

काठमाण्डौ महानगरपालिका
नेपाल इञ्जिनियरिङ्ग सेवा, अधिकृत छैटौं तह, वातावरण इञ्जिनियर पदको खूला र आन्तरिक प्रतियोगितात्मक
लिखित परीक्षाको पाठ्यक्रम
एवं परीक्षा प्रणाली (योजना)

पाठ्यक्रमको रूपरेखा :- यस पाठ्यक्रमको आधारमा निम्नानुसार दुई चरणमा परीक्षा लिइने छ :

प्रथम चरण :- लिखित परीक्षा पूर्णाङ्क :- २००
द्वितीय चरण :- अन्तर्वार्ता पूर्णाङ्क :- ३०

१. प्रथम चरण: - लिखित परीक्षा योजना (Written Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या X अङ्क	समय
प्रथम	वातावरण विज्ञान र इञ्जिनियरिङ्ग	१००	४०	वस्तुगत: बहुवैकल्पिक प्रश्न (MCQ)	१०० प्रश्न X १ अङ्क	१ घण्टा १५ मिनेट
द्वितीय	सम्बन्धी विषय	१००	४०	विषयगत	१० प्रश्न X १० अङ्क	३ घण्टा

२. द्वितीय चरण: - अन्तर्वार्ता (Interview)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता (Interview)	३०	मौखिक (Oral)

द्रष्टव्य :

- यो पाठ्यक्रम रूपरेखालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।
- लिखित परीक्षाको माध्यम भाषा अंग्रेजी वा नेपाली अथवा अंग्रेजी र नेपाली दुवै हुन सक्नेछ ।
- माथि उल्लिखित पदको पाठ्यक्रमको प्रथम र द्वितीय पत्रको विषयवस्तु एउटै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- प्रथम तथा द्वितीय पत्रका एकाईहरूको प्रश्नसंख्या यथासम्भव निम्नानुसार हुनेछ :

खण्ड	A	B	C
प्रथम पत्रका एकाई	1	2	3
प्रश्न संख्या	20	20	40
द्वितीय पत्रका एकाई	1	2	3
प्रश्न संख्या	2	2	4

- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरूको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१०. पाठ्यक्रम लागू मिति :-

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प्रथम र द्वितीय पत्र :- वातावरण विज्ञान र इञ्जिनियरिङ्ग सम्बन्धी बिषय

Section A- 40 Marks

1. BASICS TO ENVIRONMENTAL ENGINEERING

1.1 Engineering Basics

- 1.1.1 Environmental engineering processes and models
- 1.1.2 Environmental sampling and analysis
- 1.1.3 Environmental degradation and manifestations (land, water and air)
- 1.1.4 History of environmental pollution and control

1.2 General Climatology & Hydrology

- 1.2.1 Meteorological fundamentals: wind, humidity, solar energy, temperature
- 1.2.2 Climate systems and classification
- 1.2.3 Weather and climatic systems of Nepal
- 1.2.4 Water resources and ecosystems, hydrological cycle
- 1.2.5 Water balance; precipitation; stream flow; runoff; evapo-transpiration
- 1.2.6 Aquifers: types of aquifers

1.3 Environmental Geology & Geomorphology

- 1.3.1 Geological and geomorphologic processes in the Earth
- 1.3.2 Geology of Nepal Himalaya
- 1.3.3 Minerals and rocks: classification, types, composition and exploration
- 1.3.4 Fluvial and lake environment: erosion, transportation and deposition

1.4 Global Environmental Issues

- 1.4.1 Climate change and global warming phenomena
- 1.4.2 Ozone layer depletion and acid rain
- 1.4.3 Transboundary pollution and movement

1.5 Urban Environment

- 1.5.1 Issues of urban areas: sanitation, solid and hazardous waste, air pollution, water pollution, groundwater depletion, food security
- 1.5.2 Urbanization infrastructures and environment (housing, water supply and sanitation, waste management, transportation, electricity, markets and commercial areas, religious and heritage sites, open spaces and recreational areas)
- 1.5.3 Disaster and urban disaster management approaches
- 1.5.4 Concept of urban planning and sustainable cities

2. ENVIRONMENTAL RESOURCES

2.1 Water Resources

- 2.1.1 Water resources management in Nepal: scenario, challenges and measures
- 2.1.2 Integrated Water Resource Management (IWRM)
- 2.1.3 Upstream-downstream linkages

2.2 Agriculture, Forest and Biodiversity

- 2.2.1 Land use, land cover and environment
- 2.2.2 Factors governing land utilization and land use pattern
- 2.2.3 Major food resources and production, major agricultural systems

2.2.4 Forest types and biodiversity status of Nepal

2.3 Energy Resources

2.3.1 Renewable and non-renewable energy resources

2.3.2 Energy resources of Nepal: sector wise consumption

2.3.3 Environmental issues of energy use: pollution, crisis and conservation

2.3.4 Energy resources of Nepal

2.4 Resource Economics

2.4.1 Ecological Economics and sustainable development

2.4.2 Externalities and instruments of emission control

2.4.3 Indifference curves

2.4.4 Welfare Economics

2.4.5 Valuation of ecosystem services

Section B- 40 Marks

3. ENVIRONMENTAL POLLUTION CONTROL ENGINEERING

3.1 Water Pollution

3.1.1 Point and non-point sources and categories of water pollutants

3.1.2 Water pollutants effect on human health and ecosystems

3.1.3 Standard methods of water analysis

3.1.4 Objectives of treatment, treatment methods: physical, chemical and biological

3.1.5 Preliminary treatment processes: racks or screens, skimming tanks, grit chambers, sedimentation, and chemical precipitation

3.1.6 Secondary treatment processes and their types, BOD removal, design criteria, activated sludge, trickling filters, rotating biological contractor, oxidation ponds and ditches, aerated lagoons and lagoons

3.1.7 Sewage filtration, intermittent sand filter, contact bed, trickling filters, bio-filters and design of trickling and bio-filters

3.2 Air Pollution

3.2.1 Sources and categories of air pollutants

3.2.2 Emission, transport, receptors of air pollutants, criteria air pollutants

3.2.3 Air pollutants effects on human health, property and visibility

3.2.4 Air pollution measurement and emission estimates

3.2.5 Air pollution control technologies

3.3 Noise Pollution

3.3.1 Noise sources and criteria

3.3.2 Health effects of noise and control mechanisms

3.4 Waste Management

3.4.1 Types, characteristics and properties of solid waste

3.4.2 Garbage collection and disposal

3.4.3 Waste handling and separation, storage and processing of the wastes

3.4.4 Transformation of solid waste

3.4.5 Methods of solid waste disposal: dumping, sanitary landfill, incineration and composting

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3.4.6 E- waste, hazardous waste and health care waste management

3.4.7 Sustainable solid waste management approaches (social, economical and environment)

3.5 Environmental Management Systems (EMS) & Modeling

3.5.1 Concept, components and stages of EMS

3.5.2 ISO 14000 series, standards and certification systems

3.5.3 Life cycle assessment and environmental labeling

3.5.4 Types and importance of environmental models

3.6 GIS and Remote Sensing

3.6.1 Concept, Scope and Principles of Remote Sensing

3.6.2 Types of Aerial Photographs

3.6.3 Remote Sensing Satellites; Image: Acquisition, Resolution Classification, Analysis and Interpretation

3.6.4 GIS: Concepts and Practices

3.6.5 Spatial Features: Point, Line, Area, Volumetric, Spatial Measurement Levels; Geo-referencing; Projections and Transformations, Layers and Coverages; Spatial Relationships and Generalization; GIS Applications in Assessing Environmental Studies.

3.7 Climate Change

3.7.1 Climate variability and model based projections of greenhouse effect

3.7.2 Climate change impacts: agriculture and food security, water resources, energy, human health, biodiversity, settlement and infrastructure and livelihood

3.7.3 Mitigation and adaptation strategies (NAPA, LAPA)

Section C- 20 Marks

4. LEGAL FRAMEWORKS

4.1 Concept of Environmental Assessment

4.1.1 Initial Environmental Examination (IEE), Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA)

4.1.2 Environmental assessment: process, practices and principles

4.1.3 Impact identification and prediction; mitigation, monitoring and evaluation

4.1.4 Government legislations relating with Environmental Assessments

4.2 Guidelines and Standards

4.2.1 Guidelines and Standards Relating to Air (Ambient, Indoor and Stack) and Water (Tolerance Limits for Industrial Effluents to be Discharged into Public Sewers and Inland Surface Waters) and Noise; Specific Industrial Effluent Standards

4.3 National Legislations

4.3.1 Legislations of Government of Nepal related with Environmental Conservation and Management:

4.3.1.1 Existing Constitution of Nepal

4.3.1.2 Local Self-Governance Act and Regulations

4.3.1.3 Existing Environmental Protection Act and Rules

4.3.1.4 National EIA Guidelines

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- 4.3.1.5 Water Resources Act
- 4.3.1.6 Solid Waste Management Act
- 4.3.1.7 Pesticides Act and Regulation
- 4.3.1.8 Climate Change Policy

4.4 International Treaties, Protocols & Conventions

- 4.4.1 International treaties, protocols and conventions related with Environmental Conservation and Management:
 - 4.4.1.1 Convention on Biological Diversity, 1992
 - 4.4.1.2 United Nations Framework Convention on Climate Change, 1992
 - 4.4.1.3 United National Convention to Combat Desertification, 1994
 - 4.4.1.4 Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997
 - 4.4.1.5 Vienna Convention for the Protection of the Ozone Layer, 1985
 - 4.4.1.6 Montreal Protocol on Substances that Deplete Ozone Layer, 1987
 - 4.4.1.7 Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, 1989
 - 4.4.1.8 Stockholm Convention on Persistent Organic Pollutants, 2004
 - 4.4.1.9 Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade, 2004

The end