

Manmohan Technical University  
Service Commission  
Curriculum of Open Competitive Examination  
For the Post of Lecturer in **Civil/ Structural Engineering**

**Description of the post:**

Service: Teaching	Group: Civil Engineering
Post: Lecturer, Civil/ Structural Engineering	Level: Lecturer

**Framework of the Curriculum:**

The examinations are conducted in two phases as mentioned below:

First Phase: Written Exam	Full Marks: 150
Second Phase: (a) Qualification, Publications and Teaching Experience:	Full Marks: 50
(b) Interview & Presentation:	Full Marks: 50

Table No: 1

First Phase: Written Exam Full Marks: 150

Paper	Subject	Full Marks	Pass Marks	Examination System	Number of Questions	Time
First	Teaching, Research and General Knowledge	50	25	MCQs	20	50 Minutes
	Subject Related Contents			MCQs	30	
Second	Subject, Research and Teaching Related Contents	100	50	Subjective Questions (short & long answer type)	14	3 Hours

Table No: 2

Second Phase: Interview Full Marks: 100

Subject	Full Marks	Examination System	Remarks
Interview and Presentation	50	Oral and Very Short Presentation	
Evaluation of Documents	50	Observation and Marking	
Total	100		

**Note:**

1. This curriculum framework is divided into two phases.
2. Open/internal competitive examination will be held as mentioned above.
3. The medium of language in written exam will be Nepali or English or both Nepali+ English only.
4. Examinees are prohibited to take mobile phone, programmable calculator, smart watch or other similar electronics devices in the examination hall.
5. The marks of academic qualification, publications and teaching experiences in the concerned field will be evaluated before the time of interview. All the publications and related documents are to be submitted before the last date of application submission.
6. The marks are allotted for these documents as given below:

S. No	Documents	Full Marks
1	Academic qualification	30
2	Research publication	10
3	Teaching experience	10
Total		50

7. The final result will be published on the basis of total marks of written exam, interview/ presentation, evaluation of academic qualification, research publications and teaching experiences.
8. In a subjective question, one or more than one questions can be included within the allotted marks area.
9. The full marks and weightage of questions are based on the given curriculum.
10. Research and problem solving types of questions will be selected from the related field.
11. This curriculum will be effective from the date of 2080/04/30

**Subject: Civil/ Structural Engineering**  
**Paper: First (Objective)**  
**Objective (Multiple Choice) Questions**

Full Marks: 50
Pass Marks: 25
Time: 50 Minutes

Part	Subject Matter	Number of Questions	Marks per Question	Total Marks
First Part	Teaching, Research and General Knowledge	20	1	20
Second Part	Subject Related Contents	30	1	30
Total		50		50

**(Extention of the Curriculum) पाठ्यक्रमको विस्तृतीकरण**

**First Part: (Teaching, Research and General Knowledge)**

**20×1=20**

क) शिक्षण सीप, विधि र विद्यार्थी मुल्याङ्कन (Teaching Skill, Methods and Evaluation): (5)

विस्तृतीकरण	उच्च शिक्षा शिक्षणका लागि आवश्यक गुण, संचार सीप, शिक्षण विधि र विद्यार्थी मुल्याङ्कन सम्बन्धी प्रश्नहरू ।
शीर्षक	थप विस्तृतीकरण
उच्च शिक्षा शिक्षणका लागि आवश्यक गुणहरू Required qualities for teaching in higher education:	उच्चशिक्षामा शिक्षणको लागि आवश्यक व्यक्तिगत, सामाजिक तथा पेशागत गुणहरू: (Required qualities for teaching in higher education: Individual, social and occupational/professional)
कक्षामा सञ्चार सीप (Communication Skill in the classroom)	सिकाइमा उत्प्रेरणा जगाउने तरिका र कक्षामा विषयवस्तुको प्रस्तुतीकरण सीप: (Motivational and presentation skills of subject matter in the classroom): भाषाको प्रयोग, विषयवस्तुको क्रमबद्धता, सिकारुमैत्री वातावरण निर्माण ।
शिक्षण विधि (Teaching methods)	शिक्षण विधिको अवधारणा र प्रयोग: (Concept and uses of teaching methods): <ul style="list-style-type: none"> <li>• Demonstration method</li> <li>• Problem solving method</li> <li>• Discovery method</li> <li>• Project method</li> <li>• Practical /Experimental method</li> <li>• Field work method</li> </ul>

विद्यार्थी मूल्याङ्कन (Student evaluation and assessment)	<ul style="list-style-type: none"> <li>• सुधारात्मक, निर्णयात्मक तथा निदानात्मक मूल्याङ्कन (Formative, summative and diagnostic evaluation).</li> <li>• मूल्याङ्कनबाट प्राप्त जानकारीको प्रयोग (Using assessment information): निर्णय गर्नका लागि (For Decision making), सुधारका लागि पृष्ठपोषण (Feedback for improvement)।</li> </ul>
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(ख) Research Aptitude, Publication Ethics and Data Interpretation: (5)

Extention	<ul style="list-style-type: none"> <li>• Meaning of research and its objectives, types and methods,</li> <li>• Research &amp; publication ethics,</li> <li>• Types of data sources, access to data, availability of data and data presentation</li> <li>• Research based article,</li> <li>• Quality of journal</li> <li>• Dissertation/thesis framework</li> </ul>
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(ग) उच्च शिक्षा प्रणाली (Higher Education System) (5)

विस्तृतिकरण	नेपालको संविधानमा शिक्षा संबन्धी प्रावधानहरु, नेपालको शिक्षा प्रणाली, नेपालमा उच्च शिक्षाको वर्तमान अवस्था, उच्च शिक्षा नीति ।
नेपालको संविधानमा शिक्षा संबन्धी प्रावधानहरु, नेपालको शिक्षा प्रणाली, नेपालमा उच्च शिक्षाको वर्तमान अवस्था, उच्च शिक्षा नीति ।	<ul style="list-style-type: none"> <li>• नेपालको संविधानमा शिक्षा संबन्धी प्रावधानहरु:</li> <li>• नेपालको शिक्षा प्रणाली: शिक्षाको संरचना, औपचारिक र अनौपचारिक प्रणाली ।</li> <li>• उच्च शिक्षामा प्राविधिक विषयको आवश्यकता</li> <li>• विश्वविद्यालय अनुदान आयोगका प्रमुख कार्यहरु तथा यसबाट विश्व विद्यालयहरुलाई दिइने अनुदानका प्रकार ।</li> <li>• उच्च शिक्षा नीति ।</li> </ul>

(घ) मनमोहन प्राविधिक विश्वविद्यालय र नेपाल इन्जिनियरिङ परिषद सम्बन्धी जानकारी (Information on Manmohan Technical University and Nepal Engineering Council) (5)

विस्तृतिकरण	म. प्रा. वि. ऐन, नियम तथा सांगठनिक स्वरुप सम्बन्धी प्रश्नहरु ।
४.१ मनमोहन प्राविधिक विश्वविद्यालय ऐन, २०७६	
४.२ मनमोहन प्राविधिक विश्वविद्यालय शिक्षक तथा कर्मचारीको सेवाका सर्त र सुविधासम्बन्धी नियमावली, २०७८	
४.३ मनमोहन प्राविधिक विश्वविद्यालय शैक्षिक प्रशासन नियमावली, २०७८	
४.४ मनमोहन प्राविधिक विश्वविद्यालय सेवा आयोग सम्बन्धी नियमावली, २०७८	
४.५ नेपाल इन्जिनियरिङ परिषद ऐन २०५५ र नियमावली २०५७ (संशोधन सहित)	

**Subject: Civil/ Structural Engineering**  
**Paper: First**  
**First Part: Teaching, Research and General Knowledge**

**Sample Questions (MCQs)**

**20×1=20**

(20 MCQs are asked from the contents of First Part. Each question carries one mark.)

Tick the best answer for the following questions from the given alternatives:

1. In the context of higher education, which of the followings is the most important role of a good teacher?
  - A) An evaluator of students in the class
  - B) A guide liner, analyzer and synthesizer of related information effectively
  - C) Innovator and Creator
  - D) **Effective communicator**
2. Which of the following assessment techniques is used to evaluate a student's progress and give feedback?
  - A) Summative
  - B) **Formative**
  - C) Decisive
  - D) Diagnostic
3. Which one is not a part of research proposal?
  - A) Methodology
  - B) Objectives
  - C) **Recommendations**
  - D) References
4. Which one is not a tool of data collection in engineering education?
  - A) **Campaigning**
  - B) Questionnaire
  - C) Focus group discussion
  - D) Participatory rural appraisal
5. The main mandate of the University Grants Commission (UGC) Nepal includes:
  - A) **Disbursing grants to universities and colleges**
  - B) Recognizing and monitoring technical institutions
  - C) Funding research centers in universities
  - D) Managing various scholarship programs
6. The main present structure of education in Nepal is:
  - A) Primary, secondary and higher level

- B) Pre-primary, Primary, basic, secondary, Higher and Research level
  - C) Primary, Secondary, Higher and Research level
  - D) **Basic, secondary and Higher level**
7. Which of the following statements is the most appropriate in terms of online education?
- A) It supplements formal education
  - B) It reduces the cost of education
  - C) It replaces the formal education
  - D) **It enhances access to education in low cost and short time.**
8. Which of the following officials is not a member of the academic council of MTU?
- A) Representative of the industrial institute
  - B) Teacher representative of MTU
  - C) **Member of the service commission of MTU**
  - D) Representative from the subject specialist
9. In which of the following case salary is discontinued to a teacher if he/she should be punished?
- A) If he/she frequently denied the code of conduct of teacher
  - B) If he/she disclosed the secrecy of the university
  - C) If he/she has not got clearance of his/her advance amount taken from the MTU
  - D) **If he/she frequently denied and neglected the appeals of stakeholders**
10. Which one of the following statements is true?
- a. Curriculum and syllabus are equivalent components.
  - b. Syllabus has a wide scope than curriculum.
  - c. **Curriculum is a broad term and syllabus is a part of curriculum.**
  - d. Syllabus includes many activities as compare to the curriculum

**Subject: Civil/ Structural Engineering**  
**Paper: First**  
**Second Part: Subject Related Contents**

**30×1=30**

**Sample Questions (MCQs)**

(30 MCQs are asked from the Contents of Group A of the Second Paper.  
Each question carries one mark.)

Tick the best answer for the following questions from the given alternatives:

1. The bending moment in a beam will be maximum where the shear force is ...  
A) Uniform  
B) Maximum  
C) **Zero**  
D) Positive
2. The number of reaction components at the fixed end of a beam is...  
A) 1  
B) 2  
C) **3**  
D) 0
3. The flexure formula is valid only for ...  
A) Torsion  
B) Compression  
C) **Bending**  
D) Shear
4. In the case of long columns the maximum possible stress depends on ...  
A) The ultimate crushing strength of the material  
B) **The maximum slenderness ratio**  
C) The radius of gyration only  
D) Effective length only
5. The loading on the conjugate beam will be ...  
A) Loading on real beam divided by EI  
B) B.M. diagram multiplied by EI  
C) B.M. diagram divided by SF diagram  
D) **B.M. diagram divided by EI**
6. The basic form of a pin jointed frame is ...  
A) **Triangle**  
B) Rectangle  
C) Trapezium  
D) Parallelogram
7. The line of thrust of the linear arch is ...  
A) The axis of the arch  
B) **The imaginary link work of thrust for a given set of loads**  
C) The springing line  
D) The neutral axis
8. M25 grade of concrete approximates...  
A) 1:3:6 mix  
B) 1:1.5:3 mix  
C) **1:1:2 mix**  
D) 1:2:4 mix

**Subject: Civil/ Structural Engineering**  
**Paper: Second (Subjective)**

Full Marks: 100
Pass Marks: 50
Time: 3 Hours

**Group: A**

**Knowledge of the Subject Matter and its Analysis:**

Questions on this part are included from the types as given below:

Question Types	Number of Questions	Per Question Marks	Total Marks
Long Questions	3	10	30
Short Questions	6	5	30
Total	9	-	60

**1. Basic Civil Engineering Courses:**

**(15)**

**1.1. Surveying:** Fundamental of Surveying, Linear Measurements, Chain Survey, Compass Survey, Leveling, Theodolite, Control Survey and its methods, Plane Table Survey, Computation of Area and Volume, Control Survey by Traversing Method, Trigonometric Leveling, Tacheometry, Contouring, Curve Surveying, Field Astronomy and Global Positioning System (GPS), Modern Method of Surveying, Geographic Information System (GIS) and Remote Sensing.

**1.2. Engineering Drawing, Estimating, Costing and Valuation:** Fundamentals of Standard drawing sheets, dimensions, scale, line diagram, orthographic projection, isometric projection/view, pictorial views, and sectional drawing. Procedure of Estimating, Building Estimates, Estimates of other Civil Engineering Structures, Specifications, Rate Analysis, Rules and Methods of Measurement of Works and Taking out Quantities, Abstract of Cost and Billing, Valuation of Civil engineering structures.

**1.3. Soil Mechanics and Foundation Engineering:** Soil formation and soil type, Soil Phase Relationship and Index Properties of Soils, Soil Identifications and Classification, Soil Structure and Clay Minerals, Soil Compaction, Principle of Effective Stress, Capillarity and Permeability, Seepage through Soils, Stress Distribution in Soil, Compressibility and Consolidation of Soil, Shear Strength of Soil, Stability of Slopes, Foundation Engineering, Importance and purpose, Soil Investigation, Lateral Earth Pressure Theories and Retaining Walls, Arching in Soils and Braced Cuts, Flexible Retaining Structures and Cofferdams, Bearing Capacity and Settlement of Shallow Foundations, Mat Foundations, Pile Foundations, Well Foundations, Foundations Soil Improvements.

**2. Structural Engineering:**

**2.1. Engineering Mechanics:**

**(10)**

Definitions, stress-strain diagrams, Hook's law, Poisson's ratio, allowable stress and safety factor, elastic constants and relationships, Torsions: definitions, assumptions, relevant formula, torsion moments and stress, modulus of rigidity,



Geometric properties of sections: Axes of symmetry; center of gravity of different sections, moment of inertia, radius of gyration, Axial forces, shear forces, and bending moments: dead and live loads, plotting the diagrams, superposition due to various combination of loads, calculation of value and position of maximum shear force and bending moments; relationship between loads, shear forces and bending moments.

**2.2. Stress and Strain Analysis: (5)**

Normal and shear stresses, Principal stresses and Principal planes, maximum shear stress and corresponding plane, Mohr's circle of stress, stresses in thin walled vessels, Theory of flexure: co-planar and pure bending, elastic curve, angle of rotation, radius of curvature and flexural stiffness, computation of deflections, bending stress. Columns, Euler's formula for long column, intermediate columns and empirical formulas; column behaviour due to buckli

**2.3. Structural Analysis: (10)**

Determinate structures: Energy Methods, Virtual Work Method, Displacement Theorems, Deflection of Beams, Influence Lines for Simple Structures, Arches, Statically Determinate Space Trusses, Cables and cable Bridges. Indeterminate Structures: Flexibility Method, Two-Hinged Parabolic Arches, Slope Deflection Method, Moment Distribution Method, Influence Lines for Continuous Beams, Elementary Plastic analysis, Direct Stiffness Method, Introduction to finite element methods. Dynamics of Structures: Dynamic analysis for SDOF and MDOF systems.

**2.4. Concrete Technology, Masonry Structures and Timber Structures: (5)**

Concrete technology: materials, properties, Mix design, Nominal mix, Design mix, quality control, Tests, and codes, Masonry Structures: design and codes of masonry structures, testing of masonry elements, Timber structures: design principles of timber beams and columns, relevant codes.

**2.5. RCC and Steel Structures: (10)**

Working stress and Limit state methods, Limit State design of beams and slabs, analysis of RC beams and slabs in bending, shear, deflection, bond and end anchorage, design of columns and footings, stair case design, pre-stressed concrete, Standard and built-up sections, design of riveted, bolted and welded connections, design of simple elements such as ties, struts, axially loaded and eccentric columns, and column bases, relevant codes for steel and RCC.

**3. Project Planning, Design and Implementation: (5)**

**3.1. Project planning, scheduling and Project management:** Project classifications; project life cycle phases; project planning process; project scheduling (bar chart, CPM, PERT); resources leveling and smoothing; monitoring, evaluation and controlling. Information system; project risk analysis

and management; project financing, tender and its process and contract management.

- 3.2. Professional Practice and Regulatory Body:** Environment and society; professional ethics; regulatory environment; contemporary issues/ problems in engineering; occupational health and safety; roles and responsibilities of Nepal Engineers Association (NEA), Act and Regulations of Nepal Engineering Council.

**Group: B**

**Subject Related Research and Problem Solving: 20**

Questions on this part are included from the types as given below:

Question Types	Number of Questions	Per Question Marks	Total Marks
Long Questions	2	10	20
Total	2		20

- 1. Research Aptitude, Publication Ethics and Data Interpretation: (10)**  
 Meaning of research and its objectives, types and methods, Research publication ethics, Process of data collection, availability of data and its presentation, Research based articles, Process of preparation and publication of qualitative journal and its framework, Dissertation/ thesis framework, Analyze the existing problems and suggest solutions
- 2. Problems and Solutions in Related Field: (10)**  
 Identify problems, issues and challenges in related field, Latest trends, issues and challenges in the field of related Subject and suggest appropriate means and ways of solutions to overcome these issues

**Group: C**

**Teaching Related Contents: 20**

Questions on this part are included from the types as given below:

Question Types	Number of Questions	Per Question Marks	Total Marks
Long Questions	1	10	10
Short Questions	2	5	10
Total	3		20

- 1. Curriculum and Teaching Plans: (10)**  
 General information on curriculum, Analysis, suggestions and Preparation of Bachelor level curriculum of MTU in related subject and its frame work, General information, importance, preparation and implementation of instructional plan, unit plan and daily lesson plan

**2. Teaching Skill, Methods and Evaluation:**

**(10)**

Required qualities for teaching in higher level: Individual, social and occupational/professional, Communication Skill: motivation and presentation of subject matter in the classroom, Teaching methods: Demonstration method, Problem solving method, Discovery method, Project method, Practical/Experimental method, Field work method, Student Evaluation and Assessment: Formative, summative and diagnostic evaluation, Using assessment information for decision making and feedback for improvement

**Subject: Civil/ Structural Engineering**  
**Paper: Second**  
**Sample Questions: (short and long answer types)**

Full Marks: 100
Pass Marks: 50
Time: 3 Hours

**Attempt all questions**

**Group: A (30+30=60)**

**Long answer type questions:** **3×10=30**

1. While digging a foundation trench for a combined footing if water starts seeping in the trench, what measure will you take as a site supervisor from structural engineering perspective? Give detail jurisdiction to construct the reinforced concrete combined footing. (10)
2. Explain the testing procedure of concrete cubes for compressive strength for an arbitrary project in detail. (10)
3. Write down a proposal for structural analysis and design of a five storied reinforced concrete school building to be constructed in Biratnagar having building plan area of 5000 sq. ft. The job has to be completed within a month. Assume an arbitrary architectural drawing. Assume all the necessary data suitably. (10)

**Short answer type questions:** **6×5=30**

4. What is an over-reinforced concrete beam? Is it acceptable or unacceptable in limit state design? Give reasons. (2.5+2.5)
5. Explain the salient points with illustration of stress- strain diagram for a mild steel under tensile force. (5)
6. If the Poisson's ratio of an elastic material is 0.4, find the ratio of modulus of rigidity to Young's modulus (5)
7. Question (5)
8. Question (5)
9. Question (5)

**Group B 2×10=20**

10. Why are you interested to choose this profession/field? What new skills have you learned over the past year? How will you make a plan for one year to improve the academic environment of the department? (2+2+6)
11. One question from research of related field (10)

**Group C (10+5+5) =20**

12. What are the types of plans that a teacher of university level should prepare? Why these plans are important for a teacher? And also prepare a teaching plan for a period to teach the students of Structural Engineering in Bachelor Level in any topic. (2+3+5)
13. What are the required qualities of a teacher? Describe two of them in brief. (1+4)
14. What is experimental method of teaching? How can it be introduced in teaching Structural Engineering in Bachelor Level? (2+3)