KATHMANDU UNIVERSITY

School of Engineering

Master Degree Programs (Course Based)

Call for Application for Admission 2019

Information for the Applicants

1. Program Specific Application Eligibility and Selection Procedure:

A) Master of Engineering in Electrical Power Engineering

Department Responsible: Department of Electrical and Electronics Engineering
Intake Capacity: 10
Application Eligibility Criterion: Four year Bachelor of Engineering Degree in Electrical Engineering, Electrical & Electronics Engineering (Electrical Major), or related discipline for master education in Electrical Power Engineering completed with minimum 50% marks on aggregate or CGPA of 2.0 (on a maximum 4 point grading system) from any recognized institution.
Selection Procedure:
Admission Test: Admission test will be conducted in format of written test and interview. Written test will consist of subjective questions (50 marks) and objective questions (20 marks). Interview performance will bear 30 marks. For being eligible for admission, minimum 50 marks shall be obtained in overall.

B) Master of Engineering in Communications Engineering

Department Responsible: Department of Electrical and Electronics Engineering
Intake Capacity: 10
Application Eligibility Criterion: Four year Bachelor of Engineering Degree in Electrical and Electronics (Communications Major) or Electronics and Communication or related discipline for master education in Communications Engineering completed with minimum 50% marks on aggregate or CGPA of 2.0 (on a maximum 4 point grading system) from any recognized institution.
Selection Procedure:
Admission Test: Admission test will be conducted in format of written test and interview. Written test will consist of subjective questions (50 marks) and objective questions (20 marks). Interview performance will bear 30 marks. For being eligible for admission, minimum 50 marks shall be obtained in overall.

C) Master of Engineering in Mechanical Engineering

Department Responsible: Department of Mechanical Engineering
Intake Capacity: 10
Application Eligibility Criterion: Four year Bachelor of Engineering Degree in Mechanical Engineering or related discipline for master education in Mechanical Engineering completed with minimum 50% marks on aggregate or CGPA of 2.0 (on a maximum 4 point grading system) from any recognized institution.
Selection Procedure:
Admission Test: Admission test will be conducted in format of written test and interview. Written test will consist of subjective questions (50 marks) and objective questions (20 marks). Interview performance will bear 30 marks. For being eligible for admission, minimum 50 marks shall be obtained in overall.

D) Master of Engineering in Structural Engineering

Department Responsible: Department of Civil Engineering
Intake Capacity: 10
Application Eligibility Criterion: Four year Bachelor of Engineering Degree in Civil Engineering or related discipline for master education in Structural Engineering completed with minimum 50% aggregate or CGPA of 2.0 from any recognized institution.
Selection Procedure:
Admission Test: Admission test will be conducted in format of written test and interview. Written test will consist of objective questions only. For being eligible for admission, minimum 50 marks shall be obtained in overall.

E) Master of Engineering/ Master of Science in Sanitation Technology

Department Responsible: Department of Civil Engineering
Intake Capacity: 10 (At least 30% reservation of either Science or Engineering Stream to ensure Interdisciplinary course delivery)
Application Eligibility Criterion: For M.E: Four year Bachelor in any Engineering subject with minimum 50% aggregate or CGPA of 2.0 from any recognized institution.
For M.S: Four year Bachelor in any Science subject with minimum 50% aggregate or CGPA of 2.0 from any

recognized institution.

Selection Procedure:

Admission Test: Admission test will be conducted in format of either or both evaluation of submitted document/ written test and interview. For being eligible for admission, minimum 50 marks shall be obtained in overall.

F) Master of Engineering/ Master of Science in Geoinformatics

Department Responsible: Department of Geomatics Engineering
Intake Capacity: 10 (5+5)
Application Eligibility Criterion: For M. E: Four year Bachelor in any Engineering subject with minimum 50% aggregate or CGPA of 2.0 from any recognized institution.
For M. S: Four year Bachelor in any Science subject with minimum 50% aggregate or CGPA of 2.0 from any recognized institution.

Selection Procedure:

Admission Test/Interview: Admission test will be conducted in format of written test focusing on Geoinformation Science and Earth observation related subjects. Written test will consist of objective questions with full marks of 100.

G) Master in Land Administration

Department Responsible: Department of Geomatics Engineering
Intake Capacity: 10 (5+5)
Application Eligibility Criterion:

Admission Requirements					
Sno.	Candidate Types	Minimum numbers of years of study (School/University Education)	Work Experience	Grade in Bachelor level	Remarks
1	Fresh Graduates with Bachelors Degree in Science, Applied Science or Engineering.	Minimum 16 years	-	2.0 CGPA or 50% in aggregate	
2	Mid career professionals with Bachelor's Degree of 3 years in any discipline or Master in any discipline	Minimum 15 years	At least 3 years experience in land related discipline or law	2.0 CGPA or 50% in aggregate	
3	Mid career professionals with Bachelor's Degree of 2 years in Science	Minimum 14 years + Senior Survey Course	At least 3 years experience in land related discipline	2.0 CGPA or 50% in aggregate	Eligible criteria for some international institutions like ITC to undertake Master degree.
4	Mid career professional with Post Graduate Diploma or equivalent in Land related discipline	Minimum 14 years	At least 3 years experience in land related disciplinee	2.0 CGPA or 50% in aggregate	Direct Entry to Master in L and Administration

Selection Procedure:

Admission Test/Interview: Admission test will be conducted in format of written test focusing on surveying and mapping, mathematics and Land Administration relate subjects. Written test will consist of objective questions with full marks of 100.

H) Master of Engineering (ME) in Computer Engineering

Department responsible: Computer Science & Engineering

Intake capacity: 10 (9+1 quota seat for Nepal Government employees)
Application Eligibility Criterion: Candidate with four-year Bachelor Degree in Computer Engineering with 50% marks on aggregate or CGPA of 2.0 out of 4.0 grading system from any recognized institution.
Duration: 2 years (4 semesters) full-time study program which will run in Dhulikhel campus, KU.
The admission is open for Nepalese as well as foreign students.

Selection procedure:

Admission Test/ Interview: A written admission test of 1.5 hours would be conducted focusing on core computer subjects. The test would comprise both objective and subjective questions and would weigh 70% of marks. Only those securing a minimum of 40 marks in the written test would be selected for the interview. Successful candidates passing both the written test and the interview would be selected for admission on the basis of merit list.

I) Master of Technology (MTech) in Information Technology (IT)

Department responsible: Computer Science & Engineering
Intake capacity: 10 (9+1 quota seat for Nepal Government employees)
Application Eligibility Criteria: Candidates with score of at least 50% in aggregate or CGPA 2.0 out of 4.0 grading system from any recognized institution, and

- Undergraduate in Engineering / Technology / Architecture / Computer Application (with honors), or
- Total of at least 16 years of education with science background, or
- M.Sc. in Physics, Chemistry, Mathematics, Statistics or any other related field.

Duration: 2 years (4 semesters) full-time study program which will run in Dhulikhel campus, KU. The admission is open for Nepalese as well as foreign students.

Selection procedure:

Admission Test/ Interview: A written admission test of 1.5 hours would be conducted focusing on core computer subjects. The test would comprise both objective and subjective questions and would weigh 70% of marks. Only those securing a minimum of 40 marks in the written test would be selected for the interview. Successful candidates passing both the written test and the interview would be selected for admission on the basis of merit list.

2. Additional Information:

Fees and Payment Information:

Total course fee for the two year (4 semesters) study period is **NRs 370,000/-** (ordinary Nepalese student fee, which excludes NRs 10,000/- caution money and NRs 1000/- per year medical insurance) for ordinary Nepalese students. The fee for sponsored candidate is 1.5 times the ordinary fee. Fee for SAARC country international candidate is 1.5 times the regular fee and for other country is 2.0 times the regular fee. Extension of period of study may subject to requirement of payment of additional fees for the extended study period.

Fee to be paid at the time of admission for ordinary Nepalese student is **NRs. 136,000/- that** includes first installment of first semester fee. Rest of the fee shall be paid in two installments per semester.

Financial Aid and Scholarship/Assistantship:

After admission, students can apply for UGC formula funding based scholarship as stated in the MoU between KU and UGC. Under the MoU, to attract bright and needy students, university may waive fees for up to 20% of the students in specific Master Programs. The government subsidy will cover the amount of fees waived. The Government may however choose to cap the maximum enrolment for which this arrangement will apply.

Graduate students are in general given opportunity of teaching assistantships or research assistantship based on their status, ability, experience, and need of the enrolled departments. The assistantships are generally provided to cover part of the fees of the student unless otherwise agreed.

Additional sponsorship, scholarship or assistantship may be available depending on availability of such provision for any particular program. Contact the responsible department for such provisions.

Provisional Application

Candidates who are awaiting the final results of their highest qualifying degree and expect that the result will be published within a month of admission can also apply on a provisional basis.

Right of Suspension/Delay of Any Program

In case, the number of seats filled is less than 50% of the intake capacity of any program by two weeks of start of

academic session for the master programs, the School may decide to suspend the program and return all the fees paid by the admitted students within a week of declaration of suspension of the program. The School may also inform in advance selected candidates about possibility of suspension of any program due to expectation of less than 50% of the intake capacity occupancy and withheld admission process of the selected candidates until further notice.

Tentative Schedule of Admission Process

Schedule	Date/Period/Deadline
Complete Application Submission	**10 September 2019**
Admission Test/Interview	**11-15 September 2019**
Admission of Selected Candidates	16-20 September 2019
Orientation program	**23 September 2019**

Note: Schedule may be adjusted by the concerned department. Any adjusted schedule will be notified.

For inquiry about application process and further information on specific programs, contact:

1. Department of Civil Engineering for ME in Structural Engineering and ME/MS in Sanitation Technology; E-mail: prachand@ku.edu.np
2. Department of Electrical & Electronics Engineering for ME in Electrical Power Engineering and Communications Engineering; E-mail: shailendra@ku.edu.np
3. Department of Mechanical Engineering for ME in Mechanical Engineering; E-mail: daniel@ku.edu.np
4. Department of Computer Science and Engineering for ME in CE and M. Tech. in IT ; E-mail: bal@ku.edu.np
5. Department of Geomatics Engineering for ME/MS in Geoinformatics and LA; E-mail: subash_ghimire@ku.edu.np

3. Syllabus for Admission Test:

Syllabus for Admission Test

Master of Engineering in Electrical Power Engineering

1. **Electric Machinery Fundamentals** **[20 %]**
   DC Generators, DC Motors, Transformers, Induction Machines, Synchronous Machines, Fractional horsepower motors

2. **Power System** **[20%]**
   Fundamentals of Power System & Modeling, Transients in Power System, Load Flow Solution & Control , Load Frequency Control, Power System Stability, Optimal System operation, Symmetrical Fault Analysis, Unsymmetrical Fault Analysis, Economic Load Dispatch

3. **Transmission lines** **[15%]**
   Short Transmission Line, Medium Transmission Line, Long Transmission Line, Power Flow Through Transmission Lines, Inductance, Resistance, Capacitance of Transmission Lines, Extra High Voltage (EHV) Transmission, FACTS, HVDC Transmission

4. **Distribution System** **[10%]**
   AC Distribution, DC Distribution, Economics of Distribution System

5. **Power System Protection** **[15%]**
   Protective Zones, Fuses, Reactors, Protective Relays, Power Circuit Breaker, Apparatus protection, Protection Against Lightning and Insulation Coordination, Power System Earthing, Substation, SCADA

6. **Electric Drives** **[10%]**
   DC Drives, Stator Controlled Induction Motor Drives, Rotor Controlled Induction Motor drives, Synchronous Motor Drives

7. **Renewable Energy technologies (RET)** **[10%]**
   Solar Photovoltaic, Wind Energy, Micro hydropower, Biomass, Biogas, Bio-fuel, Geothermal Energy, Wave, Tidal Energy etc

Syllabus for Admission Test

Master of Engineering in Communications Engineering

1. Signal and Systems [15%]

Linear Time-Invariant (LTI) Systems, Fourier series and Fourier Transform, Fourier Analysis for Discrete Time Signals and Systems, Noise, Energy and Power, Sampling of Continuous Signals, Discrete Time Signals and Systems

2. Digital Signal Processing [20%]

Z-Transform, Discrete filters. Finite Duration Impulse Response (FIR) Digital Filters, Infinite Impulse Response (IIR) Digital Filters, Discrete Fourier Transform, Fast Fourier Transform (FFT)

3. Analog and Digital Communication [20%]

Communication Channels Overview, Linear Modulation, Angle Modulation, Noise in Communication Systems, Digital Modulation Techniques, Information Theory and Coding, Pulse Code Modulation (PCM), Delta Modulation (DM)

4. Electromagnetics [15%]

Uniform Plane Waves, Transmission Lines, Waveguides, Antennas and Radiating Systems

5. Eletronics Devices [15%]

Diodes, Bipolar Junction Transistor, Field Effect Transistor, Power Amplifiers, Operational Amplifiers

6. Mathematics [15%]

Calculus and Linear Algebra, Differential Equations and Complex Variables, Statistics and Probability

Syllabus for Admission Test

Master of Engineering in Mechanical Engineering

1. Applied Mechanics and Design [30%]

Engineering Mechanics: Free-body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

2. Fluid Mechanics and Thermal Sciences [40%]

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan- Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Applications: Power Engineering: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. I.C. Engines: Air-standard Otto, Diesel and dual cycles. Refrigeration and air-conditioning: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. Turbomachinery: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

3. Materials, Manufacturing and Industrial Engineering [30%]

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials

Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control: Deterministic models; safety stock inventory control systems

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

Syllabus for Admission Test

Master of Engineering in Structural Engineering

1. Strength of Material [15%]

Bending Moment and Shear Force in Beams and Frames, Centre of Gravity and Moment of Inertia, Stress and Strains, Thin Walled Vessels, Theory of Flexure, Torsion, Buckling

2. Structural Analysis [20%]

Analysis by Strain Energy Method, Analysis of Truss Deflection, Elastic Deflection of Beams, Influence Lines for Simple Structures, Analysis of Statically Determinate Arches and Frames, Suspension Cable System, Slope Deflection Method, Moment Distribution Method, Influence Lines for Continuous Beams.

3. Steel and Timber Structures [15%]

Structural Fasteners, Design of Tension Members, Design of Compression Members, Design of Beams, Design Of Composite And Built Up Beams, Design of Plate Girder, Design of Roof Trusses, Design of Timber Structures

4. Soil Mechanics and Foundation Engineering [10%]

Phase Relationship, Seepage Through the Soil, Strength and Deformation, Settlement and Consolidation, Retaining Structures on Soil, Stability of Soil Slopes, Subsurface Exploration, Shallow Foundation, Mat Foundation, Lateral Earth Pressure and Retaining Walls, Sheet Piles Wall, Pile Foundations, Drilled – Pier and Caisson Foundation.

5. RCC [20%]

Design of Flexural Members by Limit State, Limit State Design for Shear and Torsion, Limit State of Serviceability, Development Lengths and Detailing of Reinforcements, Design of Flanged Beams, Design of Slabs, Design of Compressive Members, Design of Foundation, Design of Staircase, Prestressed Concrete (Introduction and Losses)

6. Mathematics [20%]

Increments, Limits and continuity, Differentiation, Applications of derivatives, Integration, Application of Definite integral, System of Linear equations, Sequence and infinite Series, Vector spaces, Eigenvalues, Eigenvectors and Linear Mapping, Co-ordinates Systems, Functions of several variables and Their Derivatives, Multiple Integrals, Beta and Gamma Functions, Applications of the Theory of Integration, Vector Functions and Their Derivatives, Vector Integral Calculus, Fourier Series and Integrals, Transformation of coordinates, Polar equations of conic section, General equation of the second degree, Analytic Geometry (3D), Spherical Trigonometry, Fundamental Formulae, First Order Differential Equations, Linear Second Order Differential Equations, Series Solutions of Differential Equations, Laplace Transforms, Partial Differential Equations(PDEs), Complex Variables, Introduction to Statistics and Data Description, Probability, One Dimensional Random Variables, Functions of One Random Variable and Mathematical Expectation, Some Important Discrete Distributions, The Normal Distribution, Random Samples and Sampling Distributions, Estimation, Tests of Hypotheses, Simple Linear Regression and Correlation, Statistical Quality Control

Syllabus for Admission Test

Master in Land Administration

1. **Elementary Mathematics** [20]
   Percentage, area, volume, simple equations, Simultaneous equations, quadratic equations, height and distance, solution of triangles, properties of triangles, circle, probability, mean, standard deviation, variance, law of indices, vectors, scalars.

2. **General Knowledge on Land Administration, management and land related laws:** [30]

   General concept of land administration, tenure system, ownership type, registration, cadastral survey, Land Use and its policy, Land Information system, Scope of Ministry of land reform and management, land related issues like land reform, Kamaiya, Sukumbasi, Haliya, Guthi, Land survey and measurement act/rule, Land Revenue acts/rule, Land related acts/rules, articles related to Land issues in Muluki Ain.

3. **General Knowledge on Surveying and Mapping** [30]

   Types of maps, map reading, latitude and longitude, height, shape of earth, Importance of maps, Surveying and mapping activities in Nepal, GIS, Remote Sensing, and Cartography

4. **General English Grammar** [20]

Syllabus for Admission Test

Master of Engineering/Master of Science in Geoinformatics

1. **Mathematics** [40]

   Increments, Limits and continuity, Differentiation, Applications of derivatives, Integration, Application of Definite integral, System of Linear equations, Sequence and infinite Series, Vector spaces, Eigen values, Eigen vectors and Linear Mapping, Multiple Integrals, Vector Integral Calculus, Fourier Series and Integrals, Transformation of coordinates, General equation of the second degree, Analytic Geometry(3D), Spherical Trigonometry, First Order Differential Equations, Linear Second Order Differential Equations, Series Solutions of Differential Equations, Laplace Transforms, Partial Differential Equations(PDEs), Complex Variables, Introduction to Statistics and Data Description, Probability, One Dimensional Random Variables, Functions of One Random Variable and Mathematical Expectation, Some Important Discrete Distributions, The Normal Distribution, Random Samples and Sampling Distributions, Estimation, Tests of Hypotheses, Simple Linear Regression and Correlation, Statistical Quality Control.

2. **Geo-Information** [30]

   Types of maps, Geoid, Ellipsoid, Datum, Projection System, Surveying Techniques and Instrument handling, GIS, Remote Sensing, Photogrammetry, Cartography.

3. **Computer Programming (C++ & Python) and Database** [30]

   Branching, Looping, Functions, Inheritance, File Handling, Introduction to Database, Design, Querying, Indexing

Syllabus for Admission Test

ME Computer Engineering/ MTech IT

All five subjects carry equal weightage.

1. **Programming**
   Basic structured programming concepts (Data Types, Operators), Object Oriented Programming Concepts (Objects, Class, Inheritance, Polymorphism)
2. **Data Structure and Algorithms**
   Stack, Queue, Lists, Hash table, Sorting and Searching algorithms
3. **Database Management Systems**
   Relational Database Concepts, ER Diagram, Normalization, Transaction
4. **Software Engineering**
   Software Process Models, Planning & Scheduling, Testing
5. **Computer Networks**
   Basics of Computer Networks, TCP/IP, Physical Layer, Network Layer, Data Link Layer, Concepts of IP Addressing