Council for Technical Education and Vocational Training
Jiri Technical School.
Jiri-5, Dolakha
Exam Pattern for **Instructor** and **Sub-Instructor**

Outline of Curriculum: According to the curriculum exam can be taken on two phases.

1. First Shift : Written Exam — Full marks – 100
2. Second Shift : a. Class Demonstration — Full marks – 10
   b. Interview — Full marks – 20

**Table 1**

**First Phase: Written Exam**

| S.No. | Subject | Full Marks | Pass marks | Exam types | No. of questions x Marks | Time |
|---|---|---|---|---|---|---|
| 1 | Subject matter related | 50 | 40 | Multiple Choice Questions (MCQS) | 25questions x 2marks | 2 Hrs 15 Minutes |
| 2 | | 50 | | Long Questions | 5 Questions x 10 marks | |

**Table 2**

**Second Phase:**

| S.No. | Subject | Full Marks | Exam types | Time |
|---|---|---|---|---|
| 1 | Class Observation | 10 | Practical | 10 Minutes |
| 2 | Interview | 20 | Interview | |

Council for Technical Education and Vocational Training
Jiri Technical School.
Jiri-5, Dolakha
Curriculum for **Construction Instructor**

**First Phase:** **Full marks:100**

**1 Construction Materials**

1.1 Properties of Building Materials: Physical, Chemical ,constituents, Thermal etc.
1.2 Stones: Characteristics and Requirements of stones as a Building Materials.
1.3 Ceramic Materials: Ceramic Tiles, Mosaic tiles, Bricks type and Testing etc.
1.4 Cementing Materials: Types and properties of Lime and Cement , Manufacturing Process, Cement Mortar and Different Tests
1.5 Metals : Steels, Types and properties , Alloys
1.6 Timber and Wood : Timber trees in Nepal, Hard and Soft wood , Characteristics of good Timber, Seasoning, Preservation of timber , Plywood, Batten board etc
1.7 Miscellaneous Materials : Asphalt , Bitumen , Paint and Varnishes, Glass, Polymers
1.8 Soil Properties and Parameters.

**2. Drawing Techniques**

2.1 Drawing sheet composition and its essential components
2.2 Suitable scales , site plans ,Preliminary Drawings , Working drawings etc
2.3 Theory of Projection drawings: Perspective , Orthographic and Axonometric Projection,First and Third angle Projection
2.4 Drafting Tools and equipments
2.5 Drafting Symbols
2.6 Topographic, Electrical, plumbing and structural drawings
2.7 Technique of Free Hand Drawing.



**3. Engineering survey**

3.1 Introduction and Basic Principles, Linear Measurement, Chain Survey, Compass Survey, Plane table survey, Leveling and Contouring, Abney Level survey, Theodolite Traversing ,Tachometry survey, Trigonometrically Leveling , Hydrographic Survey etc

3.2 Use of Total Station and Electronic Distance Measuring Instruments Hydrographic surveying

**4. Concrete Technology**

4.1 Constituents and Properties of Concrete, water Cement ratio, Grade and strength of concrete , Concrete Mix Design, Testing of Concrete
4.2 Mixing Transportation , Pouring and Curing of concrete
4.3 Admixtures,
4.4 High strength concrete
4.5 Pre stressed concrete Technology

**5. Building Construction, Housing and Urban planning**

5.1 Load bearing and framed structures, Foundation types and its design
5.2 Types of walls , Types of roofs
5.3 Types of Doors and Windows, Types of Stair and design of Dog legged Stair
5.4 Damp Proofing Methods
5.5 Plastering and pointing
5.6 Shoring, Scaffolding, Under pining, Timbering of Trenches, Formworks
5.7 Present Status and Practices of building construction in Nepal
5.8 Specific Consideration in design and consideration of buildings in Nepal
5.9 Community Buildings: Schools and hospital buildings and their design Considerations
5.10 Local and Modern Building Construction Materials in Nepal
5.11 Urban Planning need and challenges in Nepal

**6. Fluid mechanics and hydraulic**

6.1 Properties of Fluid, Hydrostatics fore on plane and curved surfaces, Buoyancy Types of Flow, Continuity Equation, Bernoulli equation and its application,
6.2 Momentum equation, Flow in Curved Path etc
6.3 Uniform and Non Uniform flow in channels
6.4 Specific energy and momentum principle and application
6.5 Analysis of pipe flow, Pipelines and Pipe Systems
6.6 Pipe networks and their analyses, water hammer phenomenon

**7. Soil Mechanics and Highway engineering**

7.1 Phase Diagrams, Physical Properties of soils and classification tests, Classification of Soils, Permeability of soil, Compaction and Consolidation of soil, Shearing Characteristics of Soil, Bearing capacity of soils, Earth pressure, Stability of slopes etc Transportation system and its Classification
7.2 Road transport and road construction in Nepal
7.3 Classification of Roads in Nepal

7.4 Feasibility study of road projects
7.5 Road Alignment and engineering survey
7.6 Highway Geometric Design
7.7 Hill roads( Problems associated with hill road construction, Route location, Hairpin bends,special structures)
7.8 Types of Road Pavements and their applicability, Construction procedure of Different types of roads
7.9 Bioengineering practices in hill side
7.10 Activities and techniques in road construction in rural roads
7.11 Maintenance of Roads
Basic Knowledge on design, construction and Maintenance of Suspended and Suspension
7.12 Bridge in Nepal (Based on TBSSP Manual)
7.13 Low cost road construction

**8. Structure Analysis and Design**

8.1 Stress and strains, Theory of tension and Flexure, Moment of Inertia, Centre of Gravity

8.2 Analysis of Beams and Frames: Bending Moment, Shear force deflection of beams and frames, determinate structure- Energy Methods , Three hinged system. Indeterminate structures - Slope and deflection method and moment distribution method, Use of influence line Diagrams for simple beams, Unit load Method.

8.3 RCC structures: Difference between working Stress and limit State Philosophy, Analysis of RC Beams, Slabs in bending, shear, deflection, bond and end anchorage, Design of axially loaded Columns, isolated and combined footings, Pre Stressed Concrete.



8.4 Steel and Timber Structures: Standard and Built up Sections , Design of Riveted, Bolted and Welded connections , Design of simple elements(Ties, strut, axially loaded and eccentric Columns, column base), Design principles of on Timber beams and columns

**9. Estimating costing and valuation**

9.1 Types of estimate and their specific uses
9.2 Methods of Calculating Quantities
9.3 Estimate of: Building Works, Road earthwork, Canal earthwork, Retaining walls, sanitary works, and Water Supply works.

9.4 Estimating Norms and Rate analysis
9.5 Bill of Quantities, Specifications and its type and purpose
9.6 Running bill and Final Bills and its Payment procedures
9.7 Valuation : Its Purpose , principles and methods

**10. Water supply and Sanitary engineering**

10.1 Rural and Community Based water Supply system
10.2 Selection of Source, Water demand
10.3 Water quality and Treatment, water demand and Supply, Source Protection
10.4 Intakes, Break Pressure tank, Collection chamber etc
10.5 Reservoir and Distribution system
10.6 Intakes, Pipe line design, Design of Transmission and distribution System, Reservoir design
10.7 Pipe and Fittings: Pipe Materials, Pipe laying and Fittings
10.8 Operation and Maintenance of water Supply Systems
10.9 Sanitation, waste water and solid waste management : On site sanitation system. Types of sewerage system , design and Construction of sewers. Types , Characteristics, sources ,quantity, generation, collection , transportation and disposal of solid wastes.)
10.10 Sanitary Landfill, incineration, Composting etc
10.11 Environmental Health Engineering: Epidemiology, Pathogens ( Bacteria, virus, helminthes, protozoa)

**11. Irrigation Engineering**

11.1 Status of Irrigation Development in Nepal
11.2 Methods of Irrigation, Water Requirements for crops, Duty and delta, Canal Losses etc
11.3 Design of Irrigation Canals.
11.4 Operation and Maintenance of Irrigation Systems
11.5 Water logging: Preventive and remedial Measures
11.6 River training and Slope protection Works
11.7 Specific Consideration in design , operation and management of hill irrigation systems

**12. Hydrology and hydropower engineering**

12.1 Hydrological cycle and water balance
12.2 Precipitation and losses
12.3 Surface runoff and hydrological analysis
12.4 Flood frequency analysis

12.5 Hydropower development in Nepal
12.6 Hydrological study, planning and design of small Hydropower Projects
12.7 Types of dams and their properties
12.8 Head Works , Dam , Spillways, Surge tanks , Stilling basin etc
12.9 Water conveyance structures
12.10 Power house and hydro electric equipments

**13. Construction Management**

13.1 Construction scheduling and Planning: Network techniques,(CPM, PERT) and bar Charts.
13.2 Contractual Procedures and Managements: Types of Contract, Tender and Tender notice, Preparation of Tender document, Contractors Pre Qualification, Evaluation of Tenders and Selection of Contractors, Contract acceptance, Condition of contract, Quotation and direct Order, Dispute Resolution, Muster rool etc.
13.3 Material Management: Procurement procedures and materials handling
13.4 Cost control and Quality control
13.5 Project Maintenance
13.6 Occupational health and safety
13.7 Project Monitoring and Evaluation
13.8 Variation , Alteration and Omissions

**14. Engineering Economics**

14.1 Benefit Cost Analysis, Cost classification, sensitivity analysis, internal rate of return, time value and money, economic equilibrium, demand supply and production, net present value, financial and economic evaluation.

**15. केही ऐन नियमहरु**

- नेपाल इञ्जिनियरिङ ऐन तथा नियमहरु
- भवन ऐन, २०५५
- संयुक्त आवास ऐन, २०५५
- Nepal Road Standard, 2027
- Nepal Fedder Road Standard, 1997
- Public Works Directive, 2002

**16. Instructional Skills and Classroom Management**

- Learning Domains and learning styles
- Bloom's Taxonomy

- Be a professional Technical and Vocational Education and Training (TVET) Instructor
- Occupational Safety and Health

**Program Evaluation**

- Conduct a CIPP Evaluation
- Conduct Goal-Free Evaluations
- Kirkpatrick's Levels of Training Evaluation
- Tyler's Goal-Based Evaluation Approach.

Council for Technical Education and Vocational Training
Jiri Technical School.
Jiri-5, Dolakha
Curriculum for **Agriculture Instructor**

**First Phase:** **Full marks:100**

**A. Soil Science**

1. Definition of soil and soil formation
2. Physical, chemical and biological properties of soils
3. Plant nutrition and soil fertility management (including integrated plant nutrient management)
4. Manures and chemical fertilizers
5. Soil erosion, conservation and sustainable soil management.

**B. Agronomy**

1. Climate and its effects in agricultural production
2. Factors affecting crop productions (bio-physical factors)
3. Principles of plant breeding
4. Irrigation and water management for crop production
5. Cropping systems/patterns in Nepal
6. Cultivation Practices of common field crops (Cereals, Buckwheat, Mustard, Mung bean, Lentil and Sugarcane)
7. Agriculture intensification and sustainable agriculture
8. Principles of experimental research design, includingCompletely Randomized Design (CRD) and Random Block Design (RBD).
9. Framer's field trial and production estimation through crop cutting survey.

**C. Horticulture**

1. Horticulture: An introduction
2. Important fruits, vegetables and spice crops of Nepal
3. Plant propagation in fruits/nursery management/training and pruning
4. Improved methods of fruits cultivation (Apple, Citrus, Mango, Guava, Banana and Kiwi )
5. Principles of vegetables cultivation and kitchen garden management
6. Plant growth regulator and tissue culture technology in horticultural crops
7. Harvesting, post-harvest technology, processing and product branding.

**D. Plant Protection**

1. Introduction to insects, pests and diseases of crops in Nepal
2. Principles of plant insect-pest and disease control ( including integrated pest management)

3. Major chemical and organic pesticides and their application methods
4. Important insect-pests and diseases of field crops, fruits and vegetables and their control measures
5. Safe use of chemical pesticides in vegetables and fruits
6. Quarantine and sanitary and phyto-sanitary measures used in Nepal.

**E. Fishery**

1. Common fish breeds of Nepal
2. Fish cultivation techniques (Rahu, Common Carp and Tilapia)
3. Fish diseases, enemies and their control measures
4. Rainbow Trout culture in Nepal
5. Fish harvesting, transport and marketing.

**F. Agricultural Extension**

1. Definition and philosophy of agricultural extension
2. Principles of extension and teaching and learning process
3. Extension methods (individual, group and mass contacts)
4. Leadership as applicable for group mobilization and community development
5. Information and communication technology (ICT) application in extension
6. Functions of communication and communication models
7. Adoption and diffusion of innovations
8. Extension approaches adopted in Nepal: past and present
9. Methods of socio-economic survey and data collection in the fields
10. Data analysis using mean, standard deviation, ratio, chi square and Spearman rank correlation
11. Methods of Rapid Rural Appraisal (RRA), focus group discussion (FGD) and key informant interview (KII).

**G. Agricultural Economics**

1. Agricultural economy, it's growth and contribution to national GDP
2. Agricultural production functions (constant, increasing and decreasing marginal rate of returns)
3. The three regions of production functions and economic decisions
4. Farm Planning and resource management (land, labor, capital and machineries)
5. Agricultural finance and farmer's access to credit
6. Agricultural marketing: problems and issues
7. Simple statistical methods – one input production function (simple linear regression )

**H. Industrial Entomology**

1. Industrial entomology: introduction and scope
2. Basic knowledge and skills of bee keeping and sericulture

3. Basic knowledge and skills of mushroom cultivation.

**I. Agricultural Policy, Plan and Act**

1. National Agriculture Policy 2004
2. Agri-business Promotion Policy 2006
3. Agro-biodiversity Policy 2007
4. Periodic Development Plans (15th Five Year Plan)
5. The Right to Food Sovereignty Act 2018

**J. Instructional Skills and Classroom Management**

- Learning Domains and learning styles
- Bloom's Taxonomy
- Be a professional Technical and Vocational Education and Training (TVET) Instructor
- Occupational Safety and Health

**Program Evaluation**

- Conduct a CIPP Evaluation
- Conduct Goal-Free Evaluations
- Kirkpatrick's Levels of Training Evaluation
- Tyler's Goal-Based Evaluation Approach.

Council for Technical Education and Vocational Training
Jiri Technical School.
Jiri-5, Dolakha
Curriculum for **Agriculture Assistant Instructor (Livestock)**

**First Phase:** **Full marks:100**

**1. General Agriculture**

1.1 Importance of Agriculture and Livestock in Nepal:
1.2 Importance of Agriculture farming & Livestock raising in Nepal
1.3 Traditional farming system & their Conservation
1.4 Organic farming in Nepal
1.5 Use & misuse of Pesticides, antibiotics & insecticides.

Major branches of agriculture, cropping pattern, cropping system, conservation of local method, measuring land ie (hector, Bighas, Ropani) calculation of fertilizers and chemicals. Different methods of disease and insects control. Definition, disadvantage and control method of weed. Soil sample taking, compost making, organic and inorganic fertilizers, their methods of application definition of soil, climate, weather, soil erosion and its control measure, off season farming, kitchen gardening.

**Production Technique**: Sowing to harvesting of major vegetables in Nepal and their recommended varieties:, Production techniques (sowing to harvesting) disease, insects, control methods of the following:
Rice, Maize, Wheat, Potato, Sugarcane, Jute, Cole crops, Root vegetable, Tomato, Broad Leaf Mustard, Mango, Apple, Banana, ,Plum,Guava

**Extension**

2.1 Role of extension workers in Agriculture & Livestock in Nepal.
2.2 Purpose, philosophy and principle of agriculture extension. Importance of agriculture extension in Nepal, role of JT in agriculture and livestock extension in Nepal.
2.3 Develop a program plan implementation, monitoring and evaluation. Educational method of extension activities.

**3.Marketing and Credit**

Function of marketing (markets)
3.1 Current system of Agriculture & Livestock markets.
3.2 Major challenges faced by Agriculture & Livestock markets.
3.3 Market regulation for quality products

Function of marketing, role of marketing agencies in Nepal, main problems with marketing in Nepal, affect of marketing of product due to supply, demand, quality of product and location.

**4. Livestock Production:**

4.1 Importance & scope of Livestock Production & Productivity in Nepal
4.2 Current situation of Livestock production
4.3 Animal Nutrition, its components and their functions for animal body.
4.4 Balanced ration for Livestock
4.5 Digestive system of ruminants and non ruminants animals
4.6 Breeds of livestock; exotic & indigenous.
4.7 Housing space requirements for all species of livestock.
4.8 Sign of oestrus)
4.9 Definition of chronic, acute infections and non infectious disease.
4.10 Preventive measures of Livestock diseases.
4.11 History taking of sick animal.
4.12 Calculation (doses) of drug, vaccine and medicines based upon the weight of animals.
4.13 Importance & functions of water in livestock

**5. Animal Health**

5.1 Common external parasites in livestock, their symptoms and treatment.
5.2 Common Internal parasite in livestock, their symptoms and treatment.
5.3 Definition of first aid, First Aid measures for fracture, burns, common poisoning & bleeding.
5.4 Different methods of drug administration in Livestock & poultry.
5.5 Bacterial, viral, protozoal & fungal diseases of Livestock & their treatment.

**6. Livestock Disease**

6.1 Bacterial disease : Haemorrhagic Speticamia, Anthrax, Black Quarter, Enterotoxima; Foot Rot, Brucellsis, Pullorum, Fowl Cholera, Fowl Typhoid, Mastistis, TB, Pneumonia.
6.2 Viral disease: FMD, PPR, Swine fever, Sheep/Goat pox, Ranikhet, Marek's disease, Avian Influenza & Blue Togue)
6.3 Symptoms and treatment of Abortion, Dystocia & retention of placenta .
6.4 Metabolic diseases (Milk fever & Ketosis)
6.5 Nutritional diseases caused by different nutrient deficiency.

**7. Fodder and Pasture**

7.1 Legumes and non Legumes grass. Different methods of pasture development
Legumes Non legumes: Berseemn, Cowpea, White clover, Lucerne, Desmodium & Vetch

7.2 Urea treatment of rice straw

7.3 Grass (Napier, Paragrass, Setaria Rye grass, )

7.4 Method of Hay and Silage making.

7.5 Common fodder trees of Nepal (Badahar, Kutmiro, Koiralo, Khaniyo, Painyo)

7.6 Common indigenous / local grasses

**8. Dairy Enterprise**

8.1 Current status of milk production in Nepal

8.2 Importance of dairy industry in Nepal.

8.3 Composition of normal milk, milk quality and adulteration of milk.

8.4 Processing of milk: cooling and storage.

8.5 Manufacturing of milk products: Paneer, Yoghurt, Ice cream, Cheese Butter & Ghee.

Council for Technical Education and Vocational Training
Jiri Technical School.
Jiri-5, Dolakha
Curriculum for **Construction Assistant Instructor**

**First Phase:** **Full marks:100**

**A. Engineering Drawing**

1. Basic Drawing tools
2. Drawings sheets and title block and lettering
3. Drawing scales
4. Different types of lines
5. Construction of different geometrical figures
6. Dimensions in the drawing
7. Axonometric projection
8. Oblique, Orthographic and isometric views
9. Plan elevation and sections of simple building
10. Site plan, trench plan, and roof plan
11. Door, window and truss and their details
12. Different kind of projections

**B. Workshop Practices**

1. Bricklaying and material used for bricklaying
2. Tools, bonds, and their properties
3. Pointing, curing of wall
4. Plumbing tools used for plumbing
5. GI and PVC fittings
6. Filing of GI Pipe and thread
7. Carpentry for wood and timber works
8. Tools for carpentry
9. Maintaining equipment's and materials
10. Activities of saw a long slicing works, shaping works
11. General information about joint
12. Basic knowledge of electricity and electrical circuits
13. Different sign and symbols of electrical safety
14. Source of power, Voltage, voltmeter and multimeter
15. Different kind of switches, and wiring
16. DP main switch and Earthling

**C. Engineering materials and their properties**

1. Clay and clay products and properties
2. Stones, their types, formation availability in Nepal and their properties,
3. Bricks, their types and properties
4. Timber and timer product and propertied
5. Metal and alloys
6. Cements, lime, and their properties and use

**D. Engineering Survey**

1. Basic principle of surveying
2. Survey tools and equipments
3. Linear distance measurement
4. Chain Survey.
5. Abney level survey
6. Compass survey and compass traversing
7. Plane table surveying
8. Levelling (level Survey)
9. Theodolite surveying and theodolite traversing
10. Tachometric surveying
11. Contouring and their properties
12. Area Volume measurement

**E. Basic Hydraulic**

1. Fluid and its properties
2. Pressure depth relationship and Pascal's Law
3. Measurement of pressure by different kinds of manometers
4. Buoyancy and Archimedes principle
5. Continuity and Bernoulli Equations and their applications
6. Pipe flow, head loss calculations
7. Open Channel flow and channel properties
8. Manning's and Chezy's formulas
9. Energy and momentum principle and application
10. Flow measurement

**F. Building Construction**

1. Building and their types
2. Foundation adopted for buildings
3. Masonry wall, stone masonry
4. Partition and cavity walls
5. Concrete construction
6. Formwork and scaffolding

7. Floor and their types
8. Roof, staircase and differ parts of buildings
9. Door and windows
10. Finishing works

**G. Estimating, costing and valuation**

1. Types of estimate and their procedure, Units of estimation.
2. Quantity of estimate
3. Estimating of various components of buildings, foundation, roads, irrigation systems, and
4. Other water supply systems
5. Rate analysis and different engineering works
6. Bill of quantities, specification and its type and procedure
7. Valuation its purpose and methods

**H. Mechanics of structure and structural design**

1. Forces on a rigid body
2. Stress and strains, theory of tension and Flexure, friction Moment of Inertia, Centre of Gravity
3. Analysis of plane truss
4. One way two slabs and their design criteria
5. Analysis of Beams and Frames: Bending Moment and Shear force
6. Steel structures and joints
7. Roof truss
8. Timber structures
9. Shear and bonds for RCC
10. Axial load in column
11. Introduction to limit state method



**I. Water Supply and Sanitary Engineering**

1. Population forecasting and work demand
2. Sources of water supply and measure discharge
3. Basic knowledge of components of water supply system and their concept (intakes)
4. Water population and concept of treatment plant
5. Distribution system
6. Gravity flow water supply system
7. Valves and fittings
8. Sanitation and sewerage system and their types
9. Quantity and disposal of sewage

10. Disposal and construction of sewers
11. Waste water treatment
12. Management of solid waste

**J. Soil Mechanics and highway engineering**

1. Classification, and properties of soil
2. Compaction and consolidation
3. Shear strength and earth pressure
4. Bearing capacities of soil
5. Road classification in Nepal
6. Highway alignment and engineering survey
7. Geometric design of highway
8. Highway drainage system
9. Highway pavement, surface and sub surface
10. Highway maintenance and hill road
11. Bridges and trail bridges and their development in Nepal

**K. Irrigation engineering**

1. Irrigation System in Nepal
2. Types and methods of irrigation
3. GCA, CCA, NCA, duty and delta and their application
4. Crop water requirement
5. Headwork and its components and irrigation structures
6. Water logging
7. Irrigation management

**L. Construction Management**



1. Project and management
2. Project planning and schedule
3. CPM and PERT
4. Contract administration and accounts
5. Quality and monitoring
6. Safety and construction equipments

**M. Entrepreneurship development**

1. Concept of business Entrepreneurship
2. Analysis of business ideas and viability
3. Formulation of business plan
4. Management of small business