TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING

INFORMATION BROCHURE

ON ENTRANCE EXAMINATION

OF

M.Sc. PROGRAMMES AT PULCHOWK CAMPUS

2066

Please read this brochure carefully

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1. INTRODUCTION

Institute of Engineering (IoE) is one of the academic technical institutes under Tribhuvan University (TU). It is operated by TU Decentralization Rule, 2055. IoE was established in connection with the introduction of National Education system in the country in 1972 officially. Nevertheless the history of the institute is linked with the history of the Technical school, which was established in 1942. Since then it has been producing technicians of different levels. It has been offering Bachelor's Degree and Diploma (technician) level course in various engineering disciplines since 1978 and 1960 respectively. As the leading institution in engineering education in the country, at its various stages of development, it has been expanding the programs in engineering education. It has run Masters and Ph.D. Level Programs in various fields of engineering. In this context, IoE has been running the masters level programs on Urban Planning, Structural Engineering, environmental Engineering, Water Resources Engineering, Power System Engineering, Information & Communication Engineering, Renewable Energy Engineering and Geo-Technical Engineering under Department of Civil Engineering in addition to other Masters program like sustainable water sanitation, Health and development.

IOE is proud of its Highly qualified faculty members, administrative staff and meritorious, hardworking and proactive students. It is being supported by external forces like Government of Nepal, donor agencies, T. U. and others. In the first phase of IOE development, which can be characterized as spontaneous stage of development, domain role was of the government in policy formulation, establishment of academic norms and execution. After 80s, the development of IOE can be regarded as the period of intended development in which wide involvement of internal forces is seen in the institutional building process. In this connection, IoE has defined its vision, Goal and objectives as follows:

Vision: Establishment of a premier institute in the field of engineering and technology leading to the format of a Deemed University.

Goal: Social and economical progress through advancement of engineering and technology in the country.

Objective:

- Contribution to human capital formation by training a qualified and adoptable labor force including high level engineers, technologists, researchers and technicians in the field of engineering.
- Supporting innovation by generating new knowledge, accessing global stores of knowledge, and adapting knowledge to local use in the field of engineering and technology.
- Provide support for democracy, nation building and social cohesion.

2. APPLICATION OF ON LINE FORMS:

Date and Time : From 8:00 A.M., 1 Marga, 2066 (16 November, 2009)
To 20:00 P.M., 9 Paush, 2066 (24 December, 2009)

3. DISTRIBUTION OF ADMISSION CARD:

Date : 14 & 16 Paush, 2066 (29 & 31 December, 2009)

Time : From 11.00 A.M. to 3:00 P.M.

4. OTHER DETAILS:

Entrance Examination		
Program	**Date**	
Structural Engineering	8 Jan.,2010	Paush 24
Information & Communication Engineering	9 Jan.,2010	Paush 25
Water Resource Engineering	10Jan. , 2010	Paush 26
Geo-Technical Engineering	11 Jan. , 2010	Paush 27
Power System Engineering	12Jan. , 2010	Paush 28
Renewable Energy Engineering	13Jan. , 2010	Paush 29
Urban Planning	14Jan. , 2010	Paush 30

Date of Result Publication	22 Jan. , 2010	Magh 8

Note: The entrance examination will be held at p at Pulchowk Campus. Time and venue will be notified on the date of admit card distribution.

5. PROGRAM ENTRY REQUIREMENTS

To be eligible for admission to the program a candidate must:

- Hold required minimum degree in respective fields (page - 5).
- Have undergraduate grades significantly above average and not less than that prescribed by the Faculty Board of the Institute of Engineering, and
- Secure a minimum score, as prescribed by the Faculty Board, in the admission test conducted by the Central Entrance Committee of IoE.

6. INTAKE CAPACITY IN M.SC. PROGRAMME

S.N.	Programmes	Regular	Sponsored or Full Fee Paying	Total	Duration of Course	Entry Requirement
1.	Urban Planning	6	14	20	2 years	B.Arch. / B.E. (Civil) / M.A. (Geography) or Equivalent
2.	Information & Communication Engineering	6	14	20	2 years	B.E. (Electronics/Electrical/Computer) or Equivalent
3.	Structural Engineering	6	14	20	2 years	B.E. (Civil) or Equivalent
4.	Power System Engineering	6	10	16	2 years	B.E. (Electrical) or Equivalent
5.	Renewable Energy Engineering	6	14	20	2 years	B. Arch / B.E. in any field or M.Sc. (Physics , Chemistry) or Equivalent
6.	Water Resources Engineering	6	14	20	2 years	B.E. (Civil or Agriculture) or Equivalent
7.	Geo-Technical Engineering	6	14	20	2 years	B.E. (Civil) or Equivalent

7. APPLICATION FOR ENTRANCE EXAMINATION

Application forms are available in the websites: www.ioe.edu.np or http://entrance.ioe.edu.np of IoE. The candidate willing to appear in the entrance examination to get enrollment into the program should fill and submit it online from 8:00 A.M. , 1 Marga, 2066 to 24:00 P.M.,9th Paush, 2066. The application process will be automatically terminated after 9th Paush, 2066.

While filling the forms, the candidate should not skip any steps. But the fields with * signs are compulsory to be filled with information.

The candidate should mention the type and No. of identification document and paste the colour photograph of prescribed specification.

The candidate must deposit an amount of Rs.2000/- as an admission test fee in the Saving Account No 006 022 9194001 3 of the Himalayan Bank, Lalitpur Branch. It can be deposited from any branch of Himalayan Bank or other Banks in the country. The Voucher No. should be mentioned in the application form. The original copy of the Voucher should be produced in the process of obtaining the admit card.

8. DISTRIBUTION OF ADMISSION CARDS

The candidate applied for the entrance examination should obtain the admission card from the office of the entrance examination board from 11.00 A.M. to 3:00 P.M. of 14 and 16 Paush, 2066, (29 &31 December, 2009).

The candidate must furnish the original copies of Identification document and the Bank Voucher mentioned in the application

9. SELECTION PROCEDURE

9.1 Candidates fulfilling the program entry requirements will be selected for the admission on the basis of merit list based on the score of the Entrance examination. Priority shall be given to the sponsered type students in the seats other than the regular category.

9.2 T.U. recognized AMIE and AMSE* candidates thus selected on the basis of merit list based on the score of entrance examination shall, however, be offered provisional admission for the following academic years. Such candidates after passing the prerequisite courses specified by IOE, will have to join the respective program within two academic years.

9.3 Merit list of successful candidates will be published on 8th Magh 2066. Admission committee of Pulchowk Campus will then publish the first list of admission as per its schedule. The candidates should contact to the Campus Admission Committee. All the selected candidates should follow the schedule published by the committee. Vacant seats due to the failure of any candidate to enroll in the prescribed time will be filled by admitting candidates from the merit wise waiting list.

*** AMSE graduates are not recognised from the year 2060 those who have graduated before 2060 can appear in the entrance examination.**

10. ADMISSION

10.1 The successful candidates shall pay requisite fees and complete the formalities within the stipulated time, failing which, they shall loose the opportunity to get the admission: The following documents should be presented at the time of admission:

- Original and attested copies of transcripts of all Academic Records from S.L.C. onwards to the latest approved Degree.
- Original copies of Migration and Provisional certificates, if applicable;
- Original copy of Nepali citizenship certificate.
- Certificate of completion of prerequisite courses with pass marks for T.U. recognized AMIE and AMSE candidates.

10.2 In case of any discrepancy on verification of the original certificates, or in case of inclusion of the candidate's name in the admission list by mistake of any kind, admission of such a candidate will be disqualified even after his/her formal admission.

10.3 The Entrance Examination Board, Institute of Engineering, will publish the list of successful candidates in the entrance examination whereas the Admission Committee of Pulchowk Campus will publish the admission list as per merit and the capacity of the program, including the provisional admission offered to the T.U. recognized AMIE and AMSE graduates. The successful candidates will be offered the provisional admission to the published seat. Incase, the candidate studying in the second part of the fourth year in T.U. failed in the final examination and could not furnish the completion certificate of the Bacheolor degree, the admission will be cancelled. Like wise, IoE may suspend any program with the number of new provisionally admitted students in fullfee category is less than 50 % of its capacity. In this case, the amount paid to IoE in the process of provisional admission will be refunded. Subsequent lists will be published from among those who appeared in the entrance test, if seats are not filled in due

to failure of the successful candidates to enroll by the stipulated time. The dates for the publication of the result and the subsequent lists shall be as mentioned in the notice published by Admission Committee of the cam. It will be the duty of the candidates to be aware of the dates and complete the requisite formalities by the due dates. No consideration shall be given to any candidate if he/she fails to complete the formalities by due dates.

10.4 In case of the foreign students, they should furnish the attested true copies of Valid passport with provision of Visa to stay in Nepal ; Transcripts of Academic records (Minimum Qualification); Character Certificate; Migration certificates and

10.5 Candidates, graduated from institutions, other than TU, shall submit the attested copies of Provisional certificate issued by the concerned institutions. If the Bachelor of engineering degree of such institutions is not enlisted in the "Directory of recognition and evaluation" booklet published by TU, the candidate shall also submit true copy of certificate of recognition and Evaluation of the degree obtained from Curriculum Development Center, TU.

11. DISTRIBUTION OF SEATS

In each programme one regular and one full fee paying category seat is reserved for qualified girl candidate. Like wise one regular seat is reserved for qualified IoE faculty. However, if the seats reserved for the girls and IoE faculty becomes vacant, this will be filled from the candidates in the merit list.

The remaining seats (Sponsored or Full Fee Paying categories) are reserved for qualified candidates, sponsored by different organizations. In case the seats allocated for organization sponsored candidates remain vacant, they would be filled from full fee paying students. However, the seats depending on the number of candidates who have been provisionally registered in the previous academic years will be reserved in their respective category of choices.

The candidates are required to declare, at the outset, their choice as regular, full fee paying students and that choice shall be binding to them unless seats are available for want of qualified candidates, in which case, IoE may consider their admission outside their category of choice.

This information supersedes the information provided in the Institute of Engineering Profile.

12. FEE STRUCTURE

Tuition fees for the academic session will be as follow:

Category		Fee Structure
a)	Regular students	Rs. 11,500.00 per semester
b)	Organizational sponsored students	Rs. 85,000.00 per semester
c)	Full fee paying students	Rs. 37,000.00 per semester

In addition to tuition fees all have to pay a non-refundable fee of Rs. 4000.00 and refundable deposit of Rs.5000.00.

In case, the admitted student need to cancel his/her admission following rules are applicable in reimbursement of fees:

a) 10% deduction from tuition fees prior to the start of class.

b) 20% deduction from tuition fees till seventh day after the start of class.

c) No repayment of tuition fees and non-refundable deposit following the seventh day from the commencement of the classes.

13. TU RECOGNIZED AMIE AND AMSE CANDIDATES

T.U. recognized AMIE and AMSE candidates can appear in the Entrance Examination and if they are successful on the virtue of merit based on the entrance score they will be offered provisional admission in the category in which they have qualified (such as regular, organizational sponsored full fee paying) for the following academic year subject to the submission of a certificate of pass mark in the pre-requisite courses as prescribed by the IoE. Such courses can be taken in constituent or an affiliated college of IoE, with the regular classes.

The pre-requisite courses will be fixed by IoE. The examination of pre-requisite course will be conducted by IOE along with its regular programmes. The tuition fee for the pre-requisite courses is fixed by IOE's constituent or affiliated colleges.

The candidate shall have to pass the prerequisite courses within two academic years of passing the entrance examination, failing which the provisional admission shall be automatically cancelled and the candidate shall have to appear in entrance examination again.

14. DURATION OF THE COURSES

The duration of the course for the fulfillment of the degree is two academic years. The maximum period within which a student is allowed to complete the course is four academic years.

15. STUDENT HOSTEL

Hostel facilities are available for few selected students according to campus rules and regulations.

The Institute's rules and regulations shall prevail in case of any conflict arising in these interpretation of this document.

16)APPENDICES

RENEWABLE ENERGY ENGINEERING

SYLLABUS FOR RENEWABLE ENERGY

Note: The depth of subject matter in each subject shall be equivalent to that of B.E. offered by T.U.

A. APPLIED MATHEMATICS

- Derivatives, Anti derivatives, Definite integrals
- Logarithmic and exponential functions. Other transcendental functions
- Three dimensional geometry
- Plane curves and polar coordinates
- Vectors in two and three dimensions
- Multiple integrals
- Partial derivatives
- Infinite series. Fourier series
- Matrices and Determinants
- Ordinary and differential equations
- Vector Calculus
- Line integrals, Surface integrals

B. GROUP-A SUBJECT

- Measurement of heat
- Thermodynamic process equations for the following
  a) Constant pressure process
  b) Constant volume process
  c) Isothermal process
  d) Adiabatic process
  e) Polytropic process
- Zeroth, First and Second laws of Thermodynamics and the concept of entropy
- Carnot cycle
- Conduction heat transfer from plane and composite walls
- Convection fundamentals and forced convection from flat plates

- Radiation heat transfer fundamentals
- Applied mechanics
- Strength of materials
  a) Stress and strain, elasticity, plasticity

C. GROUP-B SUBJECT

- Concept of fluid
- Pressure measurement
- Conservation of mass, Continuity equation in 1D, 2D and 3D
- Conservation of linear momentum
- Bernoulli's equations
- Basics of viscous flow
- Fundamental laws of electricity
- Fundamentals of alternating current
- Basic electronics
  a) Semiconductor materials
- Principles of Transducers
  a) Temperature
  b) Light
  c) Velocity
  d) Pressure

D. ENERGY

- Sources of conventional energy, Fossil fuels, Calorific values, Basic combustion requirements.
- Renewable energy sources and their nature, Solar thermal, Solar photo-voltaic, Wind, Bio-mass and Geothermal.

MODE OF ENTRANCE EXAMINATION

a. The admission test will be of a single paper of 3 hours duration with 120 nos. of questions and 150 Full marks.

b. The question papers will be in English.

c. The separate answer sheet is provided with the question paper which must be used for answering the questions the Examination can be conducted with the use of computers as per the situation.

d. Non programmable calculators are permitted. Exchange of calculators is strictly prohibited. Candidates have to bring their own calculators.

e. The test consists of two sections, A and B. Each section consists of 4 Groups of subject areas. Section A in general will include objective types of questions carrying one mark each, where as Section B will contain objective types of questions carrying two marks each. All questions are compulsory. There is a provision of negative marking. 0.25 marks for Group A type questions and 0.5 marks for Group B type questions shall be deducted for each incorrect answer from the secured marks.

f. The distribution of both types of questions under each group (subject areas) will be:

Group (Subject areas)	No. of Questions	
	Carrying One mark each	Carrying Two marks each
Applied Mathematics	25	10
Group-A Subjects	25	10
Group-B Subjects	25	10
Energy	15	-
Total	**90**	**30**

SAMPLE QUESTIONS
RENEWABLE ENERGY

SECTION - A

1) Choose the correct answer from the different alternatives given:

1.1 Using Green's theorem in the plane the area of a bounded closed curve C is given by

a) $\frac{1}{2}\oint xdy + ydx$ b) $\frac{1}{2}\oint xdx + ydx$

c) $\frac{1}{2}\oint xdx - ydx$ d) $\frac{1}{2}\oint xdy - ydx$

1.2 In three-dimensional space the equation $y^2+4z^2=4$ represents

a) a sphere b) an ellipsoid

c) a circular cylinder d) an elliptic cylinder

1.3 The value of $\left[\vec{a}-\vec{b},\vec{b}-\vec{c},\vec{c}-\vec{a}\right]$ where $|\vec{a}|=1,|\vec{b}|=5,|\vec{c}|=3$ **is**

a) 1 b) 2

c) 9 d) 0

1.4 Identify the wrong statement

a) $\lim_{x\to 0}\frac{\sin x}{x}=1$ b) $\lim_{x\to\infty} x\sin\frac{1}{x}=1$

c) $\lim_{x\to 0} x\sin\frac{1}{x}=0$ d) $\lim_{x\to\infty} x\sin\frac{1}{x}=0$

1.5 $\int_0^{\pi/2}\frac{dx}{1+\sin x}$ **is**

a) 1 b) 0 c) 2 d) 3

1.6 The value of $\vec{i}\times(\vec{a}\times\vec{i})+\vec{j}\times(\vec{a}\times\vec{j})+\vec{k}\times(\vec{a}\times\vec{k})$ **is**

a) $3\vec{a}$ b) $\vec{a}$ c) $2\vec{a}$ d) $4\vec{a}$

1.7 $\frac{\partial^2 u}{\partial t^2}=c^2\frac{\partial^2 u}{\partial x^2}$ **is**

a) radio equations b) one – dimensional heat flow

c) two-dimensional heat flow d) wave equation

2) Choose the correct answer from the different alternatives given

2.1 Watt is closest to

a) 1 Btu/hr b) 2.5 Btu/hr c) 3.5 Btu/hr d) 6 Btu/hr

2.2 The work done in an isothermal process between states 1 and 2 is given by

a) $\frac{p_1v_1}{J}\ln\frac{v_2}{v_1}$ kcal b) $\frac{p_1v_1-p_2v_2}{(\lambda-1)J}$ kcal

c) $\frac{p_1}{J}(v_2-v_1)$kcal d) None of above

2.3 In an adiabatic process between states 1 and 2

a) work done remain zero

b) change in enthalpy remains zero

c) change in heat transfer remains zero

d) none of the three equals zero.

2.4 Heat flow through a slab of length l with T1 and T2 as the slab face temperatures is given by

a) $Q=KA(T_1-T_2)/1$ b) $Q=K/A(T_1-T_2)$

c) $Q=KA1/(T_1-T_2)$ d) $Q=UA(T_1-T_2)$

2.5 Nusselt number for convective heat transfer in forced convection laminar flow is

a) $0.345Pr^{1/2}Re^{1/3}$ b) $0.332Pr^{1/2}Re^{1/3}$

c) $0.332Pr^{1/3}Re^{1/2}$ d) $0.345Pr^{1/3}Re^{1/2}$

2.6 If you operate an engine working on Carnot cycle between the source and sink temperature of 1500C and 250C respectively, the thermal efficiency of your engine would be closest to:

a) 20% b) 30% c) 40% d) 42%

3) Choose the correct answer from the different alternatives given:

3.1 Viscosity of gases

a) increases with the increase of temperature

b) decreases with the increase of temperature

c) remains constant with the increase of temperature

d) remains constant for some increase of temperature then decreases with further increase of temperature.

3.2 The continuity equation is the result of application of the following law is the flow field.

a) First law of thermodynamics b) Conservation of energy

c) Conservation of mass d) Newton's second law of motion

3.3 In a static fluid with as the vertical direction, the pressure variation is given by

a) $\frac{dP}{dy}=\rho$ b) $\frac{dP}{dy}=-\rho$ c) $\frac{dP}{dt}=r$ d) $\frac{dP}{dt}=-r$

3.4 Reynold number is

a) $\frac{\text{Inertial force}}{\text{Viscous force}}$ b) $\frac{\text{Viscous force}}{\text{Inertial force}}$

c) $\frac{\text{Shear force}}{\text{Viscous force}}$ d) $\frac{\text{Inertial force}}{\text{Shear force}}$

3.5 In a steady flow of incompressible fluid, as the diameter is doubled the velocity will

a) be halved b) be doubled

c) increase four fold d) decrease four fold

3.6 A solid copper conductor at 20^0C has the following characteristics

Resistivity = $1.77x10^{-8}\ \Omega$m.

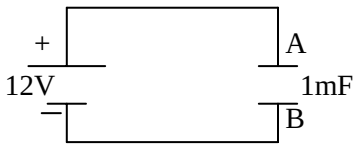
Radius = 0.1 inch

Length = 5000m

What is the resistance of the conductor ?

a) 0.017 Ω b) 4.37 Ω c) 12.32 Ω d) 18.26 Ω

3.7 What is the charge on the capacitor on plate A in the following illustration ?



a) -83μC b) -0.012C c) +83 μC d) +0.012C

3.8 Which of the following is not an active element?

a) transistor b) MOSFET c) Diode d) Resistor

3.9 Which of the following is a transducer ?

a) photo cell b) LC circuit c) Resonance circuit d) resistor

3.10 The most commonly used transducer for measurement of linear velocity is

a) electromagnetic transducer b) transformer
c) auto transformer d) magnet type

3.11 Power amplification is biggest in

a) common collector configuration
b) common base configuration
c) common emitter configuration
d) common base-emitter configuration.

3.12 Power transistors are invariably provided with

a) heat sink b) metallic casing
c) soldered connections d) fan for heat removal.

4) Choose the correct answer from the different alternatives given

4.1 Which of the following is the dominant energy source in world energy consumption?

a) oil b) nuclear c) hydro d) bio-mass

4.2 The nearest calorofic value of biogas is

a) 100 MJ/m^3 b) 70 MJ/m^3 c) 40 MJ/m^3 d) 20 MJ/m^3

4.3 The nearest per capita energy consumption in Nepal is about

a) 35GJ b) 25GJ c) 15GJ d) 5GJ