

पूर्वाञ्चल विश्वविद्यालय
गोठगाँऊ, मोरङ, नेपाल



प्रवेश परीक्षा तथा विद्यार्थी भर्ना सम्बन्धी संशोधित विनियमावली २०७८



पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकाय

विराटनगर, मोरङ्ग, नेपाल

प्रवेश परीक्षा तथा विद्यार्थी भर्ना सम्बन्धी विनियमावली २०७८

पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकाय अन्तर्गत संचालित विभिन्न शैक्षिक कार्यक्रमहरूको प्रवेश परीक्षा तथा विद्यार्थी भर्ना प्रक्रियालाई थप सुदृढ, पारदर्शी, समयानुकूल बनाउन पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकायको प्रवेश परीक्षा तथा विद्यार्थी भर्ना सम्बन्धी विनियमावली २०७८ बनाई लागु गर्न वाञ्छनीय देखिएको छ ।

१. संक्षिप्त नाम र प्रारम्भ:

(क) यो विनियमावलीको नाम पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकायको “प्रवेश परीक्षा तथा विद्यार्थी भर्ना सम्बन्धी विनियमावली २०७८” रहनेछ ।

(ख) यो विनियमावली शैक्षिक वर्ष २०७८/०७९ साल देखि लागु हुनेछ ।

२. परिभाषा: विषय वा प्रसंगले अर्को अर्थ नलागेमा यस विनियमावलीमा:

१. “विनियमावली” भन्नाले पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकायको प्रवेश परीक्षा तथा विद्यार्थी भर्ना सम्बन्धी विनियमावली २०७८ भन्ने सम्झनुपर्दछ ।
२. “प्रवेश परीक्षा” भन्नाले पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकायले संचालन गर्ने प्रवेश परीक्षा भन्ने बुझ्नु पर्दछ ।
३. “स्नातक” तह भन्नाले पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकाय अन्तर्गत हाल संचालित स्नातक तहका कार्यक्रमहरू भन्ने बुझ्नुपर्दछ ।
४. “स्नातकोत्तर” तह भन्नाले पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकाय अन्तर्गत हाल संचालित स्नातकोत्तर तहका कार्यक्रमहरू भन्ने बुझ्नुपर्दछ ।
५. “अंकभार” भन्नाले प्रवेश परीक्षामा सम्बन्धित विषयहरूबाट सोधिने प्रश्नहरूको प्रतिशत भन्ने बुझ्नुपर्दछ ।
६. “पूनः प्रवेश परीक्षा” भन्नाले पहिलो पटक प्रवेश परीक्षा भइसकेपछि हुने दोश्रो परीक्षा भन्ने बुझ्नुपर्दछ ।
७. ‘डीन’ भन्नाले इञ्जिनियरिङ्ग संकायको डीन भन्ने बुझ्नुपर्दछ ।
८. ‘संकाय’ भन्नाले पूर्वाञ्चल विश्वविद्यालय अन्तर्गतका संकाय भन्ने सम्झनुपर्दछ ।
९. ‘प्रवेश परीक्षा समिति’ भन्नाले पूर्वाञ्चल विश्वविद्यालय इञ्जिनियरिङ्ग संकायको प्रवेश परीक्षा संचालनको लागि गठन गरिएको समिति भन्ने बुझ्नुपर्दछ ।
१०. ‘योग्यता क्रम’ (Merit List) भन्नाले प्रवेश परीक्षामा प्राप्त प्राप्तांक अनुसार सबैभन्दा बढी अंक ल्याउने लाई पहिलो क्रममा राखी तयार गरिएको विद्यार्थीहरूको List भन्ने बुझ्नुपर्दछ ।
११. ‘विश्वविद्यालय’ भन्नाले पूर्वाञ्चल विश्वविद्यालय भन्ने बुझ्नुपर्दछ ।



३. प्रवेश परीक्षाको फाराम तथा आवश्यक कागजात सम्बन्धमा

- (क) संकायबाट लिइने प्रवेश परीक्षाको सूचना राष्ट्रिय दैनिक पत्रिका/विश्वविद्यालयको वेबसाइटमा प्रकाशित गरिने छ ।
- (ख) संकायबाट जारी भएको प्रवेश परीक्षाको सूचना अनुसार विद्यार्थीहरूले आफूले अध्ययन गर्न चाहेको शैक्षिक संस्था तथा कार्यक्रम छनोट गरि अनलाइन (Online) मार्फत तोकिएको समयसिमा भित्र प्रवेश परीक्षाका फारम भर्नु पर्ने छ ।
- (ग) सम्बन्धित परीक्षार्थीले अध्ययन गर्न चाहेको शैक्षिक कार्यक्रमका लागि आवश्यक न्यूनतम योग्यता पुरा गरेको हुनु पर्ने छ । विश्वविद्यालयले तोकेको मापदण्ड तथा न्यूनतम योग्यता अनुसार फारम भरेको नभएमा उक्त फारम स्वतः खारेज (अस्वीकृत) हुनेछ, र सोको जिम्मेवारी स्वयम् सम्बन्धित परीक्षार्थी हुनेछ ।
- (घ) आरक्षण कोटामा फारम भर्न चाहने विद्यार्थीले उक्त फारममा आरक्षणको कोटामा उल्लेख गर्नु पर्नेछ ।

४. . प्रवेश परीक्षा समिति

पू. वि. कार्यकारी परिषद्ले प्रवेश परीक्षा संचालनका लागि सम्बन्धित संकायको डीन वा डीनले तोकेको व्यक्तिको संयोजकत्वमा प्रवेश परीक्षा समिति गठन गर्नेछ । प्रवेश परीक्षा डीन कार्यालयबाट संचालन हुनेछ । प्रवेश परीक्षा समितिले प्रवेश परीक्षालाई व्यवस्थित गरी संचालन गर्न आवश्यक कार्यविधीहरू बनाउन सक्नेछ । गठित समितिले प्रवेश परीक्षाको सम्पूर्ण प्रक्रिया पूरा गरी नतिजा प्रकाशन गर्नेछ । प्रवेश परीक्षा समितिले आवश्यकता अनुसार विज्ञहरू र सम्बन्धित डीन कार्यालयका कर्मचारीहरू समेत रहने गरी विभिन्न उपसमिति गठन गरी कार्य गर्न सक्नेछ । विज्ञहरू र कर्मचारीहरूलाई यस विनियमावलीको अनुसूचीमा उल्लेख भए अनुसारको पारिश्रमिक उपलब्ध गराइनेछ ।

५.पूनः प्रवेश परीक्षा सम्बन्धी व्यवस्था

प्रथम प्रवेश परीक्षा पश्चात् विद्यार्थी भर्ना भइसकेपछि, विश्वविद्यालयले निर्धारण गरेको कोटा (शैक्षिक कार्यक्रम अनुसार) ५० प्रतिशत वा सो भन्दा बढी भर्ना नभएमा सम्बन्धित कलेजहरूले लिखित रूपमा डीन कार्यालयमा निवेदन दिनु पर्नेछ । सो पश्चात् सम्पूर्ण कलेजहरूको जम्मा कोटा र विद्यार्थीहरूको कूल भर्ना संख्यालाई विश्लेषण गरी डीन कार्यालयबाट पूनः प्रवेश परीक्षा संचालन गर्ने वा नगर्ने सम्बन्धमा आवश्यक जानकारी गराइनेछ । साथै प्रथम प्रवेश परीक्षाको नतिजा प्रकाशित भई भर्नाका लागि दिइएको समयवाधि समाप्त भएको ३० दिन भित्रमा दोश्रो प्रवेश परीक्षा सम्पन्न गरिसक्नु पर्ने छ ।

६.प्रवेश परीक्षाको समय मिति तथा केन्द्र सम्बन्धमा

- (क) प्रवेश परीक्षाको केन्द्र, मिति, समय र स्थान प्रवेश परीक्षा समितिको निर्णय बमोजिम हुनेछ । सो सम्बन्धी विस्तृत जानकारी अग्रिम रूपमा समयमानै राष्ट्रिय दैनिक पत्रिका वा विश्वविद्यालयको वेबसाइटमा प्रकाशित गरिने छ ।
- (ख) परीक्षार्थीहरूले Online बाट नै प्रवेश पत्र (Admit Card) प्रस्ट बुझिने गरि Color Print गर्नु पर्ने छ । साथै नेपाल सरकारबाट जारी गरिएको परीक्षार्थीको फोटो सहितको विवरण खुलेको (नागरिकता / सवारीचालक अनुमतिपत्र / राष्ट्रिय परिचय पत्र /



मतदाता परिचय पत्र/ 12 कक्षा वा Diploma वा सो सरहको अन्तिम Semester वा Yearly परीक्षा को प्रवेश पत्र) को सक्कल सहित परीक्षा संचालन हुने दिन परीक्षामा उपस्थित हुनु पर्ने छ । अन्यथा प्रवेश परीक्षामा सहभागी गराइने छैन ।

७. प्रवेश परीक्षा नतिजा प्रकाशन सम्बन्धी व्यवस्था

प्रवेश परीक्षामा प्राप्त गरेको अंकको आधारमा नतिजा (Merit List) प्रकाशन गरिने छ ।



अनुसूची: १

१. इञ्जिनियरिङ्ग संकाय प्रवेश परीक्षा समितिको कार्यविधि

१.१. प्रवेश परीक्षा नतिजा प्रकाशन विधी

(क) प्रवेश परीक्षा उत्तीर्ण गर्न स्नातक तहको हकमा कूल पूर्णाङ्कको न्यूनतम ३३% अंक प्राप्त गरेको हुनुपर्नेछ । स्नातकोत्तरको हकमा कूल पूर्णाङ्कको न्यूनतम ४०% अंक प्राप्त गरेको हुनुपर्नेछ ।

(ख) विद्यार्थीहरूले प्रवेश परीक्षामा प्राप्त गरेका कुल प्राप्तांक बराबर भएमा निजहरूको १ तह मुनिको प्राप्तांक प्रतिशतको आधारमा सूची प्रकाशित गरिनेछ ।

१.२. प्रवेश परीक्षाको अंकभार सम्बन्धी व्यवस्था

(क) प्रवेश परीक्षामा सबै तहमा वस्तुगत (Objective) प्रश्नहरू १०० अंकको सोधिने छ ।

(ख) स्नातक तहको हकमा निम्न अनुसार अंक विभाजन हुनेछ । Syallbus अनुसूची ३ मा दिइएको छ ।

विषय	अङ्कभार
Math	४०
Physics	३०
Chemistry	२०
English	१०
Total	100

शैक्षिक कार्यक्रमहरू:

- Bachelor in Civil Engineering
- Bachelor in Electronics, Communication and Automation Engineering
- Bachelor in Electrical Engineering
- Bachelor in Computer Engineering
- Bachelor in Geomatic Engineering
- Bachelor in Architecture
- Bachelor in Biomedical Engineering



(ग) स्नातकोत्तर तह अन्तर्गतका विभिन्न शैक्षिक कार्यक्रमहरूको हकमा निम्न अनुसार अंक विभाजन हुनेछ ।

Program: M.Sc. in Information System Engineering	
Subject(s)	Marks
Aptitude	30
Mathematics	15
Computer Concept	15
C Programming & OOP	10
Operating System	5
SAD & Software Engineering	5
Networking & Telecommunication	5
Data Structure & DBMS	5
Basic Electronics	5
Digital Logic	5
Total Marks	100

Program: M.Sc. in Engineering Management	
Subject(s)	Marks
Aptitude	30
Mathematics	15
Computer Concept	15
Electronics	5
Electrical	5
Civil	5
Mechanical	5
Management	20
Total Marks	100



Program: Master of Engineering in Earthquake	
Subject(s)	Marks
Aptitude	30
Mathematics	15
Civil:	
Applied Mechanics (Statics and Dynamics), and Strength of Materials	15
Theory of Structure	10
Engineering Geology; Soil Mechanics and Foundation Engineering	15
Concrete Technology; Steel and Timber Structure and RCC	15
Total Marks	100
Program: Master of Science in Urban Design and Conservation	
Subject(s)	Marks
Aptitude	30
Mathematics	15
Architecture	30
Civil	25
Total Marks	100
Program: M.Sc. in Electrical Power Engineering	
Subject(s)	Marks
Circuit Theory, Basic Electronics and Instrumentation	15
Power System, Switchgear and Protection, High Voltage Engineering	40
Power Electronics and Control Theory	10
Electrical Machines, Energy Utilization and Conservation	20
Aptitude	15
Total Marks	100



Program: M.Sc. in Construction Management	
Subject(s)	Marks
Surveying	10
Construction Technology and Material	15
Project Engineering	15
Construction Management	15
Professional Practice	10
Structures	15
Estimating, Costing and Valuation	10
Mathematics	10
Total Marks	100

(ड) स्नातक/ स्नातकोत्तर तहको प्रवेश परीक्षाको समयावधी २ घण्टाको हुनेछ ।

१.३. विद्यार्थी भर्ना सम्बन्धी व्यवस्था

(क) पूर्वाञ्चल विश्वविद्यालयको कुनै पनि शैक्षिक कार्यक्रममा भर्ना हुन चाहने विद्यार्थीले अनिवार्य रूपमा सम्बन्धित संकायद्वारा संचालित प्रवेश परीक्षा उत्तिर्ण गरेको हुनु पर्नेछ ।

१.४. प्रवेश परीक्षामा सम्मिलित हुन चाहिने न्यूनतम योग्यता:

१.४.१ स्नातक तहका सम्पूर्ण शैक्षिक कार्यक्रमहरू BE (Biomedical, Civil, Computer, Electrical, Electronics, Communication and Automation, Geomatic) / Bachelor in Architecture का लागि:

(क) 10+2 वा सो सरहको परिक्षामा कुनै कक्षा (११ वा १२) मध्येमा Math, Physic, & Chemistry मा अनिवार्य १०० पूर्णांक को अध्ययन गरि न्यूनतम C ग्रेड हुनुपर्ने र कुनै पनि परीक्षार्थीहरूले ११ र १२ दुवै कक्षामा माथि उल्लेखित बिषयहरू मध्ये उक्त बिषय ११ वा १२ मा अध्ययन गरेको खण्डमा कुनै एक कक्षामा न्यूनतम C ग्रेड प्राप्त गरेका विद्यार्थीहरू प्रवेश परीक्षाका लागि योग्य हुने छन ।

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(ख) ३ वर्षे डिप्लोमा इन्जिनियरीड अध्ययन गरेका वा National Examination Board (Technical 9-12) वा सो सरहको परीक्षार्थीहरूको हकमा भर्ना लिन चाहेका शैक्षिक कार्यक्रममा नै डिप्लोमा गरेको भए उक्त परीक्षार्थीहरूको हकमा 10+2 वा सरहमा भएको व्यवस्था लागू नहुने तथा निजहरूले सम्बन्धित शैक्षिक कार्यक्रममा नै न्यूनतम 2 CGPA (out of 4) वा 45% प्राप्त गरेका विद्यार्थीहरू प्रवेश परीक्षाका लागि योग्य हुने छन ।

वा

(ग) ३ वर्षे डिप्लोमा इन्जिनियरीड अध्ययन गरेका वा National Examination Board (Technical 9-12) वा सो सरहको परीक्षार्थीहरूको हकमा डिप्लोमा न्यूनतम 2.0 CGPA (out of 4) वा 45% प्राप्त गरेका साथै कुनै कक्षामा Math, Physic, & Chemistry मा न्यूनतम C ग्रेड प्राप्त गरेका विद्यार्थीहरू सम्पूर्ण शैक्षिक कार्यक्रमका लागि योग्य हुने छन ।

वा

(घ) A Level अध्ययन गरेका परीक्षार्थीहरूका लागि Math, Physic, Chemistry मा सम्पूर्ण बिषयहरूमा न्यूनतम D ग्रेड प्राप्त गरेका विद्यार्थीहरू प्रवेश परीक्षाका लागि योग्य हुने छन ।

वा

(ङ) 10+2 वा सो सरहको परीक्षा उत्तीर्ण गरेका परीक्षार्थीहरूको हकमा ग्रेड तथा प्रतिशत दवै भएको खण्डमा निजहरूको ग्रेड जुनसुकै भएता पनि न्यूनतम 45% in Aggregate का साथै Math, Physic, & Chemistry/Computer बिषयहरूमा न्यूनतम 45% प्राप्त गरेका विद्यार्थीहरू प्रवेश परीक्षाका लागि योग्य हुने छन ।

वा

(च) I. Sc. वा सो सरहको परीक्षा उत्तीर्ण गरेका परीक्षार्थीहरूको हकमा न्यूनतम 45% प्राप्त गरेका विद्यार्थीहरू प्रवेश परीक्षाका लागि योग्य हुने छन ।

Note:

- 10+2 वा सो सरहको तहमा Math, Physic, Chemistry बिषयहरूमा Theory / Practical मा छुटाछुटै ग्रेड उल्लेख भएमा Aggregate Grade (Theory + Practical) न्यूनतम C प्राप्त गरेमा स्नातक तहको प्रवेश परीक्षामा सहभागी हुन योग्य हुने छन ।
- माथि उल्लेख गरे बमोजिम Chemistry को सट्टामा १०० पूर्णांकको Computer Science अध्ययन गरि न्यूनतम C Grade वा 45% प्राप्त गरेका विद्यार्थीहरू पनि BE Computer / BE Geomatic / Bachelor in Architecture प्रवेश परीक्षाका लागि योग्य हुने छन
- If CGPA is evaluated based on more than 4, then students obtaining minimum 50% of CGPA will be eligible.



१.४. २ स्नातकोत्तर तहका शैक्षिक कार्यक्रमहरूका लागि:

S.N.	Program	Minimum Eligibility
1	Master of Engineering in Earthquake	The Candidate must have passed Bachelor in Civil Engineering or equivalent with minimum 50% marks or C+ grade (CGPA 2.40) in aggregate.
2	Master of Science in Information System Engineering	The Candidate must have passed Bachelor in Computer/ Electronics & Communication Engineering or equivalent with minimum 50% marks or C+ grade (CGPA 2.40) in aggregate.
3	Master of Science in Engineering Management	The Candidate must have passed Bachelor in Engineering in any discipline or equivalent with minimum 50% marks or C+ grade (CGPA 2.40) in aggregate.
4	M.Sc. in Urban Design & Conservation	The Candidate must have passed Bachelor in Civil Engineering / Architecture or equivalent with minimum 50% marks or C+ grade (CGPA 2.40) in aggregate.
5.	Master of Science in Construction Management	The Candidate must have passed Bachelor in Civil Engineering / Agricultural Engineering/ Bachelor in Architecture or equivalent with minimum 50% marks or C+ grade (CGPA 2.40) in aggregate.
6.	Master of Science in Electrical Power Engineering	The Candidate must have passed Bachelor in Electrical Engineering or equivalent with minimum 50% marks or C+ grade (CGPA 2.40) in aggregate.

Note: In case of foreign certificate, student should submit equivalent certificate and grading of each subject with CGPA or document having total percentage from concerned authority.



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Syllabus Structure and Contents for Bachelor of Engineering's Entrance Examination

- Weightage in Physics (P), Chemistry (C), Mathematics (M), and English (E): The weightage for M, P, C and E for the entrance examination syllabus shall be 40%, 30%, 20% and 10%, respectively.

Syllabus of Mathematics [Weightage: 40%]

1. Set, Logic and Functions

- 1.1 Set, real number system, intervals, absolute value, logic, connectives, laws of logic
- 1.2 Function, types of functions – injective, surjective, bijective, algebraic, trigonometric, exponential and logarithmic; Inverse of function, composite functions

2. Algebra

- 2.1 Matrices and determinants, types and properties, inverse of a matrix
- 2.2 Complex numbers and Polynomial equations
- 2.3 Sequence and series, Permutation and Combination
- 2.4 Binomial theorem, exponential and logarithmic series

3. Trigonometry

- 3.1 Trigonometric equations and general values
- 3.2 Inverse trigonometric functions, principal value
- 3.3 Properties of triangles, in-centre, ortho-centre and circum-centre, solution of triangles

4. Coordinate Geometry

- 4.1 Straight lines, pair of lines
- 4.2 Circles, equations of circle in different forms, tangent and normal
- 4.3 Conic sections: Parabola, Ellipse and Hyperbola, standard equations and simple properties
- 4.4 Coordinates in space, Plane and its equation

5. Calculus

- 5.1 Limit and continuity of functions, indeterminate forms, L'Hospital's rule
- 5.2 Derivatives, rules of derivatives, geometrical & physical meanings, higher order derivatives, applications of derivative: tangent and normal, rate of change, maxima and minima



- 5.3 Integration, linear properties, rules of integration, standard integrals, definite integral, applications of definite integral: area under a curve and area between two curves
- 5.4 Differential equations, order and degree, differential equation of first order and first degree: variable separable method, homogeneous, linear and exact differential equations, integrating factor

6. Vectors and their Products

- 6.1 Vectors in plane and space, algebra of vectors, linear combination of vectors, linearly dependent and independent set of vectors
- 6.2 Product of two vectors, scalar and vector product of two vectors, scalar triple product

7. Statistics and Probability

- 7.1 Measures of location and measures of dispersion
- 7.2 Correlation and regression
- 7.3 Basic terms of probability, conditional and compound probability, additive and multiplicative rules, Bayes' theorem, binomial distribution

Syllabus of Physics [Weightage:30%]

1. Mechanics

- 1.1 Physical Quantities, Vector and Kinematics: Dimensions, Resolution and Polygon laws of Vector, Vector Algebra, Equations of Motions, Projectile Motion, Relative Motion
- 1.2 Newton's Laws of Motion and Friction: Conservation of linear momentum, Applications of Newton's Laws in Equilibrium and Non-equilibrium, laws of Solid Friction and verification
- 1.3 Work, Energy and Power: Work-Energy theorem, Kinetic and Potential energy, Conservation of Energy, Conservative and non-conservative forces, Elastic and inelastic collisions
- 1.4 Circular motion, Gravitation and SHM: Centripetal force, Conical Pendulum, Banking of Track, Gravitational Potential, variation of g , Motion of satellite, Rocket launch technology, Energy in SHM, Spring -Mass system, simple Pendulum, Damped and Forced oscillation, resonance
- 1.5 Rotational Dynamics: Moment of Inertia, Radius of Gyration, Rotational KE, Center of gravity and center of mass, Torque, Conservation of Angular momentum
- 1.6 Elasticity: Hook's law, Young modulus, Bulk modulus, modulus of rigidity, Poissons' ratio, elastic energy
- 1.7 Fluid Mechanics: buoyancy, flotation, Archimedes' principle, surface tension, capillarity and applications, viscosity, Newton, Stoke and Poiseuille's formula, Reynold number, continuity equation, Bernoulli's equation

2. Heat and Thermodynamics



- 2.1 Temperature and Quantity of Heat: Thermal Equilibrium, Specific heat, latent heat Method of Mixture, Measurement of specific heat and latent heat, Newton's law of cooling, triple point
- 2.2 Thermal expansion: Expansion of Solid & Liquid, Measurement and Applications of expansions
- 2.3 Transfer of Heat: Conduction, Convection, Radiation, Thermal Conductivity, Black body radiation, Stefan- Boltzmann law
- 2.4 Thermal properties of Matter: Molecular Properties of matter, Kinetic Theory of gases, heat capacities of gases and solids
- 2.5 Laws of Thermodynamics: First law, Heat and Work, relation of specific heat of gas, thermodynamics processes, Second law, Heat engine, efficiency, Carnot Cycle, Otto Cycle, Diesel cycle, Refrigerator, Entropy.

3. Geometric and Physical Optics

- 3.1 Reflection: Plane and Curved Mirror, Mirror Formula
- 3.2 Refraction: Plane Surface, Critical Angle, Total Internal Reflection, Lateral shift, Prism, Minimum Deviation, Lenses, Lens Formula, Lens maker's formula, Combination of lenses in contact, Optical Fiber
- 3.3 Dispersion: Spectrum, Dispersive Power, Chromatic Aberration, Achromatism, Spherical Aberration, Scattering of light
- 3.4 Nature and Propagation of Light: Huygen's principle, Velocity of light
- 3.5 Interference: Coherent sources, Young's double slit experiment
- 3.6 Diffraction: Fraunhofer diffraction, Diffraction grating, Resolving power
- 3.7 Polarization: Brewster's law, Transverse nature of light, Polaroid

4. Waves and Sound

- 4.1 Wave Motion: Travelling and Stationary wave
- 4.2 Mechanical Waves: velocity of sound in solid, gas and liquid, effect of temperature, pressure, humidity
- 4.3 Waves in Pipes and String: closed and Open pipes, Resonance, Resonance Tube, string, laws of vibration of fixed string
- 4.4 Acoustic Phenomena: Pressure amplitude, intensity level, quality and pitch, Ultrasonic and Infrasonic, Doppler's effect

5. Electricity & Magnetism

- 5.1 Electrostatics: Coulomb's law, Electric field and Gauss law, Potential and potential gradient, Capacitors, combination of capacitors, types of capacitors, effect of dielectrics, Energy stored by capacitors, polarization and displacement
- 5.2 DC Circuits: Ohm's law, resistivity and conductivity, work and power, Galvanometer and Ohm meter, internal resistance, Joule's law, Kirchhoff's law and applications



- 5.3 Thermoelectric Effect: Seebeck effect, Thermocouples, Peltier effect, Thermopile, Thomson effect
- 5.4 Magnetic effect: Force on a conductor and charge, Torque, Hall's effect, Biot-Savart's law, Ampere's law, Force between parallel conductors
- 5.5 Magnetic properties of matter: Earth magnetism, magnetic materials, permeability, susceptibility, hysteresis
- 5.6 Electromagnetic Induction: Faraday's law, Induced emf, AC Generators, Self and mutual induction, energy stored by inductor, transformer
- 5.7 Alternating Currents: RMS value, Phasor diagram of capacitance, inductance and resistance, Quality factor, Power factor

6. Modern Physics

- 6.1 Electrons: Millikons's experiment, Cathode rays, specific charge
- 6.2 Photons & Quantization of Energy: Photoelectric effect, Plank's constant, Bohr's theory, spectral series, De Broglie theory, Uncertainty principle, X-ray and Bragg's law, Laser
- 6.3 Solids & Semiconductor Devices: Intrinsic and extrinsic semiconductors, P-N junction, Rectification, Zener diode, Transistor, Logic gates
- 6.4 Radioactivity & Nuclear Reaction: Atomic mass, Isotopes, Nuclear density, Einstein's mass energy relation, mass defect, fission & fusion, law of radioactive disintegration, carbon dating, health hazard
- 6.5 Recent Trends in Physics
 - 6.5.1 Particle Physics: Particle and anti-particle, Quarks, Lepton, Baryon, Mesons, Higgs Boson
 - 6.5.2 Universe: Big Bang and Hubble's Law, Dark Matter, Gravitational Wave, Black Hole
 - 6.5.3 Seismology: Pressure wave, Surface Wave, Internal wave
 - 6.5.4 Telecommunication: Radio, TV and Mobile, GPS and Remote sensing
 - 6.5.5 Environment: Energy Crisis, Environment Pollution, Ozone Layer
 - 6.5.6 New Technology & Materials: Nano-technology, super conductor & Perfect conductor

Syllabus of Chemistry [Weightage: 20%]

1. Physical Chemistry

- 1.1 Chemical Arithmetic: Dalton's atomic theory and Laws of Stoichiometry, Atomic mass and Molecular mass, Empirical molecular formula and limiting Reactants, Avogadro are Hypothesis and its applications and Equivalent masses.
- 1.2 State of Matter: Gaseous state, liquid and solid states.
- 1.3 Atomic Structure and Periodic Classification of Elements:



1.4 Oxidation, Reduction and Equilibrium

1.5 Volumetric Analysis,

1.6 Ionic Equilibrium, Acid, Base and Salt

1.7 Electrochemistry

1.8 Energetic of Chemical Reaction, Chemical Kinetics, Chemical Bonding and Shape of Molecules

2. Inorganic Chemistry

2.1 Non-metal: Hydrogen, Oxygen, Ozone, Water, Nitrogen and its compounds, Halogen, Carbon, Phosphorous, sulphur, Noble gas and Environment pollution.

2.2 Metals: Metallurgical Principle, Alkali metal, Alkaline Earth metals, Coinage metals: Copper, Silver, Gold

2.3 Extraction of Metal: Zinc and Mercury, Iron Compound

3. Organic Chemistry

3.1 Introduction: Fundamental principles, Purification of organic compounds, Nomenclature of Organic compounds, Structure isomerism and idea of reaction mechanism

3.2 Hydrocarbons: Alkanes, Alkenes and Alkynes, Aromatic hydrocarbons

3.3 Haloalkanes and Haloarenes

3.4 Alcohols, Phenols and Ethers

3.5 Aldehydes, Ketones, Carboxylic Acid and Derivatives, Aliphatic and Aromatic

3.6 Nitro Compounds and Amines: Aromatic and Aliphatic

Syllabus of English [Weightage:10%]

The English proficiency test for entrance in engineering is based on general English and it is designed to measure students' abilities to communicate in English. It consists of four (4) chapters, with each chapter consisting of 4-8 sub-chapters, as outlined hereunder. Each university may decide on distribution of weightage across each chapter/sub-chapter.

1. Vocabulary

1.1 Synonyms and antonyms

1.2 Homonyms, homophones

1.3 Word building, suffixes and prefixes

1.4 Meaning of words in context

1.5 Idioms and phrases



2. Grammar

- 2.1 Articles and possessives
- 2.2 Pronouns, prepositions, adjectives, adverbs
- 2.3 Tenses, modals, conditions
- 2.4 Subject verb agreement
- 2.5 Tag questions
- 2.6 Sentence types and transformations
- 2.7 Voice
- 2.8 Direct and indirect narration

3. Reading Comprehension

- 3.1 Contents/ideas
- 3.2 Reading between the lines
- 3.3 Contextual clues
- 3.4 Reconstruction (rewording)

4. Writing

- 4.1 Punctuations
- 4.2 Cohesive devices
- 4.3 Coherence
- 4.4 Discourse markers

5. Sounds of English

- 5.1 Phonemes
- 5.2 Phonemics symbols
- 5.3 Word stress
- 5.4 Intonation



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३.१ Entrance Examination Syllabus of M.Sc. in Electrical Power Engineering

Details of the contents:

Circuit Theory, Basic Electronics and Instrumentation:

- i. **Electric Circuits:** Network graph, KCL, KVL, Node and Mesh analysis, DC/AC circuit analysis, phase circuits, Power and power factor in ac circuits. Transient response: Transient response analysis for R-L, R-C & R-L-C circuits, Laplace Transform, Fourier Series and transform, Pole zero plots, Two port Networks: Z - parameters, Y-parameters & ABCD-parameters.
- ii. **Basic Electronics:** Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers, Combinational and Sequential logic circuits, Multiplexer, De-multiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.
- iii. **Instrumentation:** Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multi-meters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

Power System, Switchgear and Protection, High Voltage Engineering

- i. **Power System:** Power generation concepts, ac and dc transmission concepts, Modelling and performance of transmission lines and cables, ABCD constants and power flow equations, Series and shunt compensation, Electric field distribution, Gauss-Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Per unit system, Symmetrical components, Symmetrical and unsymmetrical fault analysis: fault currents, node voltages during fault, System stability concepts, swing equation; Equal area criterion, stability enhancements, Power control: Load-frequency control, VAR-Volt control.
- ii. **Switchgear and Protection:** Concept of switchyard components, Relays and its types, circuit breaker, theory of ARC quenching, DC and AC circuit breaking, transient recovery voltage, Recovery voltage, Rate of rise of TRV and RV, Re-striking Voltage, frequency of oscillation, Principle of overcurrent, differential and distance protection; transformer



protection, alternator protection, feeder and line protection, solid state relays and digital protection; and, Safety Engineering: Electric shocks, Equipment Earthing.

- iii. **High Voltage Engineering:** Generation, testing; Switching and lightning overvoltage, Protection against overvoltage, Dielectric breakdown- Gaseous Breakdown-Vacuum breakdown, Corona discharges and EMI, Insulation coordination

Power Electronics and Control Theory

- i. **Power Electronics:** Characteristics of semiconductor power devices: Diode, Thyristor, TRIAC, GTO, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost, Single and three phase configuration of uncontrolled rectifiers, Line commutated thyristor based converters, Bidirectional ac to dc voltage source converters, Issues of line current harmonics, Power factor, Distortion factor of ac to dc converters, Single phase and three phase inverters, Sinusoidal pulse width modulation
- ii. **Control Theory:** Mathematical modeling and representation of systems, Feedback principle, transfer k diagrams and Signal flow graphs, Transient and Steady State analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-lag compensators; P, PI and PID controllers, State Space model, State transition matrix.

Electrical Machines, Energy Utilization and Conservation

- i. **Electrical Machines:** Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections; DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of dc motors; Three phase induction motors: construction, operation, types, performance, characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Construction and operation of single phase induction motors; Synchronous machines: construction, performance, regulation and parallel operation, starting of synchronous motor, characteristics; Losses and efficiency of electric machines.
- ii. **Utilization of Electrical Energy:** Choice of electric drives and applications; traction motors and electric braking, train movement and energy consumption; Design of illumination systems and various lighting schemes; Electric heating methods of electric heating and its types; Hydro-generation: Power output equation, components, site selection, turbine and generator selection.

Aptitude

This will cover quantitative and analytical ability test to solve real world problems.



३.२. Entrance Examination Syllabus of M.Sc. in Construction Management

Details of the contents:

- i. **Surveying:** Fundamentals of surveying; measurements (linear distance, vertical distance, and angle and directions); levelling (Principle of levelling, booking and computation of reduced level, differential levelling, fly levelling, profile levelling, reciprocal levelling, precise levelling, sources of errors in levelling); topographic survey (principles and applications); Traversing (Horizontal control and vertical control, computation for closed and linked traverse); Tacheometry (Stadia method, tangential method, sources of errors and precision); Contouring (Characteristics of contour, contour interval, interpolation of contours, use of contour maps); Simple circular curves, principles and applications of GPS/GIS.
- ii. **Construction Technology and Material:** Use of concrete in engineering structures, Ingredients of concrete (Cement, Aggregates, Water, Admixtures); Mix design of concrete; Quality control of concrete: Batching, mixing, handling, placing, compaction and curing. Different types of concrete and their properties: Ordinary concrete, Light weight concrete, Heavy weight concrete, Self-compacting concrete, Shotcrete; Strength of concrete: Tensile, Compressive, Shear and bond; Testing of concrete: Compressive strength test, tensile strength test, non-destructive tests; Durability of concrete: Effect of water and permeability, causes of concrete deterioration; Corrosion of reinforcement bars in concrete: reasons and prevention.
- iii. **Project Engineering.** Definition and characteristics of project, Classification of project, Project life cycle, Project management; Project appraisal, Project proposal writing, Project formulation (Feasibility analysis, Cost benefit analysis, Input analysis, Environmental analysis); Project planning and its importance, Project planning process, Work breakdown structure, Project scheduling with Bar chart, CPM and PERT; Project monitoring and control, Elements of project control (Quality, time and cost), Project control (Quality control, Schedule control and Cost control), Earned value analysis, Project management information system; Project risk and its types, Sources of project risk, Management of Project risk (Risk identification, Risk management planning, Qualitative and quantitative risk analysis, Risk response planning, Risk monitoring and control); Project finance, Capital structure planning, Capital budgeting techniques.
- iv. **Construction Management:** Scope of construction management, Construction project management, Construction project characteristics, Relation between client, consultant and contractor; Construction planning and scheduling, Steps and stages of construction planning, Time cost tradeoff; Construction material management, Planning construction materials, ABC classification of construction materials, Inventory planning process, Procurement of materials; Familiarization with construction equipment, Advantages and disadvantages of using equipment, Equipment for (Excavation, transporting and compaction, Aggregate production and handling, Concrete mixing, Cranes, Tunnel construction, Highway pavement construction, Hydraulic structure construction), Selection of appropriate equipment; Contract management (Method of work execution, Type of contract); Tendering process (Preparation before tendering, Tender notice, Tender document, Conditions of contract, Prequalification, Tender evaluation and award); Site



- management (Responsibility of site engineer, Supervising work of contractor, Record keeping, Site order book, Muster roll, Measurement book, Running bill and final bill, completion report); Project maintenance (Types of maintenance, estimating maintenance cost, Planning and scheduling of maintenance, Management of maintenance and financing); Personnel management (Principles of management, Centralization and decentralization, Leadership styles, Communication, Motivation, Personnel selection and training, Trade union); Health and safety at construction site (Accident at construction site, Causes of accident, Prevention of accident); Specification (Purpose of specification, Importance of specification, Types of specification, Specification writing); Valuation (Purpose and principles of valuation, Factors affecting value of property, Various methods of valuation of property, Depreciation).
- v. **Professional Practice:** Ethics and profession, Engineering ethics, Engineering council act, Code of conduct, Duties of an engineer and architect, Building code and bylaws, Nepal Labor law, Intellectual property right, Liability and negligence, Vicarious liability, Conflict and dispute management.
- vi. **Structures:** Center of gravity, centroid, and Moment of inertia; Axial force, shear force, bending moment and torsion, Shear force and bending moment diagram; relationship and diagram Interpretation (AF, SF, BM), Simple stress and strain, Hooke's law, Stress and strain diagram; Bending stress, Deflection of simple beam; Differences between working stress method, ultimate load method and limit state method, Design of singly and doubly reinforced section, Design of (one way and two-way slabs, simply supported beam, continuous slab and beam, cantilever beam and slab, short columns), Design of (Spread footing, isolated footing, combined footings, and mat foundations).
- vii. **Estimating, Costing and Valuation:** Types and methods of estimate (Approximate estimate, detailed estimate, revised estimate, supplementary estimate, repair and maintenance estimate); Analysis of rates (Requirements of rate analysis, factors affecting rate analysis, preparing rate analysis for building works), Detailed estimate of (Two storied load bearing and frame structure building, earthwork in road construction); specifications (purpose, importance and types), Valuation of property (Land and buildings).
- viii. **Mathematics: Basic Mathematics:** Set and Functions, Two dimensional and three-dimensional co-ordinate geometry, probability, mean, median, mode, standard deviation, **Algebra:** Polynomials Complex numbers, Sequence and series, Permutation and combination, Equations and inequalities, Matrices and Determinants, Eigen values and Eigen vectors, Diagonalization of matrix; **Geometry** (angles, triangles, Pythagorean theorem, parallelogram, trapezoid, area, volume, surface area, quadrilateral, circle, graph, y-intercept); **Calculus** : Limits and Continuity, Ordinary and Partial Differentiation, Indefinite and definite Integration, Application of Derivatives and Anti-derivatives, Ordinary Differential Equations.



अनुसची ४.

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प्रवेश परीक्षाका परीक्षार्थीहरूलाई निर्देशन

- 1) परीक्षार्थीहरूले परीक्षा दिन आउँदा आफ्नो Color Print सहित को फोटो भएको प्रवेशपत्र साथै आफ्ने परिचय खुल्ने सक्कल परिचय पत्र (नागरिकता / सवारीचालक अनुमतिपत्र / राष्ट्रिय परिचय पत्र / मतदाता परिचय पत्र / 12 कक्षा वा Diploma वा सो सरहको अन्तिम Semester वा Yearly परीक्षा को प्रवेश पत्र) अनिवार्य रूपमा लिएर आउनुपर्नेछ । विदेशी नागरिकको हकमा Passport/ वा अन्य परिचय खुल्ने सक्कल परिचय पत्र अनिवार्य रूपमा लिएर आउनुपर्नेछ ।
- 2) परीक्षार्थीहरूले केन्द्राध्यक्षद्वारा निर्देशित सीट-प्लानअनुसार तोकिएको स्थानमा बस्नु पर्नेछ ।
- 3) परीक्षा सञ्चालनका लागि केन्द्राध्यक्ष, निरीक्षकहरूद्वारा गरिएका निर्देशनहरू परीक्षार्थीको कर्तव्य हुनेछ । कर्तव्य पालन नगर्ने परीक्षार्थीलाई निष्काशन तथा निजको परीक्षा रद्द गर्न समेत सकिनेछ ।
- 4) प्रवेश परीक्षा प्रारम्भ भएको ३० भन्दा मिनेट बढी ढिलो गरी परीक्षा दिन आउने परीक्षार्थीलाई परीक्षामा सम्मिलित गराइने छैन ।
- 5) परीक्षार्थीहरूले परीक्षा हलमा i.) पुस्तक ii) नोट iii) चिट iv) मोबाइल फोन v) स्मार्ट घडि/Ear Phone vi) प्रोग्रामेवल क्याल्कुलेटर vii) पर्स viii) पकेट कम्प्युटर वा अन्य निषेधित वस्तुहरू साथमा राख्न पाउने छैन ।
- 6) परीक्षार्थीहरूले परीक्षा कोठामा हल्लागर्ने, एक आपसमा कुराकानी गर्ने, एक अर्काको प्रश्नपत्र, उत्तर पुस्तिका देखाउन र सांकेतिक रूपमा सम्पर्क राख्न पाउने छैन । यस्ता क्रियाकलापहरू गरिएको पाइएमा परीक्षाबाट निष्कासन गरिनेछ ।
- 7) परीक्षार्थीहरूले Answer Sheet मा विश्वविद्यालयले दिएको Gel Pen ले मात्र लेख्नु पर्नेछ ।
- 8) परीक्षा दिँदा परीक्षार्थीहरूले आवश्यक Rough गर्नु परेमा Question Booklet मै गर्न सकिनेछ ।



- 9) **Answer Sheet** मा केही केरमेट गर्न पाउने छैन । **Answer Sheet** मा परीक्षार्थीले आफ्नो नाम, रोल नं. र दस्तखत गर्दा ध्यानपूर्वक सहि ठाउँमा सहि विवरण भर्नुपर्नेछ । कुनै कारण गल्ती भएमा नयाँ **Answer Sheet** दिइने छैन ।
- 10) निरीक्षकसँग कुनै पनि प्रश्नको बारेमा सोधपुछ गर्न पाइने छैन ।
- 11) परीक्षार्थीहरूले परीक्षा प्रारम्भ भएको १ घण्टाभन्दा अगाडि आफ्नो सिट र परीक्षा भवन छाड्न पाइने छैन ।
- 12) परीक्षार्थीहरूले **Question Booklet** र **Answer Sheet** अनिवार्यरूपमा बुझाउनु पर्नेछ ।

