पाठ्यक्रमको सूचीकरण:

- यस पाठ्यक्रमको आधारमा निम्नलिखित एक चरणमा परीक्षा लिइने ५० पूर्णाङ्क
- अन्वेषण: पूर्णाङ्क २०

प्रथम चरण - लिखित परीक्षा योजना (Examination Scheme)

<table>
<thead>
<tr>
<th>विषय</th>
<th>पूर्णाङ्क</th>
<th>उत्तरांग</th>
<th>परीक्षा प्रणाली</th>
<th>प्रश्न संख्या x अवधि मिनेट</th>
<th>समय</th>
</tr>
</thead>
<tbody>
<tr>
<td>सेवा सम्बन्धी</td>
<td>१००</td>
<td>४०</td>
<td>वस्तुत वहुउत्तर (Multiple Choice)</td>
<td>५० x २ = १००</td>
<td>४४ मिनेट</td>
</tr>
</tbody>
</table>

द्वितीय चरण

<table>
<thead>
<tr>
<th>विषय</th>
<th>पूर्णाङ्क</th>
<th>परीक्षा प्रणाली</th>
</tr>
</thead>
<tbody>
<tr>
<td>व्यतिक्रम अन्तर्बाट</td>
<td>२०</td>
<td>मौखिक</td>
</tr>
</tbody>
</table>

1. लिखित परीक्षाको माध्यम भाषा नेपाली र अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुनसकेँदै।
2. पाठ्यक्रमका एकाईबाट निम्नमात्र प्रश्नहरू सोधिनेछन्।

<table>
<thead>
<tr>
<th>एकाई</th>
<th>१</th>
<th>२</th>
<th>३</th>
<th>४</th>
<th>५</th>
<th>६</th>
<th>७</th>
<th>८</th>
<th>९</th>
<th>१०</th>
<th>११</th>
<th>१२</th>
<th>१३</th>
</tr>
</thead>
<tbody>
<tr>
<td>प्रश्न संख्या</td>
<td>४</td>
<td>४</td>
<td>४</td>
<td>३</td>
<td>३</td>
<td>४</td>
<td>४</td>
<td>४</td>
<td>४</td>
<td>४</td>
<td>४</td>
<td>४</td>
<td>४</td>
</tr>
</tbody>
</table>

3. वस्तुत वहुउत्तर (Multiple Choice) प्रश्नहरूको उत्तर सही दिइएको प्रत्येक सही उत्तर वापत २ (दुई) अंक प्रदान गरिएको भने गलत उत्तर दिइएको प्रत्येक गलत उत्तर वापत २० प्रतिशत अर्थात् ०.४ अंक कटा गरिएको। तर उत्तर नियममा तस्बा वापत अंक दिइने छैन मा अंक कटा पनि गरिएको हुनेछ।
4. यस पाठ्यक्रमका जैसै लेखिएका भएका पनि पाठ्यक्रमका परेका एनौ, नियमहरू परीक्षाको सम्बन्धमा मिति भन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्बन्धु हुनेछ।
5. लिखित परीक्षाबाट छौटी भएका उमेदवारहरूलाई मात्र अन्तर्बाटामा सम्मलित गराइएको छ।
6. पाठ्यक्रम लागू मिति - २०६६। ६। १ गते
1. General Agriculture and Agricultural Engineering
   1.1 Principles of agronomy (cereals, cash crops, pulses, vegetables, fruits and oilseed)
   1.2 Introduction to sociology and rural development
   1.3 Elements of soil science (soil fertility, properties and classification)
   1.4 Soil water, soil moisture tension, infiltration, permeability, wilting coefficient and conductivity
   1.5 Plant water relationship, evaporation, transpiration and consumptive use, evapotranspiration (ET) estimation methods
   1.6 Water requirements, irrigation frequencies, and irrigation effectiveness
   1.7 Method of Irrigation (Furrow irrigation, border irrigation and check basin irrigation, Sprinkler and drip/tickle irrigation)
   1.8 Type of drainage system, surface and sub surface drainage system
   1.9 Ground water and aquifers, hydraulics of wells
   1.10 Water erosion (rain drop erosion, rill erosion, gully erosion, stream channel erosion)
   1.11 Human, animal, electrical and mechanical powers
   1.12 Introduction to primary and secondary agricultural implements

2. Surveying
   2.1 General
      2.1.1 Classifications
      2.1.2 Principle of surveying
      2.1.3 Selection of suitable method
      2.1.4 Scales, plans and maps
      2.1.5 Entry into survey field books and level books
   2.1.2 Leveling
      1.2.1 Methods of leveling
      1.2.2 Leveling instruments and accessories
      1.2.3 Principles of leveling
   2.3 Plane Tabling
      2.3.1 Equipment required
      2.3.2 Methods of plane tabling
      2.3.3 Two and three point problems
   2.4 Theodolite and Traverse surveying
      2.4.1 Basic difference between theodolites
      2.4.2 Temporary adjustments of theodolites
      2.4.3 Fundamental lines and desired relations
      2.4.4 Tachometry: stadia method
      2.4.5 Trigonometrical leveling
      2.4.6 Checks in closed traverse
   2.5 Contouring
      2.5.1 Characteristics of contour lines
      2.5.2 Method of locating contours
      2.5.3 Contour plotting
   2.6 Setting Out
      2.6.1 Small buildings
      2.6.2 Simple curves
3. Construction Materials
   3.1 Stone
      3.1.1 Formation and availability of stones in Nepal
      3.1.2 Methods of laying and construction with various stones
   3.2 Cement
      3.2.1 Different cements: Ingredients, properties and manufacture
      3.2.2 Storage and transport
      3.2.3 Admixtures
   3.3 Clay and Clay Products
      3.3.1 Brick: type, manufacture, laying, bonds
   3.4 Paints and Varnishes
      3.4.1 Type and selection
      3.4.2 Preparation techniques
      3.4.3 Use

4. Mechanics of Materials and Structures
   4.1 Mechanics of Materials
      4.1.1 Internal effects of loading
      4.1.2 Ultimate strength and working stress of materials
   4.2 Mechanics of Beams
      4.2.1 Relation between shear force and bending moment
      4.2.2 Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading
   4.3 Simple Strut Theory

5. Hydraulics
   5.1 General
      5.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity
      5.1.2 Pressure and Pascal's Law
   5.2 Hydro Kinematics and Hydro Dynamics
      5.2.1 Energy of flowing liquid: elevation energy, kinetic energy, potential energy, internal energy
   5.3 Measurement of Discharge
      5.3.1 Weirs and notches
      5.3.2 Discharge formulas
   5.4 Flows
      5.4.1 Characteristics of pipe flow and open channel flow

6. Soil Mechanics
   6.1 General
      6.1.1 Soil types and classification
      6.1.2 Three phase system of soil
      6.1.3 Unit weight of soil mass: bulk density, saturated density, submerged density and dry density
      6.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids, air content and density index
   6.2 Soil Water Relation
      6.2.1 Terzaghi's principle of effective stress
      6.2.2 Darcy's law
      6.2.3 Factors affecting permeability
6.3 Compaction of Soil
   6.3.1 Factors affecting soil compaction
   6.3.2 Optimum moisture content
   6.3.3 Relation between dry density and moisture content

6.4 Shear Strength of Soils
   6.4.1 Mohr-Coulomb failure theory
   6.4.2 Cohesion and angle of internal friction

6.5 Earth Pressures
   6.5.1 Active and passive earth pressures
   6.5.2 Lateral earth pressure theory
   6.5.3 Rankine's earth pressure theory

6.6 Foundation Engineering
   6.6.1 Terzaghi’s general bearing capacity formulas and their application

7. Structural Design

7.1 R.C. Section in Bending
   7.1.1 Under reinforced, over reinforced and balanced sections
   7.1.2 Analysis of single and double reinforced rectangular sections

7.2 Shear and Bond for a R.C Section
   7.2.1 Shear resistance of a R.C section
   7.2.2 Types of shear reinforcement and their design
   7.2.3 Determination of anchorage length

7.3 Axially Loaded R.C. columns
   7.3.1 Short and long columns
   7.3.2 Design of a rectangular column section

7.4 Design and Drafting of R.C. Structures
   7.4.1 Singly and doubly reinforced rectangular beams
   7.4.2 Simple one way and two way slabs
   7.4.3 Axially loaded short and long columns

8. Building Construction Technology

8.1 Foundations
   8.1.1 Subsoil exploration
   8.1.2 Type and suitability of different foundations: shallow, deep
   8.1.3 Shoring and dewatering
   8.1.4 Design of simple brick / stone masonry and RCC foundations

8.2 Walls
   8.2.1 Type of walls and their functions
   8.2.2 Choosing wall thickness, height to length relation
   8.2.3 Use of scaffolding

8.3 Damp Proofing
   8.3.1 Sources of dampness
   8.3.2 Remedial measures to prevent dampness

8.4 Concrete Technology
   8.4.1 Constituents of cement concrete
   8.4.2 Grading of aggregates
   8.4.3 Concrete mixes
   8.4.4 Water cement ratio

8.5 Factors affecting strength of concrete

8.6 Curing
9. Soil and Water Engineering

9.1 Water Conveyance and Control
9.1.1 Design of open channels, channel linings, drop structures and spillways, water control and division structures
9.1.2 Design of underground pipe conveyance system

9.2 Land Development
9.2.1 Land leveling-grading design methods, estimation of earthwork quantities, leveling and grading procedures, equipment for land grading and field layout

9.3 Ground Water, Irrigation Wells and Pumps
9.3.1 Design of wells
9.3.2 Wells construction procedures
9.3.3 Indigenous water lifting devices, positive displacement pumps, centrifugal pumps, vertical turbine pumps, submersible pumps, propeller and mixed flow pumps, selection of pumps and their performances, repaired and maintenance

9.4 Water Erosion and Control Measures
9.4.1 Soil losses and its measurement
9.4.2 Erosion control measures (engineering and bioengineering methods)
9.4.3 Conservation structures, watershed management and water harvesting techniques

10. Farm Structure Development

10.1 Planning of farmstead, farm residence, water supply and sanitation
10.2 Farm road, farm fencing, farm ponds, farm irrigation and drainage

10.3 Animal Shelters
10.3.1 Dairy barn (housing requirements, stanchion and loose housing barns with milking barn, pen barn)
10.3.2 Poultry housing (housing requirements, types of poultry house, brooder house
10.3.3 Ship and goat housing (types, housing requirements, construction material, layout
10.3.4 Swine housing (types, housing requirements, construction materials, layout
10.3.5 Aquacultural engineering (types, pond construction)

10.4 Storage Structures
10.4.1 Fodder storage structure, feed storage structure, food grain storage structure, indigenous storage structure, bag storage structure, grain bins, and modern godowns
10.4.2 Farm machinery storage structure and farm workshop

10.5 Farm and Rural Electrification
10.5.1 Power transmission and distribution, house wiring and its components
10.5.2 AC motor (single phase and poly phase), starters, selection of electric motors, care and maintenance of electric equipments
10.5.3 Micro-hydro power plants
11. Estimating and Costing

11.1 General
11.1.1 Main items of work
11.1.2 Units of measurement and payment of various items of work and material
11.1.3 Standard estimate formats of government offices

11.2 Rate Analysis
11.2.1 Basic general knowledge of the use of rate analysis norms prepared by Ministry of Works and Transport and the district rates prescribed by district development committee

11.3 Specifications
11.3.1 Interpretation of specifications

11.4 Valuation
11.4.1 Methods of valuation

12. Construction Management

12.1 Organization
12.1.1 Need for organization
12.1.2 Responsibilities of a civil overseer
12.2.3 Relation between owner, contractor and engineer

12.2 Site Management
12.2.1 Preparation of site plan
12.2.2 Organizing labor
12.2.3 Measures to improve labor efficiency
12.2.4 Accident prevention

12.3 Contract Procedure
12.3.1 Contracts
12.3.2 Departmental works and day work
12.3.3 Types of contracts
12.3.4 Tender and tender notice
12.3.5 Earnest money and security deposit
12.3.6 Preparation before inviting tender
12.3.7 Agreement
12.3.8 Conditions of contract
12.3.9 Construction supervision

12.4 Accounts
12.4.1 Administrative approval and technical sanction
12.4.2 Familiarity with standard account keeping formats used in governmental organizations
12.4.3 Muster roll
12.4.4 Completion report

12.5 Planning and Control
12.5.1 Construction schedule
12.5.2 Equipment and materials schedule
12.5.3 Construction stages and operations
12.5.4 Bar chart
13. Rural Engineering

13.1 Green Roads
13.2 Water Supply and Sanitation Engineering
   13.2.1 General
   13.2.2 Objectives of water supply system
   13.2.3 Source of water and its selection: gravity and artisan springs, shallow and deep wells; infiltration galleries
   13.2.4 Gravity Water Supply System
   13.2.5 Design period
   13.2.6 Determination of daily water demand
   13.2.7 Determination of storage tank capacity
   13.2.8 Selection of pipe
   13.2.9 Pipe line design and hydraulic grade line
13.3 Bio engineering Measures
13.4 Renewable Energy

---The End---