hoof trimming<br>Formula used for numbering<br>Methods of hoof trimming                                 | 1 |
| 22 | Provide minerals/salt<br>for cattle /buffalo&<br>yak/chaori | Importance of mineral & salt<br>Signs and symptoms of mineral deficiency<br>Methods of providing salt & minerals  | 1 |
| 23 | Select breeding bull<br>/female                             | Definition of selection for breeding purpose<br>Importance of selection<br>Principle of selection<br>Selection criteria for male and female for<br>breeding<br>Importance of records for selection<br>Criteria for selection                  | 1 |
| 24 | Defect heat by external<br>sign                             | Oestrous cycle<br>Importance of heat detection<br>Age of puberty cattle/buffalo<br>Signs and symptoms of heat in cattle/buffalo<br>Appropriate time for mating/ AI  | 1 |
| 25 | Detect standing heat on<br>cow/ buffalo&<br>yak/chaori      | Use to detect heat by teaser<br>Mounting to other animals   | 1 |
| 26 | Care pregnant<br>cattle/buffalo&<br>yak/chaori              | Introduction<br>Feeding management<br>Housing management<br>Space requirement for female<br>Sanitation of barn<br>Maintaining health record<br>Correction of health related problems<br>Pregnancy diagnosis<br>-Routine drenching management. | 1 |
| 27 | Provide care for<br>breeding male bull                      | Introduction<br>Feeding management<br>Housing management<br>Space requirement<br>Sanitation<br>Health care management   | 1 |

|    |   |  |   |
|----|---|--|---|
|    |   | Routine drenching against parasites  |   |
| 28 | Care during parturition                                       | Signs and symptoms of before parturition<br>Space requirement<br>Cleaning and sanitation of barn<br>assisting during parturition time<br>Precaution during parturition   | 2 |
| 29 | Care newly born calf  | Removal of mucous from nose<br>Importance of colostrums feeding<br>Assisting for colostrums feeding<br>Assisting for breathing<br>Assisting for walking/ moving<br>Removing of navel<br>Orphan management if necessary   | 2 |
| 30 | Arrange for breeding management of cattle/buffalo& yak/chaury | Importance of breeding<br>Sexual maturity of male and female<br>Reproductive parts of male and female<br>Spermatogenesis and oogenesis of cattle/buffalo<br>Sensational effect<br>Appropriate time of mating<br>Arrangement of mating<br>Methods of breeding of cattle/buffalo   | 2 |
| 31 | Provide feed for cattle/buffalo& yak/chaury                   | Importance of feeding of cattle/buffalo<br>Routine feeding time<br>Amount/quantity of feed/day/time<br>Feeding style<br>Utilization of feed and water<br>Requirement of feed and feeding standard  | 2 |
| 32 | Provide preventive health care                                | List of ecto-endo parasite of cattle/buffalo.<br>List of common diseases of cattle/buffalo<br>Preventive measure of disease and parasite<br>Vaccination schedule of cattle/buffalo<br>Barn sanitation and disinfectant use for barn sanitation(See detail of parasite and diseases of cattle/buffalo)  | 2 |
| 33 | Explain housing system of cattle/buffalo& yak/chaury          | Types of Housing -Open yard, Intensive, Semi intensive<br>Space requirement of different stages of animal<br>Head to head and tail to tail system<br>Provision of ventilation, door, windows<br>Wall, roof and roofing type<br>Floor system type and importance<br>Provision of store, labour room, isolation room<br>Fencing and its importance | 2 |
| 34 | Select the site for cattle/buffalo& yak/chaury farm           | Objectives of site selection<br>Criteria for site selection<br>Factors considering in site selection   | 1 |
| 35 | Calculate space requirement for cattle/buffalo &              | Importance and scope<br>Space requirement for breeding male<br>Space required for breeding female  | 2 |

|    |   |  |           |
|----|---|--|-----------|
|    | yak/chaury  | Space required for replacement stock<br>Space required for calving pen<br>Space required for isolation pen<br>Space required for store, manure pit etc   |           |
| 36 | Arrange facilities for cattle/buffalo & yak/chaury farm       | Electricity, lighting facility, water supply etc   | 1         |
| 37 | Collect farm animal urine for manure                          | Composition of cattle urine its relation to environment<br>Losses of nutrients due to sunlight<br>Losses of nutrient due to leaching<br>Methods of decomposition   | 1         |
| 38 | Apply cattle urine as a source of soil nutrient and pesticide | Objective of dilution<br>Source of pesticide & soil nutrient<br>Soil & foliar application  | 1         |
| 39 | Apply bio-gas slurry in to soil                               | Definition of bio-gas slurry<br>Composition of bio-gas slurry<br>Importance of bio-gas slurry<br>Protection from bio-gas slurry<br>Methods of application bio-gas slurry                                     | 2         |
| 40 | Arrange tools/materials in cattle/buffalo farm                | Arrange of feeding watering equipments<br>Arrangement of market tools<br>Arrangement of veterinary tools.<br>Arrangement of handling tools/equipments<br>methods of storage of tools equipments<br>materials | 2         |
| 41 | Sale product  | Preparation of marketable product<br>Channel of marketing<br>Demand of consumers<br>Processing before marketing of product<br>Quality occurrence<br>Labeling if necessary<br>Importance of billing system    | 2         |
| 42 | Keep records of cattle/buffalo farm                           | Importance of record keeping<br>Elements of records<br>Types of farm records: Breeding, Production, Health, Feed, Calving  | 4         |
| 43 | Explain Artificial Insemination (AI)                          | Introduction, History, Advantages and Disadvantages of AI  | 2         |
| 44 | Explain Steps of AI   | Semen collection, Examination, Dilution, Storage   | 4         |
| 45 | Inseminate cow by AI method                                   | Insemination techniques<br>Sterilization and assembling of AI gun<br>Thawing, loading and insemination   | 4         |
| 46 | Detect proper time of AI                                      | Breeding behavior, History taking from owner, Examination of vaginal mucosa  | 2         |
|    |   | <b>Total</b>   | <b>78</b> |

**Livestock Production and Management I**  
**Sheep and goat Production**

Total Hours : 78 hrs  
Theory : 16 hrs  
Practical : 62 hrs

**Description:**

This part of course is designed to provide basic skills and knowledge of sheep and goat farming including breeds of sheep and goat, housing, care and manage of newly born kids/lambs, pregnant/lactating female, breeding buck/ram, replacement stock for commercial farming and marketing of live animal and meat.

**Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of sheep and goat farming in Nepal
2. explain different breeds of sheep and goat
3. design shed for commercial farming
4. manage newly born kids/ pregnant/lactating female, breeding male, replacement stock
5. explain sheep and goat breeding
6. explain feeds and feeding of sheep and goat
7. market live animal, meat and wool

| S.N | Skill   | Related technical knowledge   | Time (Hrs) |
|-----|---|---|------------|
| 1   | Explain scope of sheep/goat production in Nepal | History of sheep and goat production<br>Scope and importance of sheep and goat production in Nepal  | 2          |
| 2   | Identify external body parts of sheep/goat      | Objectives to study external body parts<br>Identification of body parts on live animal and with help of well labeled diagram of animal                                  | 1          |
| 3   | Identify local breeds of goat                   | Characteristics of Kari goat, Terai goat, Sinhal goat, Chyangra   | 1          |
| 4   | Identify improved breeds of goat                | Breed characteristics of Jamunapari, Barberi, Sanen   | 4          |
| 5   | Identify local breeds of sheep                  | Breed characteristics of Kage, Baruwal, Bhote, Lampuchhre   | 1          |
| 6   | Identify improved breeds of sheep               | Breed characteristics Merino, Ramboulet   | 2          |
| 7   | Restrain sheep/goat for treatment/castration    | Objectives of restraining<br>Method of restraining<br>Precaution to be taken  | 2          |
| 8   | Collect manure                                  | Composition of sheep/goat manure<br>Importance of sheep/goat manure for improving soil quality/ fertility<br>Methods of collection/ composting<br>Application of manure | 2          |
| 9   | Castrate buck/ram by close method               | Introduction of castration<br>Proper age of castration<br>Handling during castration<br>Equipments used in castration   | 2          |

|    |   |   |   |
|----|---|---|---|
|    |   | Precaution during castration<br>Use of antiseptic<br>Advice to the farmer   |   |
| 10 | Calculate live weight by body measurement of sheep/goat | Importance of body weight calculation<br>Principle of body wt .calculation<br>Methods of body measurements<br>Calculation of live wt. by using formulas<br>Live wt. estimation according to age, lifting weighing and other method.         | 2 |
| 11 | Perform tagging for identification                      | Introduction of tagging<br>Importance and principle of tagging<br>Handling method for tagging<br>Tools equipments used in tagging<br>Formula used for numbering<br>Methods of tagging<br>Other temporary marking system if in used          | 1 |
| 12 | Score condition of sheep/goat                           | Introduction<br>Method of condition scoring   | 1 |
| 13 | Provide minerals/salt for goat /sheep                   | Importance of mineral & salt<br>Signs and symptoms of mineral deficiency<br>Methods of providing salt &minerals   | 1 |
| 14 | Select breeding male /female                            | Definition of selection for breeding purpose<br>Importance of selection<br>Principle of selection<br>Selection criteria for male and female for breeding<br>Importance of records for selection<br>Criteria for selection                   | 1 |
| 15 | Defect heat by external sign                            | Oestrous cycle<br>Importance of heat detection<br>Age of puberty sheep/goat<br>Signs and symptoms of heat in sheep/goat   | 1 |
| 16 | Care pregnant sheep/goat                                | Introduction<br>Feeding management<br>Housing management<br>Space requirement for female<br>Sanitation of pen<br>Maintaining health record<br>Correction of health related problems<br>Pregnancy diagnosis<br>Routine drenching management. | 1 |
| 17 | Provide care for breeding male                          | Introduction<br>Feeding management<br>Housing management<br>Space requirement<br>Sanitation<br>Health care management<br>Routine drenching against parasites  | 1 |
| 18 | Care during parturition                                 | Signs and symptoms of before parturition  | 2 |

|    |  |   |   |
|----|--|---|---|
|    |  | Space requirement<br>Cleaning and sanitation of barn<br>assisting during parturition time<br>Precaution during parturition  |   |
| 19 | Care newly born kids   | Removal of mucous from nose<br>Importance of colostrums feeding<br>Assisting for colostrums feeding<br>Assisting for breathing<br>Assisting for walking/ moving<br>Removing of navel<br>Orphan management if necessary  | 2 |
| 20 | Explain ten point technology of goat farming                       | Ten point technology prepared by Bandipur goat farm   | 2 |
| 21 | Arrange for breeding management of sheep/goat                      | Importance of breeding<br>Sexual maturity of male and female<br>Reproductive parts of male and female<br>Spermatogenesis and oogenesis of sheep/goat<br>Sensational effect<br>Appropriate time of mating<br>Arrangement of mating<br>Methods of breeding of sheep/goat                        | 2 |
| 22 | Provide feed for sheep/goat  | Importance of feeding of sheep/goat<br>Routine feeding time<br>Amount/quantity of feed/day/time<br>Feeding style<br>Utilization of feed and water<br>Requirement of feed and feeding standard   | 2 |
| 23 | Make feeding rack from local materials                             | Introduction and Importance of feeding rack<br>Size and height of feeding rack  | 4 |
| 24 | Prepare mineral block for goat/sheep                               | Introduction and importance<br>Ingredients required<br>Feeding method of mineral block  | 4 |
| 25 | Explain cultivation practice of fodder trees for sheep/goat        | List of fodder trees<br>Cultivation practices   | 2 |
| 26 | Cultivate grasses for sheep/ goat                                  | Annual/ Perennial/ Biannual grasses for pasture   | 4 |
| 27 | Provide preventive health care                                     | List of ecto-endo parasite of sheep/goat.<br>List of common diseases of sheep/goat<br>Preventive measure of disease and parasite<br>Vaccination schedule of sheep/goat<br>Sanitation and disinfectant for sanitation<br><b>(detail of parasite and diseases of sheep/goat in AH I and II)</b> | 2 |
| 28 | Make ecto-parasitocidals by using tobacco and other local material | Method of preparation of ecto paracial drugs by using local materials   | 2 |



|    |   |   |           |
|----|---|---|-----------|
| 29 | Dip goat to control from external parasites | Dip tank: shape and size  | 4         |
| 30 | Explain housing system of sheep/goat        | Types of Housing Space requirement of different stages of animal<br>Fencing and its importance  | 2         |
| 31 | Select the site for sheep/goat farm         | Objectives of site selection<br>Criteria for site selection<br>Factors considering in site selection  | 1         |
| 32 | Calculate space requirement for sheep/goat  | Importance and scope<br>Space requirement for breeding male<br>Space required for breeding female<br>Space required for replacement stock<br>Space required for kidding pen<br>Space required for isolation pen<br>Space required for store, manure pit etc | 2         |
| 33 | Arrange facilities for sheep/goat farm      | Electricity, lighting facility, water supply etc  | 1         |
| 34 | Arrange tools/materials in sheep/goat farm  | Arrange of feeding watering equipments<br>Arrangement of market tools<br>Arrangement of veterinary tools.<br>Arrangement of handling tools/equipments<br>methods of storage of tools equipments<br>materials  | 2         |
| 35 | Sale product                                | Preparation of marketable product<br>Channel of marketing<br>Demand of consumers<br>Processing before marketing of product<br>Quality occurrence<br>Importance of billing system  | 2         |
| 36 | Slaughter sheep/goat                        | Introduction<br>Methods of slaughtering<br>Different parts used for meat, offal   | 6         |
| 37 | Keep records of sheep/goat farm             | Importance of record keeping<br>Elements of records<br>Types of farm records: Breeding, Production, Health, Feed, kidding   | 4         |
|    |   | <b>Total</b>  | <b>78</b> |

**Livestock Production and Management II**  
**Poultry production**

**Total Hours : 78 hrs**  
**Theory : 16 hrs**  
**Practical : 62 hrs**

**Description:**

This part of course is designed to provide basic skills and knowledge of poultry farming including breeds of chicken, housing, care and manages of broiler and layer chicken for commercial farming and marketing of meat and eggs.

**Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of poultry farming in Nepal
2. explain different breeds of chicken
3. design poultry house for commercial farming
4. care/ manage chicks, grower and layers
5. care/ manage broiler chickens
6. explain poultry breeding
7. explain feeds and feeding of poultry
8. market meat and eggs

| SN | Task statement  | Related Technical knowledge   | Time (hrs) |
|----|---|---|------------|
| 1  | Explain scope of poultry production in Nepal                                | History of poultry production in Nepal<br>Scope and importance of poultry farming<br>Present status (statistics), problems and future prospect of poultry production in Nepal | 2          |
| 2  | Explain government policies for poultry farming/ hatchery industry in Nepal | Government policies, norms, rules and regulation for poultry industry<br>Government and private chicken hacheries   | 1          |
| 3  | Explain common terms used in poultry  | Poultry, broiler, layer, pullet, capon, rooster, culling, moulting, starter, grower, finisher, cock, hen, chicks, geld,   | 1          |
| 4  | Explain poultry breeds  | Zoological classification   | 1          |
| 5  | Identify external body parts of a chicken                                   | Well labeled diagram of a chicken<br>Live chicken   | 1          |
| 6  | Explain Asiatic breeds  | Breed characteristics of chicken :<br>Asiatic-Brahma, Cohchin, Lngsan   | 2          |
| 7  | Explain Mediterranean breeds  | Mediterranean: Leghorn, Minorka   | 1          |
| 8  | Explain English breeds  | English: Austrolarp, Sussex   | 1          |
| 9  | Explain American breeds   | American: Rode Island Red, New Hampshire, Plymouth Rock   | 1          |
| 10 | Identify commercial broiler chicken   | Broiler: Vencob, Cob 100, Hubbard, Arboracre, Ross  | 1          |

|    |   |   |   |
|----|---|---|---|
|    |   |   |   |
| 11 | Identify commercial layer chicken                   | Layer: Hyline brown, Lomann, Isha brown, Babcock, Saver star cross 579  | 1 |
| 12 | Identify Nepali local chicken                       | Sakhini, Ghatikhuile, Pwankhulte  | 1 |
| 13 | Identify commercial dual purpose breed of chicken   | Giriraj   | 1 |
| 14 | Explain housing system of poultry                   | Housing system:<br>Free range,<br>Semi intensive,<br>Intensive( cage ,deep litter)<br>Advantages and disadvantages of each system   | 3 |
| 15 | Explain deep litter housing system of poultry       | Advantages and disadvantages<br>Litter management:<br>Application of lime and bleaching powder<br>Thickness of litter in summer and winter months<br>Floor space requirements in different age group  | 2 |
| 16 | Select site for poultry farm construction           | Purpose of farming: Hatchery/<br>commercial<br>Topography<br>Availability of feeds/ medicine<br>Workers/ technician availability<br>Market accessibility<br>Water and electricity supply<br>Roads<br>Availability of low cost construction materials            | 2 |
| 17 | Explain poultry shed construction                   | Lay out diagram<br>Purpose of construction( hatchery, layer, broiler farm);Small farm , Large scale farm<br>Construction materials: Sand, gravel, cement, GI sheet, stone/ brick, local roofing materials<br>Area calculation on basis of no. of birds and type | 2 |
| 18 | Identify the parts of digestive system of a fowl    | Well labeled diagram<br>Dissection of chicken<br>Name and function of different parts   | 1 |
| 19 | Identify the parts of reproductive system of a fowl | Well labeled diagram<br>Dissection of chicken<br>Name and function of different parts<br>Process of egg formation in reproductive tract   | 1 |

|    |  |   |   |
|----|--|---|---|
| 20 | Identify internal structure of a egg     | Well labeled diagram<br>Fresh egg<br>Nutrient composition of egg<br>Normal and abnormal eggs  | 1 |
| 21 | Identify poultry equipments              | Feeder, drinker, nest box, hover, perches, weighing balance, candler, debeaker, vaccinator, refrigerator, light source  | 1 |
| 22 | Prepare for brooding                     | Installation of hover, height of brooder, chick guard, fitting light, temperature maintaining, litter placing, checking water sources, emergency light source, space calculation, proper ventilation , protection from chilling and air draft.  | 1 |
| 23 | Care chicks ( 0-8 weeks)                 | Receiving chicks from reliable hatchery, maintaining bio-security, feeding chicks (L1 ration), incorporation of electrolytes, vitamin and antibiotics in feed or water in order to prevent early chick mortality, vaccination, record keeping( daily feed consumption, weight gain, medicine and vaccination, mortality)                                      | 3 |
| 24 | Care grower (8-16 weeks)                 | Bio-security measure, feeding pullet (L2 ration), feed restriction, reducing artificial light, moulting, debeaking, vaccination, vitamin and antibiotics supplement, record keeping   | 3 |
| 25 | Vaccinate birds                          | Vaccine and vaccination in poultry<br>Vaccination schedule for layer chicken<br>Vaccination method<br>Precaution to be taken  | 1 |
| 26 | Perform debeaking                        | Purpose of debeaking, age and method of debeaking<br>Precaution to be taken   | 1 |
| 27 | Deworm bird                              | Anthelmintics used in poultry, dose of anthelmintics, method of deworming( with feed/ water)  | 1 |
| 28 | Care laying chicken (16 weeks and above) | Bio-security measure, feeding layer (L3 ration), increasing artificial light, culling and selection of layer and non-layer, vaccination, vitamin and antibiotics supplement, record keeping( daily feed consumption, egg production, medicine and vaccination, mortality, culling, sales record), comparison with performance record provided by the hatchery | 3 |
| 29 | Sale of layer after                      | Age and stage of removal( sale) of  | 1 |

|    |  |  |   |
|----|--|--|---|
|    | productive life                        | layer<br>Sale of culled birds  |   |
| 30 | Keep local Nepali chicken              | Breed of local chicken, market demand, price rate, taste, rearing method, advantage and disadvantage of keeping local chicken, feeds and feeding   | 2 |
| 31 | Protect bird from hot/ chilled weather | Summer management and winter management of poultry bird  | 2 |
| 32 | Differentiate layer vs non layer       | Characteristics of layer and non layer chicken   | 2 |
| 33 | Collect eggs                           | time of collection, method of collection, storage of eggs  | 1 |
| 34 | Sort eggs for sale                     | Broken eggs, abnormal eggs( double yolk egg, yolkless egg, extra-large and small eggs, thin shelled egg)   | 1 |
| 35 | Sale eggs                              | Packing., storage, transportation of eggs<br>Marketing of eggs   | 1 |
| 36 | Keep account                           | Calculation of cost of production, profit and loss analysis, feed cost, medicine cost, labor cost, rent, electricity cost, maintenance and repair  | 3 |
| 37 | Care broiler chicks (starter)          | Receiving chicks from reliable hatchery, maintaining bio-security, feeding chicks (B1 ration), incorporation of electrolytes, vitamin and antibiotics in feed or water in order to prevent early chick mortality, vaccination, record keeping( daily feed consumption, weight gain, medicine and vaccination, mortality) | 3 |
| 38 | Care broiler finisher                  | Maintaining bio-security, feeding broiler (B2 ration), incorporation of electrolytes, growth promoter and antibiotics in feed or water, vaccination, record keeping( daily feed consumption, weight gain, medicine and vaccination, mortality)   | 2 |
| 39 | Market broiler chicken                 | Live bird marketing<br>Price fixing<br>Reason of price fluctuation<br>Marketing channel for broiler<br>Slaughtering technique<br>Freezing of meat  | 2 |
| 40 | Manage poultry manure                  | Collection, disposal and conservation of poultry manure, quality of manure , differentiation of layer and broiler manure on the basis of plant nutrients,  | 1 |

|    |   |  |           |
|----|---|--|-----------|
|    |   | sale of manure, application method   |           |
| 41 | Explain feeds/feeding of chicken                      | Layer ration: L1, L2, L3 ration<br>Broiler ration: B1 and B2<br>Breeder ration<br>Nutrient content of different type of ration<br>Use of locally available feed ingredients<br>Time of storage of ration | 2         |
| 42 | Explain hatchery management                           | Hatchery, parent stock, sources of parent stock, breeding and feeding management of parent stock, ratio of male and female   | 3         |
| 43 | Explain concept of AI in bird                         | Definition of AI, advantage and disadvantage, semen collection from rooster, technique of AI in bird   | 3         |
| 44 | Introduce common diseases/ parasites of poultry birds | Common diseases and parasites of poultry<br>( detail study in animal health II)  | 1         |
| 45 | Explain concept of duck farming                       | Common breeds, feeding, breeding, rearing and diseases of duck   | 3         |
| 46 | Explain concept of quail farming                      | Common breeds, feeding, breeding, rearing and diseases of Japanese quail   | 2         |
| 47 | Prepare scheme for poultry farming                    | Component of scheme preparation, scheme for broiler farm, layer farm, breeder farm, large and small scale poultry farm, banking procedure for loan   | 2         |
|    |   | <b>Total</b>   | <b>78</b> |

## Swine production

**Total Hours : 78 hrs**

**Theory : 16 hrs**

**Practical : 62 hrs**

### **Description:**

This part of course is designed to provide basic skills and knowledge of pig farming including breeds of swine, housing, care and manage of piglet, sow, breeding boar fattening pig for commercial farming and marketing of meat and piglets.

### **Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of swine farming in Nepal
2. explain different breeds of swine
3. design pig sty for commercial farming
4. care/ manage piglets, sow, gilt, breeding boar and fattening pig
5. Explain swine breeding
6. Explain feeds and feeding of swine
7. Market meat and piglets

| <b>S.No</b> | <b>Skill</b>  | <b>Related technical knowledge</b>  | <b>Time (hrs)</b> |
|-------------|---|---|-------------------|
| 1           | Explain Importance of pig farming in Nepal                  | Introduction of pig farming<br>Scope and importance of pig farming in Nepal<br>Socio economic and cultural aspect of pig farming    | 2                 |
| 2           | Explain present status/ prospect of pig production in Nepal | Role of government to improve pig farming<br>Government and private pig farms in Nepal<br>Possibilities of pig farming in Nepal     | 2                 |
| 3           | Explain social problems regarding pig farming               | Points to be considered before establishment of pig farming<br>Social problems in pig farming<br>Environmental problems             | 1                 |
| 4           | Define terminologies used in swine production:              | Terminologies used in swine production:<br>Sow, boar, piglet, gilt, farrowing, litter, pork, ham, geld, runt, flushing, steaming up | 1                 |
| 5           | Classify pig species  | Zoological classification of pig  | 1                 |
| 6           | Identify external body parts of a pig                       | Purpose of study of external body parts<br>Identification of body parts by well labeled diagram and live animal                     | 2                 |
| 7           | Identify the suitable breeds for commercial piggery         | Breed characteristics of improve breed:<br>Landrace, Yorkshire, Hampshire, Tamworth, Duroc Jersey, Pakhribas Cross                  | 3                 |
| 8           | Identify local breeds of pig                                | Characteristics of local breed: Hurra, Chwanche   | 1                 |
| 9           | Study behavior of pigs                                      | Importance of study common behavior<br>Feeding behavior   | 2                 |

|    |   |   |   |
|----|---|---|---|
|    |   | <p>Body movement<br/> Behavior on heat period<br/> Behavior on pregnancy<br/> Behavior during farrowing<br/> Behavior in sick period<br/> Excitement at strange places</p>  |   |
| 10 | Handle/ restrain pig                                      | <p>Objectives of restraining/ handling pig<br/> Handling of small piglets<br/> Method of restraining of adult boar and sow<br/> Handling sow in heat and pregnant time<br/> Handling of sick pig<br/> Precaution to be taken during handling</p>  | 4 |
| 11 | Collect/ dispose manure                                   | <p>Nutrient composition of dung<br/> Demonstration of methods of collection<br/> Protection from leaching and evaporation<br/> Environment pollution<br/> Application of manure<br/> Selling of manure</p>  | 1 |
| 12 | Castrate male piglet by open method                       | <p>Definition of castration<br/> Purpose of Castration<br/> Proper age for castration<br/> Handling of piglet during castration<br/> Tools, materials, equipments required for castration<br/> Precaution to be taken during castration<br/> Use of antiseptic<br/> Advices to the farmers.</p>           | 4 |
| 13 | Calculate live weight by body measurement formula for pig | <p>Purpose of body weight calculation<br/> Different formula used for estimation of live body weight<br/> Measuring length and hearth girth<br/> Calculation of live wt. by using formula<br/> Tools and equipment used<br/> Estimation of live wt. according to age, lifting and weighing by balance</p> | 2 |
| 14 | Identify pig by ear noticing method                       | <p>Introduction of ear noticing<br/> Handling method for ear noticing<br/> Equipments needed for ear noticing<br/> Numbering technique<br/> Methods of ear noticing<br/> Other identification system: naming...</p>   | 2 |
| 15 | Perform teeth clipping                                    | <p>Age for teeth clipping<br/> Purpose of teeth clipping<br/> Methods of handling during teeth clipping<br/> Tools and equipment used<br/> Precaution to be taken during teeth clipping</p>   | 2 |
| 16 | Inject iron for piglet                                    | <p>Importance of iron in piglet<br/> Piglet anemia<br/> Signs and symptoms<br/> Proper age for iron injection<br/> Dose of iron dextrin</p>   | 3 |



|    |   |  |   |
|----|---|--|---|
|    |   | Methods of iron injection to piglets<br>Other sources of iron supplement in piglets  |   |
| 17 | Select breeding boar  | Importance of selection<br>Principle of selection<br>Selection methods: Individual selection,<br>Progeny testing, Pedigree selection   | 1 |
| 18 | Select sow/ gilt for breeding purpose                           | Importance of selection<br>Principle of selection<br>Selection methods: Individual selection,<br>Progeny testing, Pedigree selection   | 2 |
| 19 | Explain reproduction in swine                                   | Reproductive organs of sow and boar<br>Function of different organs<br>Hormonal roles on reproduction  | 2 |
| 20 | Defect heat by external symptoms of sow                         | Estrous cycle of swine<br>Puberty and sexual maturity in pig<br>Signs and symptoms of heat in saw<br>Detection of heat and appropriate time for mating.  | 2 |
| 21 | Explain housing system of pig                                   | Types of Housing -Open yard type<br>-Closed type<br>Ventilation, door, windows, fencing<br>Wall system: type and importance<br>Roof and roofing type and importance<br>Floor system type and importance<br>Feeding trough, waterer, gutter, manure yard.<br>Store, labour room, isolation room,<br>farrowing box<br>Fencing and its importance<br>Lay out plan | 2 |
| 22 | Select the site for piggery                                     | Criteria for site selection<br>Factors to be considered for site selection   | 1 |
| 23 | Calculate space requirement for different age and stages of pig | Space requirement for fattening<br>Space required for open system<br>Space required for Breeding boar and sow<br>Space required for farrowing crate<br>Space required for isolation pen<br>Space required for store, manure pit etc  | 1 |
| 24 | Arrange facilities for piggery                                  | Provision of electricity for light and heat<br>Provision of fresh water supply   | 1 |
| 25 | Arrange tools/materials in piggery                              | Arrange of feeding, watering equipments<br>Provision of weighing/ measuring tools/<br>restraining materials<br>Provision of first aid box<br>Storage of tools and equipments   | 2 |
| 26 | Repair /maintain piggery  | Maintaining fence<br>Repairing of permanent structure (House,<br>Tools, equipments etc)  | 1 |
| 27 | Care pregnant sow   | Feeding ; daily feed requirement, steaming up<br>Space requirement for pregnant sow<br>Sanitation of pig sty   | 2 |

|    |  |  |           |
|----|--|--|-----------|
|    |  | Pregnancy diagnosis<br>Weight gain during pregnancy<br>Isolation at the time of farrowing<br>Routine de-worming  |           |
| 28 | Care breeding boar                             | Feeds and Feeding requirements<br>Housing Management- space requirement<br>Sanitation of sty<br>Health care management<br>Routine drenching  | 2         |
| 29 | Care sow during/ after farrowing               | Signs and symptoms of farrowing<br>Preparation of farrowing place<br>Cleaning and sanitation of farrowing crate<br>Provision of guard rail<br>Dystocia management<br>Precaution to be taken during farrowing   | 3         |
| 30 | Provide post natal care of piglet              | Removal of mucous from nose<br>Providing bedding material<br>Protection from chilling in winter<br>Importance colostrums feeding<br>Assisting for breathing<br>Removing of umbilicus cord<br>Special care of runt and weak piglets<br>Orphan management if necessary | 2         |
| 31 | Care piglet before weaning                     | Space requirement<br>Creep area<br>Feeds for piglets and creep feeding<br>Weaning of piglets   | 2         |
| 32 | Provide preventive health care                 | Ecto and endoparasites of pig.<br>List of common diseases of pig<br>Vaccination schedule of pig<br>Sanitation and disinfectant in piggery<br><b>(Details of parasites and diseases of pig- see in Animal Health I and II)</b>  | 4         |
| 33 | Assist to find market demand/ supply of piglet | Number and capacity of piggery in local areas<br>Price of piglet<br>Weaning age  | 2         |
| 34 | Sale product(meat)                             | Marketing channel<br>Local, national and international market<br>Project work to find out actual sales of meat and live pigs in terms of amount and quantity/number  | 4         |
| 35 | Keep records of piggery                        | Breeding record, Sales record, Health record, Feeding record and Labor record  | 4         |
| 36 | Keep account of pig production                 | Daily transaction, Profit and loss, Financial analysis<br>Scheme preparation   | 5         |
|    |  | <b>Total</b>   | <b>78</b> |

## Rabbit, Dog and Laboratory Animals (Optional I)

**Total Hours : 78 hrs**

**Theory : 16 hrs**

**Practical : 62 hrs**

**Description:**

This part of course is designed to provide basic skills and knowledge of rabbit, dog and laboratory animal production including breeds, breeding, housing, care and management and marketing.

Here are three optional modules out of three training institute can choose one for detail practical study according to there resources or need. It is suggested that training center should inform about chosen module to CTEVT for examination point of view.

**Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of rabbit, dog and laboratory animal in Nepal
2. explain different breeds of rabbit, dog and laboratory animal
3. design housing and shelter for rabbit, dog and laboratory animal
4. care/ manage rabbit, dog and laboratory animal
5. explain breeding rabbit, dog and laboratory animal
6. explain feeds and feeding of rabbit, dog and laboratory animal
7. market rabbit, dog and laboratory animal

| S. N                     | Task/skill                                  | Related technical knowledge   | Time (Hr) |
|--------------------------|---|---|-----------|
| <b>Rabbit production</b> |   |   |           |
| 1                        | Explain scope of rabbit production in Nepal | Introduction and classification of rabbit<br>Scope of rabbit production<br>Economic importance of rabbit  | 2         |
| 2                        | Explain breed characteristic of rabbit      | Characteristics of meat type breed<br>Characteristics of fur breed  | 3         |
| 3                        | Explain housing requirement of rabbit       | Housing type<br>Space requirement<br>Site selection<br>Equipment necessary inside housing<br>Hutch and organizing run<br>Nest box   | 3         |
| 4                        | Explain feeds/feeding of rabbit             | Requirements of nutrient for different age and stages of rabbit<br>Nutrient requirements for fur production<br>Nutrient requirement for meat production<br>Nutrient requirement for lactating mother<br>Method of feeding and water supply for rabbit | 3         |
| 5                        | Handle rabbit                               | Methods of handling<br>Precaution during handling   | 1         |
| 6                        | Manage breeding of rabbit                   | Breeding behavior of rabbit<br>Age for breeding   | 1         |

|                         |  |   |   |
|-------------------------|--|---|---|
|                         |  | Sexing of rabbit  |   |
| 7                       | Manage mating                                | Mixing male and female<br>Coitus stimulation<br>Precaution  | 1 |
| 8                       | Care pregnant rabbit                         | Signs of pregnancy<br>Care of pregnant<br>Handling during pregnancy<br>Gestation period of rabbit   | 1 |
| 9                       | Care newly born kitten                       | Removal of kitten<br>Prevention from enemies<br>Chances of refusal of kitten by mother in case of touching by man at birth<br>Bedding materials used          | 1 |
| 10                      | Care lactating female                        | Feeding lactating female<br>Nutritive and palatable food for female   | 1 |
| 11                      | Wean young from mother                       | Weaning and its importance<br>Age of weaning<br>Feeding and care after weaning  | 1 |
| 12                      | Care rabbit kept for meat/<br>fur production | Proper feeding<br>Daily care and management<br>Cleaning and sanitation of pen<br>Protection from enemies  | 2 |
| 13                      | Provide health care service<br>for rabbit    | Prevention, control and treatment of:<br>Coccidiosis, Liver fluke, Ear mange,<br>Metritis   | 2 |
| 14                      | Remove fur                                   | Technique of removal<br>Storage of fur<br>Marketing of fur<br>Quality of fur  | 2 |
| 15                      | Slaughter rabbit for meat<br>purpose         | Methods of handling before killing<br>Slaughtering techniques<br>Dressing methods<br>Preparation of meat<br>Keeping quality<br>Nutritive value of rabbit meat | 2 |
| 16                      | Keep records                                 | Types of record: breeding, production,<br>feeding, weigh gain, financial, health<br>records<br>Analysis of records  | 2 |
| <b>Pet animal (Dog)</b> |  |   |   |
| 17                      | Introduce dog as a pet<br>animal             | History of dog keeping as companion<br>animal<br>Dog behavior   | 1 |
| 18                      | Explain scope pet animal                     | Scope and importance of dog as pet animal   | 2 |
| 19                      | Classify dogs on the basis<br>of usage       | Popular breed of dogs:<br>Dog breeds kept as a friend of children<br>Dog breeds kept as home guard<br>Dog breeds utilized as household workers                | 2 |
| 20                      | Explain the breed character<br>of dog        | Doberman<br>Mastiff   | 2 |

|                   |  |   |   |
|-------------------|--|---|---|
|                   |  | Alsatian<br>Boxer, Mungral  |   |
| 21                | Handle dog                               | Importance of handling dogs<br>Methods of handling<br>Use of mouth cover<br>Handling by owner<br>Precaution during restraining  | 1 |
| 22                | Provide routine care for dog             | Tools equipment used for care of dogs<br>Bathing method<br>Catch care<br>Exercise for dog<br>Training of dog<br>Teeth care  | 2 |
| 23                | Castrate male dog                        | Principle and procedure of castration   | 3 |
| 24                | Explain spaying in female                | Principle and procedure of spaying  | 4 |
| 25                | Provide preventive care for dog          | Routine deworming schedule<br>Vaccination against Rabies, Distemper, Parvoenteritis, Parainfluenza, Leptospirosis, Hepatitis  | 3 |
| 26                | Perform physical examination of dog      | History taking<br>Inspection<br>Examination of body part  | 2 |
| 27                | Explain construction of kennel for dog   | Kennel space<br>Bedding materials<br>Routine cleaning and sanitation of kennel  | 2 |
| 28                | Arrange for dog breeding                 | Oestrus cycle of dog<br>Mating behavior<br>Heat period of dog<br>False pregnancy<br>Accidental pregnancy  | 2 |
| 29                | Care for pregnant dog                    | Pregnancy diagnosis<br>Feeding requirement during pregnancy<br>Kennel management<br>Problems during pregnancy (Morning sickness)  | 1 |
| 30                | Care puppy                               | Nursing management of puppy   | 1 |
| 31                | Explain about concept of kennel club     | Scope and importance of kennel clubs<br>Minimum requirement to establish a kennel club<br>Preparation of a model of kennel club<br>Services to be provided by a kennel club<br>Example of kennel clubs in Nepal | 2 |
| 32                | Explain common diseases of dog           | Signs symptoms control treatment of Distemper, Parainfluenza, Parvo enteritis and Rabies ,Hepatitis, Parasites and parasitic diseases   | 6 |
| 33                | Keep record                              | Breeding, Vaccination and Health records  | 2 |
| <b>Lab animal</b> |  |   |   |
| 34                | Explain importance of laboratory animals | Purpose keeping lab animal<br>Different use of lab animal   | 2 |

|    |  |   |           |
|----|--|---|-----------|
| 35 | Explain characteristics of laboratory animal | Characteristics of Guinea pig, Mouse, Rabbit kept as lab animal     | 4         |
| 36 | Explain care of laboratory animals           | Feeding, housing, breeding, daily care and management of lab animal | 4         |
| 37 | Keep record                                  | Feeding, Breeding, Vaccination and Health records                   | 2         |
|    | <b>Total</b>                                 |   | <b>78</b> |

## Fish Production (optional II)

**Total Hours : 78 hrs**  
**Theory : 16 hrs**  
**Practical : 62 hrs**

### **Description:**

This part of course is designed to provide basic skills and knowledge of fish culture including species identification, breeding, rearing and transportation of brood fish and fingerlings. It gives basic skills of the control of diseases, parasites as well as protection of cultivated fishes from enemies and predators. It also provide a basic concept of rearing Rainbow trout and a popular Magur fish

### **Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of fish culture in Nepal
2. explain different species of fish cultivated in Nepal
3. design pond for fish culture
4. transport, rear and stock fingerling with less chances of mortality
5. breed fish by natural way as well as artificially
6. control diseases and parasites of fish
7. market fish and fingerlings

| SN | Skill / Task List                           | Related Technical Knowledge  | Time (Hr) |
|----|---|--|-----------|
| 1  | Classify fish species                       | Introduction of fish and fish culture<br>Zoological classification of fish<br>Differentiation between fish culture and aquaculture   | 2         |
| 2  | Explain scope of fish farming in Nepal      | History of fish farming in Nepal<br>Scope of fish culture in Nepal<br>Economic importance of fish  | 2         |
| 3  | Explain method of fish culture              | Pond fish culture, Cage culture, Riverine fish culture, Pen culture<br>Running water vs stagnant water fish culture<br>Fish farming zone of Nepal  | 3         |
| 4  | Identify external body parts of fish        | External body parts of fish with function of each parts  | 2         |
| 5  | Identify common fish species found in Nepal | <b>Indigenous species</b><br>Indian major carps: Rohu, Bhakur, Naini<br>Locally popular fish: Asala, Katle, Buduna, Jalkapur<br>Weed/ predatory fish: Magur, Bhoti, Shinghi, Barari<br><b>Exotic species</b><br>Chinese carps: Big head carp, Silver carp, Grass carp<br>Common carps: German carp, Israeli carp<br>Rainbow trout fish | 10        |
| 6  | Select site for fish farming                | Conditions required for fish farming<br>Source of water/ water temperature<br>Drainage facility, Soil type   | 2         |

|    |   |  |   |
|----|---|--|---|
|    |   | Accessibility of road, market, labour, fingerlings supply  |   |
| 7  | Explain method of construction of fish pond                     | Lay out plan<br>Dike, Core trench, Spill way, Embankment, Inlet, Outlet, Area of pond, Carrying capacity   | 2 |
| 8  | Explain types of fish pond                                      | Incubator/ hatchery<br>Nursery pond, Rearing pond, Breeding pond   | 2 |
| 9  | Maintain/repair fish pond                                       | Different problems of fish pond<br>Maintenance of dike height/slope<br>Cleaning of fish pond, application of fertilizer/lime in pond   | 2 |
| 10 | Maintain water quality of pond                                  | pH, turbidity, water temperature, dissolved oxygen level, water level  | 1 |
| 11 | Explain type of fish culture                                    | Monoculture, Polyculture, Monosex culture<br>Integrated fish culture: Paddy cum fish culture, Duck cum fish culture, Pig cum fish culture etc<br>Stocking density in each type<br>Advantage and disadvantage of each type                            | 3 |
| 12 | Explain fish breeding   | General concept of fish breeding and fingerling production<br>Conditions required for fish breeding<br>Natural and artificial breeding   | 2 |
| 13 | Select brood fish   | Characteristics of brood fish<br>Differentiation of male and female brood fish<br>Age of breeding for different species of cultivated fish   | 1 |
| 14 | Explain natural breeding of common carp                         | Monosex culture, selection of brood fish, water temperature, season of breeding, male and female ratio, Kakabon preparation, spawning, hatching, feeding of hatchlings   | 2 |
| 15 | Explain artificial breeding of Indian major carps/Chinese carps | Selection of brood fish, age and weight of brood fish, male female ration, hypophysation, injection time/ dose of pituitary extract/ injection of ovaprim and dose rate, spawning, breeding hapa, incubator, water sprinklers, feeding of hatchlings | 4 |
| 16 | Transport fry/fingerlings                                       | Ordering fingerlings; Sources of fingerlings<br>Method transportation of fingerlings<br>Stocking density and method of stocking<br>Precaution to be taken during transport and stocking time   | 2 |
| 17 | Rear fry/ fingerlings   | Management of nursery pond; Feeding of fry and fingerlings<br>Protection from enemies;<br>Symptom of dissolve O <sub>2</sub> deficiency<br>Assessment of growth rate   | 2 |
| 18 | Rear fish for table purpose                                     | Management of rearing pond<br>Feeding of artificial feeds for fast growth<br>Natural food, Protection from enemies   | 2 |



|    |  |   |           |
|----|--|---|-----------|
|    |  | Symptom of dissolve O <sub>2</sub> deficiency<br>Assessment of growth rate  |           |
| 19 | Rear brood fish  | Management of breeding pond<br>Transportation of brood fish<br>Protection from enemies<br>Symptom of dissolve O <sub>2</sub> deficiency<br>Growth rate and symptoms of maturity   | 2         |
| 20 | Explain concept of rearing Magur fish                    | General concept, sources of fingerling, rearing, stocking density, growth rate, feeding habit and marketing   | 2         |
| 21 | Explain concept of rearing Rainbow trout fish            | General concept, sources of fingerling, rearing technique, requirement of running water, water quality, race way management, water temperature, stocking density, growth rate, feeding habit and marketing                      | 2         |
| 22 | Explain concept of rearing fish in aquarium              | General concept, purpose, type of fishes kept in aquarium, sources of fingerling, feeding habit and marketing   | 2         |
| 23 | Identify natural feed in pond                            | Feeding habits of different fishes<br>Phytoplankton and zooplankton<br>Importance of fertilizer in fish pond  | 2         |
| 24 | Prepare feed for fish from locally available ingredients | Natural and artificial food<br>Feeding requirement for different stages and types of fish<br>Mixing of different ingredients for fish ration<br>Feeding time, Feeding behavior  | 4         |
| 25 | Explain different weed fishes                            | Weed fishes: <i>Puntius</i> spp., <i>Channa</i> spp,<br>Control of Weed fishes  | 2         |
| 26 | Explain predatory fishes/enemies                         | List of predatory fishes: <i>Wallago attu</i> , <i>Clarius batrachus</i> , <i>Heteropneutis fosillis</i> , <i>Anguila bengalensis</i><br>Fish enemies: Snake, Frog, Crocodile, Otter<br>Control of predatory fishes and enemies | 2         |
| 27 | Control common fish diseases parasites                   | Common fish diseases: Icthiothyriosis, White spot disease, Fin rot, Gill rot, Argulosis, Gyrodactylus, Dactylogyrus<br>Sign and symptoms, control and treatment.  | 6         |
| 28 | Harvest fish   | Stage of harvesting, Methods of harvesting<br>Using Nets: Drag net, Scoop net, Maji Jal<br>Care and maintenance fish nets<br>Fishing hook, Harvesting by removal of water<br>Harvesting by poisoning                            | 2         |
| 29 | Market fish  | Time of harvesting fish<br>Marketing channel and fish market, Pricing<br>Customer behavior and marketing policy   | 1         |
| 30 | Keep records   | Record of feed, production, costs, sales, health<br>Analyzing record for management purposes  | 3         |
| 31 | Develop and annual calendar                              | Elements of a fish farming calendar for fish farming  | 2         |
|    |  | <b>Total</b>  | <b>78</b> |

### Horse and Mule Production (Optional III)

**Total Hours : 78 hrs**

**Theory : 16 hrs**

**Practical : 62 hrs**

**Description:**

This part of course is designed to provide basic skills and knowledge of horse and mule production including housing, care and management, breeding and health care of riding horse and pack animals.

**Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of horse and mule in Nepal
2. design housing/ shelter for horse and mule
3. care/ manage different stages and age of horse and mule
4. Explain feeds and feeding

| S N | Task/skill                                  | Related technical knowledge   | Time (hrs) |
|-----|---|---|------------|
| 1   | Explain scope of horse/ mule in Nepal       | Introduction of horse and mule<br>Scope and importance of horse and mule in Nepal<br>Use of horse/mule in Nepal<br>Statistics horse/mule in Nepal<br>Terminology used in horse/mule | 2          |
| 2   | Select horse/mule                           | Purpose of selection<br>Selection criteria for horse/mule<br>Method of selection  | 3          |
| 3   | Identify external body part of horse/mule   | Importance of study external body parts<br>Identification of external body parts  | 2          |
| 4   | Explain breed characteristics of horse/mule | Importance of study of breed character<br>Body structure based character<br>Colour based character<br>Behavior based character<br>Size based character<br>Draft based character     | 5          |
| 5   | Study behavior of horse/mule                | Purpose of study<br>Feeding behavior<br>Body movement<br>Behavior during Pregnancy<br>Behavior during foaling   | 2          |
| 6   | Handle horse/mule                           | Purpose of restraining<br>Method of handling: by casting, by using twitch, by lifting of limb, by using anesthetics<br>Precaution during handling                                   | 4          |
| 7   | Restrain animal using casting rope          | Purpose of casting<br>Size of rope (length and thickness) used for casting a horse<br>Preparation for casting<br>Precaution during casting  | 3          |

|    |  |   |   |
|----|--|---|---|
| 8  | Manage manure of horse/mule                | Proper method of management<br>Precaution during management   | 2 |
| 9  | Castrate male horse by open method         | Meaning of castration<br>Advantage of castration<br>Proper age for castration<br>Casting animal<br>Materials required: anesthetics with dose rate, surgical instruments, bedding materials<br>Surgical procedure<br>Post operative care | 4 |
| 10 | Estimate body weight of horse/mule         | Estimate body weight by observation for calculation of dosage of drug   | 2 |
| 11 | Detect heat of mare                        | Importance of detection of heat<br>Estrus cycle<br>Age of puberty<br>Sign and symptoms of heat<br>Mating time and mating behavior   | 2 |
| 12 | Care pregnant mare                         | Feeding of pregnant mare<br>Housing and space requirement<br>Cleaning and sanitation<br>Preventive health care  | 2 |
| 13 | Care newly born foal                       | Removal of mucous from nose<br>Bedding material<br>Assistance for walking and suckling<br>Feeding colostrums<br>Removal of navel  | 3 |
| 14 | Care post parturient mare                  | Feeding of mare<br>Housing and space requirement<br>Cleaning and sanitation<br>Preventive health care   | 3 |
| 15 | Care riding/ race horse/pack animal        | Feeding of riding horse/mule<br>Feeding requirements of horse/ mule<br>Housing and space requirement<br>Cleaning and sanitation<br>Preventive health care   | 3 |
| 16 | Fit saddle                                 | Purpose and method of fitting a saddle  | 3 |
| 17 | Place a pack frame for loading pack animal | Purpose and method of placing a pack  | 3 |
| 18 | Assist in training a riding/pack animal    | Purpose and method of training  | 4 |
| 19 | Care equipments of work animal             | Care of Pack, harness, saddle, bridle   | 3 |
| 20 | Explain digestion in horse                 | Digestive system of horse<br>Role of digestion in caecum  | 4 |
| 21 | Trim hoof of horse/mule                    | Purpose of hoof trimming<br>Precaution during hoof trimming<br>Handling of animal for hoof trimming<br>Procedure of trimming hooves   | 2 |
| 22 | Perform sole fitting                       | Purpose of sole fitting<br>Shape and size   | 3 |

|    |                                       |   |           |
|----|---------------------------------------|---|-----------|
|    |                                       | Fitting sole/ nailing of sole   |           |
| 23 | Age animal by dentition               | Purpose of aging<br>Technique of aging  | 2         |
| 24 | Explain housing for horse/mule        | System of housing<br>Space requirement for foal, stallion, mare, breeding male and female   | 4         |
| 25 | Explain special disease of horse/mule | Spasmodic colic sign and symptoms<br>Laminitis sign and symptoms<br>Pole-evil sign and symptoms<br>Thrush of sole sign and symptoms<br>Making thrush powder and use | 6         |
| 26 | Care foot of horse                    | Anatomy of horse foot<br>Sole of horse (frog), care to prevent laminitis  | 2         |
|    | <b>Total</b>                          |   | <b>78</b> |

## Animal Nutrition and Fodder Production

**Total Hours : 156 hrs**  
**Theory : 32 hrs**  
**Practical : 124 hrs**

### **Description:**

This course is designed to provide basic skills and knowledge necessary for feeds and feeding of animals and cultivation of fodder and pasture required to feed livestock and poultry

### **Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of animal nutrition and fodder production in Nepal
2. explain nutrients required for different animal species and poultry birds
3. classify feed stuffs
4. cultivate fodder and grasses
5. produce and manage pasture
6. assist to formulate ration for livestock and poultry
7. conserve fodder and forage for lean season
8. calculate dry matter and total feeds required for animals

| S.N | Skill   | Related technical knowledge  | Time (hrs) |
|-----|---|--|------------|
| 1   | Define Animal Nutrition                         | Definition of animal nutrition and related terminology used in animal nutrition: Nutrition, Nutrient, Ration, Feed, Dry matter, DE, ME,  | 2          |
| 2   | Classify nutrients                              | Water, Carbohydrate, Protein, Fat, Mineral, Vitamin  | 2          |
| 3   | Explain function of water in animal body        | Source of fresh clean water<br>Function of water<br>Dehydration / rehydration<br>Water requirements in hot summer, for milk producing animal, animal in draft purpose, general requirements /day | 2          |
| 4   | Explain the role of carbohydrate in animal body | Introduction<br>Source of carbohydrate<br>Function of carbohydrate<br>Deficiency symptoms<br>Requirements  | 2          |
| 5   | Explain the role of protein in animal body      | Introduction<br>Type of protein<br>Amino acids: essential amino acid<br>Source of protein<br>Function of protein<br>Deficiency symptoms<br>Requirements  | 3          |

|    |  |  |   |
|----|--|--|---|
| 6  | Explain the role of fat/lipid in animal body                       | Fat and Lipid<br>Essential fatty acid<br>Source of fat<br>Function<br>Deficiency symptoms<br>Energy requirements   | 2 |
| 7  | Explain the role of vitamins in animal body                        | Introduction<br>Type of vitamins: Fat soluble and water soluble vitamins<br>Source and functions of different vitamins<br>Deficiency symptoms<br>Requirements  | 3 |
| 8  | Explain the roles of minerals in animal body                       | Introduction<br>Micro minerals: Fe, Co, Cu, Se, I, Zn<br>Macro minerals: Ca, P, Na, K, Mg, Cl<br>Sources and functions of minerals<br>Mineral deficiency symptoms<br>Requirements  | 4 |
| 9  | Explain the digestion process of ruminant and non- ruminant animal | Microbial digestion in ruminants<br>Enzymatic digestion in non-ruminants<br>Microbial activities in rumen/ caecum  | 3 |
| 10 | Determine nutrient requirement for animals                         | Concept of NRC and ARC standard<br>Nutrient requirements for layer / broiler chicken<br>Nutrient requirement for pigs<br>Nutrient requirement for dairy cattle and buffalo<br>Nutrient requirements for sheep and goat<br>Nutrient requirements for horse and mule | 4 |
| 11 | Classify the feed stuffs   | Roughage: dry roughage and succulent roughages<br>Concentrate: energy rich, protein rich<br>Feed supplements: mineral and vitamin supplements<br>Feed additives: antibiotics, preservatives, antifungal  | 4 |
| 12 | Identify locally available feed ingredients                        | Feed ingredients: energy rich, protein rich  | 3 |
| 13 | Formulate ration for different animal species                      | Importance of balance ration<br>Feed formulation for poultry<br>Feed formulation for dairy cattle and buffalo<br>Feed formulation for pig  | 6 |
| 14 | Calculate dry matter for cattle and buffalo                        | Dry matter requirements for cattle and buffalo<br>Calculation of green fodder<br>Calculation of the dry fodder<br>Calculation of energy rich concentrate<br>Calculation of protein rich concentrate  | 4 |

|    |  |   |   |
|----|--|---|---|
| 15 | Process feed ingredients   | Introduction of feed processing<br>Husking, wilting, drying, soaking, grinding, ensiling, chopping, roasting , pelleting  | 4 |
| 16 | Explain the importance of crop/ animal by-product in animal rate | Introduction of byproduct<br>Crop by products: rice polish, wheat bran, molasses, oil cakes, brewery extract<br>Animal by- products: fish meal, meat meal, blood meal, feather meal, bonemeal dairy by-products | 4 |
| 17 | Design yearly feeding plan                                       | Importance of feeding plan<br>Locally available feed stuff  | 2 |
| 18 | Collect fodder/forage grass ( herbarium collection)              | Herbarium collection method and importance  | 4 |
| 19 | Classify grass   | Annual, biennial , perennial grasses<br>Leguminous and non leguminous greases and fodder  | 3 |
| 20 | Explain factor nutritive value of feeds stuff                    | Live stock supplies and breed<br>Feeding method, -Level of feeding<br>Protein and fiber ratio<br>Physiological condition of animal  | 4 |
| 21 | Cultivate perennial leguminous grasses                           | Cultivation practice of Stylo, Kudzu, Desmodium,  | 3 |
| 22 | Cultivation of annual legume grass                               | Cultivation practice of Beseem, Vetch   | 2 |
| 23 | Cultivation of perennial non legume grasses                      | Cultivation practice of Napier, Setaria<br>Molasses, Paspalum, Rye grass  | 5 |
| 24 | Cultivate the annual forage grass                                | Cultivation practice of oat   | 2 |
| 25 | Follow mixed cropping system                                     | Maize, cowpea and soyabean<br>Oat and berseem   | 2 |
| 26 | Explain importance of grass for livestock farming                | Importance of green grass<br>Fodder trees for livestock<br>Nutritive value of fodder  | 2 |
| 27 | Identify multipurpose fodder trees found in local area           | Introduction of multipurpose tree<br>Importance of multipurpose trees<br>Local, Botanical, English name of fodder and grasses<br>Nutritive value of locally available multipurpose tree                         | 3 |
| 28 | Establishing fodder nursery in school farm                       | Introduction of nursery<br>Site selection<br>Lay outing for nursery<br>Arrangement of irrigation drainage, path<br>Fencing<br>Soil preparation for seed bed<br>Plastic bag<br>Nursery tools and equipments      | 5 |
| 29 | Propagate fodder trees by vegetative methods                     | Propagation by cutting<br>Propagation of layering<br>Propagation of budding   | 4 |

|    |  |  |   |
|----|--|--|---|
|    |  | Propagation of grafting<br>Planting of cutting<br>Media preparation for layering   |   |
| 30 | Cultivate local fodder tree                                      | Badahar-Kutmiro Nivaro,Tanki, Pakhuri,<br>Kharsu, Ipilipil, Dabadabe, Kimbu  | 8 |
| 31 | Propagate by reproductive method                                 | Preparation of media<br>Reliable source of seed<br>Seed collection time and storage<br>Dormancy breaking process if necessary<br>Germination test<br>Soiling of seed<br>Preparation of plastic bag<br>Preparation of soil mixture<br>Filling of soil mixture in plastic<br>Plantation method<br>Daily care and management<br>Inoculation | 5 |
| 32 | Transplant fodder trees  | Site selection for transplanting<br>Preparation of pit for transplant<br>Transplantation of seedling   | 4 |
| 33 | Provide care for fodder trees                                    | Manuring, irrigation, weeding, lopping<br>techniques of fodder trees   | 2 |
| 34 | Identify main plant parts stage of fodder trees used for feeding | Parts of grass and trees<br>Identify nutritive stage and part of plant   | 2 |
| 35 | Lope fodder  | Lopping method; Lopping season<br>Lopping time (morning/ day)  | 2 |
| 36 | Feed/grass fodder  | Preparation grass fodder before feeding<br>Frequency of feeding<br>Time for feeding  | 2 |
| 37 | Introduce pasture management                                     | Definition of pasture<br>Importance and scope of pasture land<br>Range land management<br>Annual legume/non legume; Perennial<br>Classification of pasture on the basis of climatic/geographical region  | 2 |
| 38 | Improve pasture land   | Rejuvenation, Renovation, Renewal  | 2 |
| 39 | Explain problems of pasture improvement                          | Problem of pasture improvement<br>Lack of coordination between stakeholders<br>Lack of inputs: seed, fertilizer, irrigation<br>Lack of technical knowledge<br>Government rules and regulation  | 2 |
| 40 | Manage local/improved pasture                                    | Management of local and improved pasture<br>Factors for improving pasture  | 2 |
| 41 | Explain the method of increasing productivity of pasture         | Methods of increasing productivity of pasture: sowing, planting, fertilizer application and irrigation, gap filling<br>Grazing system  | 2 |
| 42 | Explain factors responsible for the deterioration of             | Factors of pasture deterioration:<br>Soil condition, heavy rain, over grazing,   | 2 |



|    |  |  |            |
|----|--|--|------------|
|    | nutrient content in pasture                  | growth of unwanted plants, lack of fertilizer application  |            |
| 43 | Apply fertilizer / manure in pasture land    | Deficiency symptoms of NPK and other soil nutrients<br>Application of NPK: foliar spray, fertilizer application in soil, application of organic manure | 2          |
| 44 | Explain gazing system                        | Grazing system; Productivity of pasture<br>Live stock unit; Carrying capacity  | 2          |
| 45 | Explain plant poisoning in pasture           | Poisonous plants<br>Signs and symptoms of plant poisoning<br>Local treatment method<br>Poisonous parts of plants                                       | 2          |
| 46 | Explain Fodder conservation                  | Introduction of fodder conservation<br>Importance of fodder conservation<br>Method of fodder conservation; Dry conservation<br>Wet conservation        | 2          |
| 47 | Make Hay                                     | Definition of hay<br>Principles of hay making<br>Selection of fodder/forage for hay making<br>Characteristics of good quality hay                      | 3          |
| 48 | Make silage                                  | Definition of silage; Principle of silage making<br>Advantage of silage; Method of silage making<br>Characteristics of good silage                     | 4          |
| 49 | Explain types of silo                        | Silos: trench silo, bunker, tower silo, pit silo   | 3          |
| 50 | Explain the storage of crop residues         | Importance of crop residues for livestock feeding<br>Storage of rice straw, oat straw, millet straw etc  | 2          |
| 51 | Improve the nutritive value of crop residues | Urea treatment<br>Treatment of salt, molasses<br>Soaking   | 2          |
| 52 | Prepare mineral block                        | Material requires for making mineral block:<br>Salt, Red soil, Egg shell, wheat four millet floor  | 2          |
| 53 | Make fodder calendar                         | Importance of fodder calendar<br>Alternative arrangements during scarcity period/season  | 2          |
|    |  | <b>Total</b>   | <b>156</b> |

## Dairy and dairy products

**Total Hours : 156 hrs**  
**Theory : 32 hrs**  
**Practical : 124 hrs**

### **Description:**

This course is designed to provide basic skills and knowledge necessary for clean, hygienic milking and milk handling as well as the processing of milk to make milk products.

### **Objectives:**

Upon completion of course, the students will be able to:

1. describe the scope and importance of dairying in Nepal
2. explain milk and its composition
3. perform milking
4. produce hygienic milk
5. perform quality control tests
6. process raw milk
7. prepare common milk products
8. prepare chhana based sweets
9. prepare khoa based sweets
10. market milk and milk products

| SN | Task statement  | Related Technical knowledge   | Time (hrs) |
|----|---|---|------------|
| 1  | Explain the scope of dairy industry in Nepal          | History of dairy development, scope and importance, constraints, present dairy policies , major dairy industries in Nepal, role of DDC, NDDB, private dairy and dairy cooperative in dairy development, present status of milk production- demand and supply ratio of milk, statistics of dairy animals                                       | 3          |
| 2  | Explain the composition of milk                       | Definition of milk<br>Composition of milk:<br>Water, Fat, Protein, Lactose, Minerals, Vitamins, Phospholipids, Cholesterol<br>Pigments, enzymes etc   | 3          |
| 3  | Explain the factors affecting the composition of milk | Factors affecting the composition of milk:<br>species, breed, individuality, stage of lactation, age of animal, seasonal variation, disease and udder infection, Nutrition, interval of milking, day to day variation, portion of milking and time of milking, milk yield, feeding, excitement, drug and hormone, condition of cow at calving | 4          |
| 4  | Explain the properties of milk                        | Physical state of milk, color, odor, specific gravity, specific heat, boiling point, refractive index, viscosity, freezing point, Ph and acidity, adhesive properties, effect of heat on milk.  | 3          |
| 5  | Identify dairy equipments                             | Dairy equipments used in dairy farm, equipments used in chilling center, equipment used in dairy  | 4          |

|    |  |  |   |
|----|--|--|---|
|    |  | plants   |   |
| 6  | Clean dairy equipments                                   | Dairy detergents, method of cleaning   | 4 |
| 7  | Sanitize dairy equipments                                | Sanitization, chemical sanitizers  | 3 |
| 8  | Prepare animal for hygienic milking                      | Cleaning and sanitization milking barn, cleaning of utensils, cleaning of milch animal, personal hygiene of workers.                       | 3 |
| 9  | Milk animal  | Hand milking: stripping, full hand milking, knuckling<br>Machine milking   | 5 |
| 10 | Collect milk   | Establishment of milk collection center, site selection, management of collection center, measurement, platform test, pricing and payment  | 5 |
| 11 | Explain chilling of milk                                 | Role temperature in bacterial growth, chilling process, bulk milk tank cooler, plate chiller, dairy equipments required in chilling center | 3 |
| 12 | Transport milk   | Transportation of milk from dairy farm to chilling center, chilling center to dairy plant.   | 3 |
| 13 | Perform organoleptic test                                | Principle, procedure, result and interpretation of test  | 1 |
| 14 | Perform COB test   | Principle, procedure, result and interpretation of test  | 1 |
| 15 | Perform alcohol test                                     | Principle, procedure, result and interpretation of test  | 1 |
| 16 | Perform acidity test                                     | Principle, procedure, result and interpretation of test  | 5 |
| 17 | Perform methylene blue reduction (MBR) test              | Principle, procedure, result and interpretation of test  | 5 |
| 18 | Perform Fat test   | Principle, procedure, result and interpretation of test  | 5 |
| 19 | Perform SNF /TS test                                     | Principle, procedure, result and interpretation of test  | 4 |
| 20 | Explain the role of bacteria in the making milk products | Common bacteria used in making Dahi, yoghurt, butter and cheese  | 2 |
| 21 | Explain milk borne diseases                              | Milk borne diseases: bovine origin, human origin   | 3 |
| 22 | Prepare for milk processing                              | Grading and sampling, Weighing, pre-heating  | 3 |
| 23 | Pasteurize milk by batch pasteurizer                     | Definition of pasteurization, LTLT method  | 3 |
| 24 | Pasteurize milk by HTST method                           | HTST method of pasteurization  | 3 |
| 25 | Homogenize milk  | Principal and procedure of homogenization of milk  | 3 |
| 26 | Standardize milk   | Definition, method of standardization :reconstitution, toning, recombination, Pearson square method  | 3 |

|    |                                 |   |            |
|----|---------------------------------|---|------------|
| 27 | Perform adulteration test       | Principle, procedure, result and interpretation of the adulteration of starch, sugar, soda, hydrogen peroxide, formalin and common salt   | 8          |
| 28 | Separate cream                  | Definition of cream, uses, types, composition and nutritive value of milk, cream separator, method of cream separation, standardization of cream.   | 5          |
| 29 | Make ice-cream                  | Definition, nutritive value, composition, properties, types, ingredients used in making ice-cream, procedure of making ice-cream(ice cream-mix preparation, aging, freezing, hardening, packaging), storage, distribution, over run calculation, production cost. | 4          |
| 30 | Prepare starter culture         | Definition, types, making procedure, preservation and quality of starter culture  | 3          |
| 31 | Make dahi/ yoghurt              | Definition, nutritive value, production procedure, market quality, packing and storage, keeping quality.  | 5          |
| 32 | Make butter                     | Definition, nutritive value, production procedure, market quality, packing and storage, defect in butter, production cost.  | 3          |
| 33 | Make ghee                       | Definition, nutritive value, production procedure (traditional method, butter method, cream method), market quality, packing, storage, defect in ghee, production cost  | 5          |
| 34 | Explain cheese making procedure | Definition, classification, nutritive value, composition, making procedure, packing and storage   | 3          |
| 35 | Make chhana                     | Definition, nutritive value, uses, making procedure, packing, storage, and production cost.   | 5          |
| 36 | Make paneer                     | Making procedure, packing, storage.   | 4          |
| 37 | Make chhana based sweets        | Procedure of making rasgolla, cham cham, Sandesh, Rasmalai  | 7          |
| 38 | Make khoa                       | Definition, nutritive value, uses, making procedure, packing, storage, and production cost.   | 7          |
| 39 | Make khoa based sweets          | Procedure of making peda, lalmohan, gulabjamun, pustakari, gundh pak.   | 9          |
| 40 | Market milk/ milk products      | Packing, distribution, advertisement and marketing strategy of milk/ milk products  | 3          |
|    |                                 | <b>Total</b>  | <b>156</b> |

## Entrepreneurship skills

**Total Hours : 156 hrs**

**Theory : 32 hrs**

**Practical : 124 hrs**

### **Description:**

This course is designed to provide basic skills and knowledge necessary for entrepreneurship development and basic management skills.

### **Objectives**

Upon completion of course, the students will be able to:

1. perform basic skills for management of livestock and poultry farms
2. prepare scheme for small livestock enterprises
3. market animal products
4. keep record properly
5. forecast/ predict risk before starting a business

| <b>S N</b> | <b>Skill</b>   | <b>Related technical knowledge</b>   | <b>Time (Hrs)</b> |
|------------|--|--|-------------------|
| 1          | Define economic terms  | Basic terminologies related to economics: agriculture economics, farm management, goods and services, utility, value, price, wealth, money, income, profit, loss, revenue, product, input<br>Role of agriculture in Nepalese economy | 5                 |
| 2          | Show the relationship between total, average and marginal products | Total products<br>Average products<br>Marginal products<br>Interrelationship   | 8                 |
| 3          | Explain production function  | Land, labor, capital<br>Entrepreneur   | 8                 |
| 4          | Calculate cost relationship of a firm                              | Calculation of total cost, fixed cost, variable cost<br>Calculation of average variable cost, average fixed cost, average total cost and average marginal cost   | 8                 |
| 5          | Explain law of diminishing return                                  | Law of diminishing return  | 3                 |
| 6          | Gather farm management information                                 | Farm record system<br>Farm inventory<br>Net-worth<br>Deciding upon level of input, level of production and combination of input & product  | 3                 |
| 7          | Explain farm planning/budgeting                                    | Principle of farm planning and budgeting<br>Importance of farm planning and budgeting<br>Steps of farm planning and budgeting<br>Methods of farm planning and budgeting  | 6                 |
| 8          | Identify sources of credits  | Sources of loan:<br>Individual lending,<br>Institutional loan: Bank and other financial institutions   | 5                 |

|    |   |   |   |
|----|---|---|---|
| 9  | Explain types of banks  | Types of bank:<br>Central bank, Commercial bank, Industrial bank<br>Development bank, Finance and cooperatives  | 5 |
| 10 | Explain loan procedures                                       | Types of loan, Loan procedure, Priority sector loan, Industrial sector loan, Secured Loan<br>Long term loan, Short term loan, Collateral for loan, Completion of loan application forms, Loan payment schedule  | 4 |
| 11 | Explain banking systems                                       | Explain rules of bank regarding payment of loans<br>Calculation of simple interest for loan payment<br>Procedure for obtaining loan from bank and other sources (ADB, Rural Dev. Bank, Women's Dev. Office etc.)  | 6 |
| 12 | Perform bank transaction                                      | Cash deposits and withdrawals:<br>Fixed deposit account<br>Saving account<br>Current account<br>Cheque issues and withdrawal system, demand draft, debit and credit card  | 6 |
| 13 | Prepare livestock/ agriculture farm plan                      | Scheme / farm plan preparation<br>Capital Investment: Fixed capital investment, running capital<br>Cost of production: fixed cost, variable cost<br>Financial analysis: Gross income and expenditure, net profit/loss, break even point   | 6 |
| 14 | Make a simple yearly production plan based on market analysis | Components of a yearly production plan, including time tables and budgets (expenses expected, income expected)<br>Decision - making regarding a particular product, based on a market analysis (including seasonal variations)<br>Preparation of a cash flow chart based on production plan | 5 |
| 15 | Explain assets/ property                                      | Definition of asset<br>Calculation methods  | 3 |
| 16 | Complete a simple farm/ business inventory                    | Review of inventory procedure<br>Keeping records<br>Calculating profit / loss   | 4 |
| 17 | Design a marketing plan                                       | Designing a marketing plan, including storage, packaging, transportation, labor needed, taxes etc.  | 4 |
| 18 | Supervise workers / direct work on the farm or enterprise     | Supervision of workers  | 4 |
| 19 | Describe the qualities of a successful entrepreneur           | Introduction to principles of small business<br>Entrepreneurs' qualities<br>Functions of entrepreneurs<br>Importance of creativity  | 5 |

|    |  |  |            |
|----|--|--|------------|
| 20 | Describe types of enterprise                             | Types of small business:<br>Private, partnership, cooperatives, joint stock company; advantages and disadvantages of each  | 6          |
| 21 | Differentiate risk and uncertainty                       | Introduction and types of risk/ uncertainty<br>Describe how risk and uncertainty can affect decision-making.<br>Risk calculation<br>Concept of decision-making - how is it done<br>Probability of success - can all succeed?                       | 6          |
| 22 | Perform a project work on a simple marketing analysis    | Basic concepts of business management<br>Types of market and marketing, Marketing strategies, Four P's rules of marketing strategy, Marketing research, Market survey guidelines   | 6          |
| 23 | Keep records   | Keeping inventory<br>Maintaining necessary records on regular basis (labor, livestock, feed consumption, seeds used, fertilizer,<br>Perform a simple inventory and record<br>Keep records of production and marketing costs<br>Keep simple account | 6          |
| 24 | Perform market study                                     | Introduction, Market study, Description of product, Complication of the product, Location of firm, Market area, Main consumer, Total demand<br>Market share, Production level, Sales promotion   | 10         |
| 25 | Prepare production plan                                  | Production Plan, Production process, Fixed capital, Depreciation, Repair maintain, Source of equipment, Planned capacity, Future capacity, Purchasing of equipments  | 8          |
| 26 | Calculate current expenses                               | Raw materials, Cost of raw materials, Availability of raw materials, Pre operating expenses, Availability of labor, Facilities for labor, Overhead expenses, Per unit cost   | 8          |
| 27 | Calculate financial aspects of a livestock/ poultry farm | Total capital, Loan requirement, Collateral for loan<br>Selling price of the product<br>Calculation of loss and profit<br>Loan payment table<br>Calculation or in term of investment<br>Calculation break even point                               | 8          |
|    |  | <b>Total</b>   | <b>156</b> |

## Extension and Community Development

**Total Hours: 234 hrs**

**Theory: 48 hrs**

**Practical: 186 hrs**

### **Description:**

This course provides skills and knowledge related to basic skill of extension and communication, community development, group formation, farmers training, approaches of extension used in different time,

### **Objectives:**

Upon completion of this course students will be able to:

1. explain extension and communication methods
2. conduct need assessment of farmers
3. assist to run farmers training
4. assist to form farmers group
5. conduct simple field trial
6. communicate with farmers
7. assist for evaluation, follow-up and monitoring of farmers program
8. assist to leader farmer

| SN | Task   | Related Technical Knowledge  | Time (Hr) |
|----|--|--|-----------|
| 1  | Compare formal and non formal education              | Meaning and types of education<br>Objectives of education<br>Comparison of formal, informal and non-formal education   | 3         |
| 2  | Define extension education                           | Principle of extension education<br>Objective of extension education<br>Importance of extension education<br>Philosophy of extension education   | 6         |
| 3  | Explain teaching learning process                    | Extension teaching methods<br>Effective teaching plan<br>Effective learning in extension<br>Method of teaching of adult farmer<br>Law of learning  | 4         |
| 4  | Explain extension approach of Nepal from past to now | Different kinds of extension approaches used in Nepal<br>Training and Visit systems<br>Conventional extension approach<br>Group approach<br>IRD extension approach,<br>Farming systems approach<br>Tuki system approach<br>Farmer to farmers Approach (Farmers field school) | 4         |
| 5  | Develop visual aids                                  | Poster<br>Chart<br>Pamphlets<br>Graph<br>Leaflets & their uses   | 8         |



|    |  |  |   |
|----|--|--|---|
| 6  | Assist to run demonstration plot in farmers field        | Method demonstration<br>Result demonstration<br>Farmers Field Trail<br>PPVT<br>Motivation method<br>Selection of farmer<br>Layout  | 5 |
| 7  | Explain functions of electronic audio visual aids        | Function & parts of LCD Projector, OHP etc.  | 2 |
| 8  | Prepare organogram of MOA                                | Role of each component<br>Role of DAO<br>Role and duty of JT/JTA<br>Role of leader farmer  | 2 |
| 9  | Communicate with farmers                                 | Definition of communication<br>Elements of communication<br>Barriers of communication<br>Diffusion process<br>Adoption & innovation process<br>Individual communication<br>Group and mass communication  | 8 |
| 10 | Explain importance of a group                            | Definition of group<br>Philosophy of group formation<br>Objectives of group formation<br>Importance of group formation   | 2 |
| 11 | Prepare a training cycle                                 | Definition of training<br>Importance of farmers' training<br>Training cycle  | 2 |
| 12 | Explain need assessment                                  | Definition of need assessment<br>Importance of need assessment<br>Different methods of need assessment (RRA & PRA)   | 4 |
| 13 | Prepare action plan of your work                         | Introduction of program planning<br>Role & nature of program planning<br>Principle & scope of program planning<br>Behavioral objectives of program planning<br>Steps of program planning<br>Evaluation of program planning<br>Monitoring of program planning | 4 |
| 14 | Define community development                             | Definition of community development<br>Objective of community development  | 2 |
| 15 | Conduct training needs assessment                        | Methods of performing training needs assessment<br>Base line data collection for training need assessment  | 4 |
| 16 | Assist community / user group in formation of objectives | Principle of objective formulation<br>Guideline of objective formulation   | 2 |
| 17 | Motivate farmers to participate in training              | Concept of participatory training<br>Discuss how people learn especially rural   | 2 |

|    |  |   |   |
|----|--|---|---|
|    |  | people (learning versus doing)  |   |
| 18 | Prepare plan for farmers training                  | Selection of training methods and materials depending upon the target groups (illiterate versus literate)<br>Arrangements of accommodation, foods and transportation for trainees                                       | 4 |
| 19 | Select trainees                                    | Helping community to select appropriate trainees<br>Characteristics of appropriate trainees   | 2 |
| 20 | Prepare posters for training                       | Materials and methods required for poster preparation<br>Shape, size, color and content of the posters  | 4 |
| 21 | Prepare a lesson plan                              | Different models of lesson plan<br>Elements of lesson plan<br>Practical lesson plan<br>Theoretical lesson plan  | 4 |
| 22 | Run practical sessions                             | Venue and places for skill training<br>Appropriate size of participants for practical session<br>Arrangement of all necessary tools and equipments/instruments<br>Conducting field trips<br>Extra-curricular activities | 4 |
| 23 | Prepare training materials                         | Preparation of flipcharts<br>Preparation of transparencies<br>Preparation of charts<br>Preparation of drawings and posters<br>Drama, role plays, display etc<br>Preparation of teaching games                           | 4 |
| 24 | Run theory sessions of the training                | Preparation of class in the training programs<br>Using mobile projector   | 2 |
| 25 | Use checklist for the evaluation of trainees       | Elements of checklist of training evaluation<br>Models of checklist   | 1 |
| 26 | Assist in reporting of training program activities | Elements of report writing<br>Reports writing skill of training activities  | 3 |
| 27 | Follow up trainees                                 | Purpose of follow-up (encouragement, review, monitoring etc.)<br>Follow up format (e.g. VAHWs, NFE facilitators, Leader farmers)  | 4 |
| 28 | Explain Farmer to Farmer Extension (FtF) Approach  | Definition<br>Scope and need<br>Basic elements of FtF<br>Experienced leader farmer and their role in FtF<br>Role of DLS, DoA and DADO, DLSO in FtF<br>FtF in practice<br>Identification of experience leader farmer     | 2 |
| 29 | Explain the role/responsibility of farmers         | Structure of committee<br>Proposal analysis   | 1 |

|    |   |  |   |
|----|---|--|---|
|    | committee                                     | Agreement of budget for Farmers Field School   |   |
| 30 | Mobilize farmers group                        | Role of group for technology transfer<br>Stages of group<br>Steps of group development<br>Attitude of group member<br>Conflicts of group member<br>Conflict management<br>Creation of demand                     | 2 |
| 31 | Explain role of experience leader farmer      | Definition of ELF<br>Characteristics of ELF<br>Relation with service provider<br>Responsibility of ELF<br>Agreement between ELF and committee  | 1 |
| 32 | Explain steps of Farmers Field School (FFS)   | Definition<br>History of FFS, importance, objectives<br>Steps of running farmers field school<br>Methods of running FFS<br>Planning<br>Monitoring<br>Evaluation of FFS   | 2 |
| 33 | Prepare plan for training                     | Objective setting<br>Program planning<br>Preparation of lesson plan<br>Running practical and theory classes<br>Evaluation criteria<br>Use of audio visual aids<br>Sequential presentation of skill and knowledge | 2 |
| 34 | Explain skill needed for ELF                  | Communication skill<br>Effective listening<br>Acceptance of feed back<br>Consideration at time of presentation   | 1 |
| 35 | Explain adoption process                      | Definition of adoption<br>Steps of adoption process<br>Factors affecting adoption process<br>Motivation factor for adoption process  | 1 |
| 36 | Explain monitoring process followed by ELF    | Group discussion<br>Demonstration<br>Filed visit   | 1 |
| 37 | Monitor/evaluate FtF approach                 | Method & activates of monitoring fallowed by ELF & institute<br>Method & activates of evaluation fallowed by ELF & institute<br>Method & activates of fallow-up fallowed by ELF & institute                      | 2 |
| 38 | Run farmers field school on the basis of need | Selection of topic according to farmers choice<br>Preparation for run FFS  | 5 |

|    |  |  |   |
|----|--|--|---|
|    |  | Coordination with concern agencies<br>Logistic management  |   |
| 39 | Evaluate impact of FFS   | Evaluation from farmers side<br>Use of check list  | 2 |
| 40 | Assist farmers to conduct Farmer led experiments (FLE)           | Objectives and importance of FLE<br>Why FLE<br>Layout of experimental plot<br>Observation<br>Data collection and record keeping<br>Share results to farmers  | 4 |
| 41 | Explain the involvement of institution for community development | Role of institution in community development<br>Concept of community development<br>Present status of participation<br>Basic requirements in participatory program<br>Right based approach   | 2 |
| 42 | Collect baseline information                                     | Introduction and importance of baseline information<br>Procedures of baseline information collection<br>Developing a baseline information collection form  | 4 |
| 43 | Prepare a project proposal                                       | Basic elements of project proposal<br>Goal<br>Objectives<br>Outputs<br>Activities<br>Inputs  | 4 |
| 44 | Prepare a progress report of program                             | Purpose of progress report<br>Subject matter of effective progress report<br>Types of progress report  | 2 |
| 45 | Explain participatory planning                                   | Introduction of participatory planning, monitoring and evaluation (PPME)<br>Why participatory approach?<br>Participatory Planning<br>Participatory Monitoring<br>Participatory Evaluation  | 2 |
| 46 | Define group approach to extension                               | The "group approach" to extension<br>Criteria of group formation<br>Various types of groups:<br>User groups,<br>Commodity groups,<br>Reference groups (natural groups)<br>Different roles of groups:<br>Technology transfer<br>Training<br>Management of common recourses<br>Empowerment | 2 |
| 47 | Assist to form group   | Group characteristics (size, caste, ethnicity, group dynamics)   | 2 |

|    |  |   |   |
|----|--|---|---|
|    |  | Wealth ranking in group formation to assess different socioeconomic factors<br>Advantages and disadvantages of heterogeneous versus homogeneous groups                                  |   |
| 48 | Assist group to select leaders                                   | Roles of group leaders<br>Necessary criteria for selection of leader<br>Methods of leader selection<br>Characteristics of a good leader<br>Helping to select leaders and volunteers     | 2 |
| 49 | Encourage members to participate in group discussions activities | Factors of encouragement of members to participate in group discussions and activities  | 3 |
| 50 | Facilitate to run the group meeting                              | Principles of running a meeting<br>Agenda<br>Allowing discussion<br>Moderating discussion<br>Making decisions   | 2 |
| 51 | Conduct follow- up   | Different methods of follow-up<br>Importance of follow-up<br>Different methods of fallow-up   | 4 |
| 52 | Mobilize the farmers to use locally available resources          | Identification method of local resources<br>Types of resources available to local groups which are properly registered e.g. forest user groups, drinking water schemes group            | 2 |
| 53 | Assist group to plan its policies and activities                 | Paperwork with government agencies<br>Technical skills for paper works  | 2 |
| 54 | Assist to manage group welfare funds                             | Process to obtain loans<br>Process of handling fund<br>Common financial and other resources   | 2 |
| 55 | Report group activities to sub-center or office                  | Demonstration of simple reporting techniques  | 2 |
| 56 | Explain group dynamic  | Definition of group dynamic<br>Role of change agent for group dynamic   | 2 |
| 57 | Explain community needs assessment                               | Definition of community need assessment<br>Different methods of community need assessment: PRA, RRA, PLA<br>Selection of appropriate method<br>Importance of community needs assessment | 4 |
| 58 | Explain of Participatory Rural Appraisal (PRA)                   | Definition of Participatory Rural Appraisal (PRA)<br>Philosophy of PRA<br>Principle of PRA<br>Importance of PRA<br>Scope of PRA<br>(In this part of curricula student MUST do one PRA)  | 4 |
| 59 | Explain of Participatory Learning Approach (PLA)                 | Definition of Participatory Learning Approach (PLA)<br>Philosophy of PLA<br>Principle of PLA  | 2 |

|    |                                     |  |   |
|----|-------------------------------------|--|---|
|    |                                     | Importance of PLA<br>Scope of PLA  |   |
| 60 | Explain tools used in PRA           | Different tools used in PRA techniques   | 2 |
| 61 | Prepare time line                   | Time line & its importance   | 2 |
| 62 | Prepare Seasonal calendar           | Cropping time & season   | 2 |
| 63 | Prepare cropping/livestock patterns | Irrigation facilities<br>Livestock components<br>Cropping  | 2 |
| 64 | Prepare land-use systems,           | Making maps of land - use<br>Making maps of land / farms / social  | 2 |
| 65 | Prepare matrix making               | Methods of ranking   | 2 |
| 66 | Discuss problems of community       | Problem identification through PRA approach<br>Problem census<br>Problem solving<br>Group technique<br>Group discussion  | 2 |
| 67 | Identify need of target groups      | Felt and unfelt need of community/family   | 2 |
| 68 | Prepare reports                     | Methods of preparing report  | 3 |
| 69 | Plan future work                    | Planning based on the results and the resources available  | 1 |
| 70 | Attend meeting                      | Basic concept of meeting (agenda, discussion, decision-making)<br>Meetings with cooperating agencies (e.g. VDC)<br>Reporting minutes of meetings   | 2 |
| 71 | Collect the demand from farmers     | Demand collection of Seeds, seedlings and grasses, and improved breeds of animals<br>How to order, distribute and inventory supplies<br>How to fill-up a basic request form from both the NGO side and the government side<br>What is an inventory and how it is performed | 4 |
| 72 | Assist farmer to run trails         | Types of trails<br>Selection criteria's of farmer for running trails<br>Terminologies used in trail (replication, plot, layout, randomization, sampling etc)   | 4 |
| 73 | Assist for demonstration            | Selection criteria's of farmer for running demonstration<br>Method and result demonstration<br>Farmers field trail   | 4 |
| 74 | Distribute supplies                 | Arranging to provide the seeds, seedlings, grasses and animals requested<br>Inventory of supplies  | 4 |
| 75 | Prepare service center program      | Activities of government, semi-government, non- government and private organizations:<br>Ideas regarding how they can work   | 3 |

|    |  |  |     |
|----|--|--|-----|
|    |  | together and complement each other for the development of the country  |     |
| 76 | Prepare plan for work in field with farmers (e.g. plan for vaccination activities, etc.) | Annual calendar and how it is put together<br>Preparation of a sample annual calendar based of farmers' needs and demands & on the basis of resources available<br>Preparation of work schedules according to a given format   | 4   |
| 77 | Assist in evaluating activities  | Study of an actual evaluation format used y an NGO and / or a government organization  | 4   |
| 78 | Follow-up distributed supplies   | Follow-up and evaluate trainees / motivators (see training module also)<br>Study of an actual "follow-up" program used by an NGO for motivators or trainees<br>Study of the actual follow-up required after distribution of minikits by government workers                                     | 4   |
| 79 | Maintain daily diary   | Diary keeping: why it is done, and how it is done; using examples<br>How to write a basic report   | 2   |
| 80 | Write a report to assist community   | Writing a report regarding funds collected for farmers' groups<br>Writing a report regarding use of improved livestock<br>Writing a report regarding farm activities (crops, orchard, vegetable, livestock)<br>Reporting results of harvesting (yield)<br>Reporting activities of pocket areas | 4   |
| 81 | Keep Records   | Statistics regarding use of improved breeding stock, Financial matters: income and expense,<br>Statistics of agriculture and livestock farms: Activities accomplished,<br>Emergency report & reporting   | 4   |
|    |  | <b>Total</b>   | 234 |

**Content Experts**

Dr. Yagendra Shrestha  
Dr. Trj Bahadur Rijal  
Mr. Mayrika Jamerkeyal  
Dr. Buddhisager Sapkota  
Dr. Babita Pradhan  
Ms Sulochana Shakya  
Mr. Genesh Kumar Shrestha  
Mr. Sarad Bajracherya  
Mr. Tika Ram Sapkota  
Mr. Bishnu Bahadur BK  
Mr. Ramhari Khanal

CTEVT would like to extend its heartfelt thanks to the following experts who contributed in the process of revising the curriculum on TSLC in Livestock Production and Management/ Animal health.

**Involvement of expert at Structure finalization**

Mr. Shiva Shanker Ghimiri  
Dr. Nar Bahadur Rajwar  
Dr. Surendra Joshi  
Dr. Bhubeneshowes Sapkota  
Mr. Genesh Kumar Shrestha  
Mr. Preedep Chandra Bhattra  
Mr. Him Prasad Bhattari  
Mr. Min Bahadur Gurung  
Mr, Jeevan Chandea Dahal  
Mr Tararaj Luitel  
Mr. Kaladhar Gaire

**Process Experts from Curriculum Development Division of CTEVT**

**Mr. Tararaj Luitel**  
**Mr. Sagermani Lamsal**