ENG 111 Communication Technique (2-2-1)

Evaluation:

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	100	-	100

Course Objectives:

This course intends to develop and strengthen the basic communication skills in the English language. Wi emphasize reading, writing and speaking. It imparts the basic concepts of technical writing such as busine letters, job application and CV, minutes, agenda and etc.

Chapter Content

1 Review of Written English

- Identification of Sentence and clause
- Classification of sentence (simple, compound, complex)
- transformation of sentences

2 Oral Communication and Note Taking

- Variety of English (BrE, AmE, formal, informal, polite, familiar, tentative)
- General rules of pronunciation (English Vowels and Consonants)
- General rules of stress and intonations
- Oral presentation/technical talk: Environmental pollution, construction, wa resources, impact of satellite communication, urban development, impact of compu in modern society

3 Technical Writing Skills

- Preparation of short memoranda (Importance, formats)
- Business letters (Importance-purposes)
- Preparation of job application and CV
- Description writing (Process, Mechanism, Place etc.)
- Calling meeting and writing minutes, notification, preparation of agenda

4 Reading Skills

- Comprehension questions and exercises from:
- The use and the misuse of science, Road foundation, Beauty, Custom, The story c hour (Kate Chopin), Knowledge and wisdom, Freedom, Letter from foreign grave B Gurung), Natural Resources of Nepal: Forests & Water (Mani Bhadra Gautam)
- Note making and precise writing from any passage

Tutorial Works:

1. Some general rules of pronunciation..
2. To present a seminar paper/report/proposal.
3. To participate in a group discussion.
4. To conduct a meeting.
5. To prepare and practice to face an interview.

Text Books:

1. Andrea J. Rutherford. *Basic Communication Skills for Technology*. 2nd Edition. Addision Wesley. Pearson Education Asia (LPE) ISBN: 8178082810
2. Khanal Arjun, Communication Skills in English, Sukunda Pustak Bhawan, 2010

Reference Books:

1. Anne Eisenberg, *Effective Technical Communication*, Mc-Graw Hill 1982.
2. V.R. Narayanaswami, *Strengthen your writing*, Orient Longman, Madras.
3. Champa Tickoo & Jaya Sasikumar, *Writing with a Purpose*, Oxford University Press, Bombay.
4. A handbook of pronunciation of English words (with 90-minute audio cassettes) Communication Skills in English.
5. Chopin, Kate. "The Story of an Hour", *Creative Delights*
6. *Gautam Shreedhar, Creation & Criticism: A Miscellaneous Thought*
7. *Gautam Mani Bhadra, Essays, Stories, Passages, Paragraphs and Letter writing for the Young Learners, Nirantar Prakashan, Kathmandu, 2008*

MTH 112 Engineering Mathematics I (3-2-0)

Evaluation:

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	100	-	100

Course Objectives:

After the completion of this course students will be able to apply the concept of calculus (Differential and integral), analytical geometry and vector in their professional courses.

Chapter **Content**

1 **Limit, Continuity and Derivative:**

i. Limit, continuity and Derivative of a function with their properties
ii. Mean values Theorem with their application
iii. Higher order derivative
iv. Indeterminate forms
v. Asymptote
vi. Curvature
vii. Ideas of curve tracing
viii. Extreme values of functions of single variables

2 **Integration with its Application:**

i. Basic integration, standard integral, definite integral with their properties
ii. Fundamental theorem of integral calculus (without proof)
iii. Improper integral
iv. Reduction formulae and use of beta Gamma functions
v. Area bounded by curves
vi. Approximate area by Simpsons and Trapezoidal rule,
vii. Volume of solid revolution

3 **Two dimensional geometry:**

i. Review (circle, Translation and rotation of axes)
ii. Conic section(parabola, ellipse, hyperbola),
iii. Central conics (Introduction only).

4. **Vector Algebra:**

i. Review of vector and scalar quantity
ii. Space coordinates
iii. Product of two or more vectors
iv. Reciprocal system of vectors and their properties
v. Equations of lines and planes by vector methods

Text Books:

1. Engineering Mathematics I: Prof. D. D Sharma (Regmi), Toya Narayan Paudel, Hari Prasad Adhikari, Sukunda Publication Bhotahity , Kathmandu
2. Calculus and analytical geometry: George B Thomas, Ross L. Finney

Reference Books:

1. Calculus with analytical geometry: E. W. Swokoswski.

2. Coordinate Geometry: Lalji Prasad.
3. Vector Analysis: M. B. Singh
4. Integral Calculus: G.D. Panta.

CMP 113 Programming in C (3-0-3)

Evaluation:

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

Course Objectives:
Main objective of this course is to develop the basic principles of programming and software system. It encompasses the use of programming systems to achieve specified goals, identification of useful programming abstractions or paradigms, the development of formal models of programs, the formalization of programming language semantics, the specification of program, the verification of programs, etc. the thrust is to identify and clarify concepts that apply in many programming contexts:

Chapter	Content	Hrs
1	**Introduction** History of computing and computers, programming, block diagram of computer, generation of computer, types of computer, software, Programming Languages, Traditional and structured programming concept	3
2	**Programming logic** Problems solving(understanding of problems, feasibility and requirement analysis) Design (flow Chart & Algorithm), program coding (execution, translator), testing and debugging, Implementation, evaluation and Maintenance of programs, documentation	5
3	**Variables and data types** Constants and variables, Variable declaration, Variable Types, Simple input/output function, Operators	3
4	**Control Structures** Introduction, types of control statements- sequential, branching- if, else, else-if and switch statements, case, break and continue statements; looping- for loop, while loop, do—while loop, nested loop, goto statement	6
5	**Arrays and Strings** Introduction to arrays, initialization of arrays, multidimensional arrays, String, function related to the strings	6
6	**Functions** Introduction, returning a value from a function, sending a value to a function, Arguments, parsing arrays and structure, External variables, storage classes, pre-processor directives, C libraries, macros, header files and prototyping	6
7	**Pointers**	7

Definition pointers for arrays, returning multiple values form functions using pointers. Pointer arithmetic, pointer for strings, double indirection, pointer to arrays, Memory allocation-malloc and calloc

8 Structure and Unions **5**

Definition of Structure, Nested type Structure, Arrays of Structure, Structure and Pointers, Unions, self-referential structure

9 Files and File Handling **4**

Operating a file in different modes (Real, Write, Append), Creating a file in different modes (Read, Write, Append)

Laboratory:

Laboratory work at an initial stage will emphasize on the verification of programming concepts learned in class and use of loops, functions, pointers, structures and unions. Final project of 10 hours will be assigned to the students which will help students to put together most of the programming concepts developed in earlier exercises.

Textbooks:

1. Programming with C, Byran Gottfried
2. C Programming, Balagurusami

References

1. A book on C by A L Kely and Ira Pohl
2. The C Programming Language by Kerighan, Brain and Dennis Ritchie
3. Depth in C, Shreevastav

PHY 111 Physics (4-2-2)

Evaluation:

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

Course Objectives:

The objectives of this course are to develop the knowledge of simple Harmonic motion in different elastic systems, to teach the theory of wave propagation and resonance, to develop the fundamental concepts on electromagnetic equipment.

Chapter **Content**

1 **Mechanical Oscillation**

Introduction and equation of Simple Harmonic Motion, energy in Simple Harmonic Motio oscillation of mass –spring system, compound pendulum

2 **Wave motion**

Introduction of wave, wave velocity and particle velocity, types of waves, equation, energy, pow and intensity of plane progressive wave, standing wave and resonance.

3 **Acoustics**

Reverberation of sound, absorption coefficient, Sabines formula, introduction, production a applications of ultrasonic wave

4 **Physical Optics**

Interference: introduction, coherent sources, interference in thin films due to reflected and transmitted light, Newton's Ring (3)

Diffraction: introduction, fraunhoffer diffraction at single silt and double silt diffraction gratin (2)

Polarization: introduction, double refraction, Nicol prism, optical activity, specific rotation, wave plates (3)

5 **Laser and Fiber Optics**

Introduction of laser, spontaneous and stimulated emission, optical pumping, He-Ne laser, Ru Laser, use of laser, Propagation of light waves, types of optical fiber, applications of optical fiber

6 **Electrostatics**

Electric charge, electric force, electric flux, electric potential, Gauss law and its applicatio electric field intensity and electric potential due to dipole, electric potential due to quadrup capacitors, electrostatic potential energy, dielectrics and gauss law charging and discharging capacitor

7 **Electricity and magnetism**

Electric current, resistance, resistivity and conductivity, atomic view of resistivity, magnet field, magnetic force, Lorentz force, Hall effect, Biot-Savart's law and its applications, for between two parallel conductors, Ampere's circuital law and its applications, Faraday's law

electromagnetic induction, self-induction R-L circuit, energy stored in magnetic field and magnetic energy density

8 Electromagnetism 9

LC oscillation, Damped oscillation, forced oscillation and resonance, Maxwell's equations displacement current, wave equations in free space, continuity equation, E and B fields, poynting vector, radiation pressure

9 Photon and matter waves 4

Photon, group velocity and phase velocity, De brogile wavelength, Schrodinger wave equation, one dimensional potential well, tunneling effect

10 Semiconductors and super conductivity 5

Introduction, types of semiconductors Dopping, P-N Junction, Metal- semiconductor junction, junction breakdown, junction capacitance, electrical conduction in metals, insulators and semiconductors according to band theory of solids, introduction to superconductor

Textbooks:

1. Fundamental of Physic by Robert Resenick and David Hallday
2. A Text Book of Engineering Physics, T. R. Lamichane
3. A text book of optics by Subramanyam and Brijlal
4. Modern physics by R. Murugason

Reference Books:

1. Concept of physic by H.C Verma
2. Modern Engineering Physic by A.S Basudeva
3. Electronics by B.L Thereja
4. Principles of Electronics, V. K. Meheta

Laboratories:

1. To determine the acceleration due to gravity & radius of gyration by single bar pendulum.
2. To determine the frequency AC mains by using son mater apparatus
3. To determine the wave length by using diameter of Newton's ring
4. To determine the wave length of laser light by using diffraction grating
5. To determine the value of Modulus of Elasticity of the material given and Moment of Inertia of Circular disc using torsional pendulum
6. To determine the capacitance of given capacitor by charging and discharging through resistor
7. To determine the low resistance of a given wire and resistance per unit length of the wire by using Carey-foster bridge
8. To plot a graph current and frequency in an LRC series circuit and to find: i) the resonance frequency ii) the quality factor

Lab textbook: B. Sc Practical Physics by C. L. Arora

CMP 114 Problem Solving Techniques (3-1-0)

Evaluation:

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	100	-	100

Course Objectives:

A large part of everyday activity involves problem solving in some form. On order to solve problem one must think analytically to find a solution to a problem. The main aim of this course is:

1. To improve and impart conceptual clarity in thinking analytically and logically.
2. To provide fundamental means of approach how to translate verbal discussion onto analytical data and then how to solve it by computer.

Course Contents:

1. **Basic Concepts of Problem Solving** **10 hrs**
   Introduction to Problem Solving Approach. How to count. Use of induction principle. Problems of Logic and Issues of Parity.

2. **Application of Geometry** **10 hrs**
   Classical Planar Geometry. Analytic Geometry. Solid Geometry and miscellaneous problems.

3. **Miscellaneous Problem Solving Techniques** **15 hrs**
   Probabilistic approach to solving Counting Problems. Logic Problems (Simple logic, theory of games. Tracing routes. Learning from Parity. Mysterious arithmetic problems and surprise). Problems from Recreational math. (Magic square and Weighing problems). Problems of Algebra and Analysis (Inequality, Trignometry and related ideas).

4. **Solving Miscellaneous Real-Life Problems** **10 hrs**
   Miscellaneous problems, impossible problems, Problems from everyday life and Statistics.

Laboratory Work:

Realization and Implementation of the numerous problems and various problem-solving techniques learned is to be implemented in C Programming Language. However, the practical implementation is also considered as an assignment for the "Programming in C" course module.

Textbooks:

1. Krantz, Steven G., *Techniques of Problem Solving*, University Press, 1998 ISBN:81-737-116-X

Reference Books:

1. Etter, D. M., *Engineering Problem Solving with ANSI C*, Prentice Hall, NJ, 1995,
2. Lakatos, *Proofs and Refutation*, Cambridge University Press, 1976.
3. Polya, G., *How to Solve It*, Princeton University Press, Princeton, 1998.

ELE 110 Basic Electrical Engineering (3 – 1 – 2)

Evaluation:

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

Course Objectives:

1. To analyze electric circuits (A.C. & D. C).
2. To work on electrical instrumentation projects.
3. To operate, distinguish and use electrical devices and machines.

Course Contents

1. **Introduction** **2 hrs**
   Role of electricity in modern society, Energy sources and production, generation, transmission and distribution of electrical energy, consumption of electricity

2. **DC Circuit Analysis** **15 hrs**
   Circuits concepts (lumped and distributed parameters), linear and nonlinear parameter, passive and active circuits, Circuit elements (Resistance, capacitance and inductance), their properties and characteriscts in a geometrical and hardware aspects, color coding, Series of parallel compilation of resistances, Equivalent resistance and its calculation, star-delta transformation, concept of power, energy and its calculations, short and open circuit, ideal and non-ideal sources, source conversion, voltage divider and current divider formula, Kirchhoff's current and voltage laws, nodal method and mesh method of network analysis (without dependent source), network theorem (i.e Superposition, Thevonin's, Norton's), maximum power transfer

3. **Single Phase AC Circuits Analysis** **10 hrs**
   Generation of EMF by electromagnetic induction, Generation of alternating voltage, sinusoidal functions-terminology (phase, phase angle, amplitude, frequency, peak to peak value), average values and RMS or effective value of any types of alternating voltage or current waveform, phase algebra, power triangle, impedance triangle, steady state response of circuits (RL, RC,RLC series and parallel) and concept about admittance, impedance reactance and its triangle), instantaneous power, average real power, reactive power, power factor and significance of power factor, resonance in series and parallel RLC circuit, bandwidth, effect of Q factor in resource

4. **Poly-phase AC Circuit Analysis** **6 hrs**
   Concept of a balanced three phase supply, generation and differences between single phase over three phase system, star and delta connected supply and load circuits. Line and phase voltage\current relations, power measurement, concept of three phase power and its measurement by single and two wattmeter methods

5. **Electric Machines** **12 hrs**

Review of magnetic circuits

Transformers: Principle of operations, features, equivalent circuits, efficiency & regulation, open circuit & short circuit tests

DC motors: Performance & operation, basic characteristics of motors & generators, speed control & selection of motors

AC machines: Induction motors (working principles, construction features and uses), Synchronous motors (working principles, construction and uses

Text Boks:

1. Boylested, Albert "Introduction of Electric circuit" Prentice Hall of India Private Limited, New Delhi
2. Tiwari, S.N, "A first course of electrical engineering" att. Wheeler & Co. Ltd. Allabhad.

References:

1. Thereja B. L & Thereja A. K. "A text book of Electrical Technology, S Chand Publication.
2. Jain& Jain" ABC of Electrical Engineering"

Laboratory Work:

1. To measure current, voltage and power across the passive components.
2. To verify Kirchhoff's Current Law (KCL) & Kirchhoff's Voltage Law (KVL)
3. To verify Thevenin's Theorem.
4. To verify maximum power transfer theorem.
5. To verify superposition theorem.
6. To measure three phase power by using two wattmeter
7. To determine efficiency and voltage regulation of a single-phase transformer by direct loading.
8. To study open circuits & short circuits tests on a single-phase transformer
9. To study the speed control of dc shunt motor by.
   i. Varying the field current with armature voltage held constant field control.
   ii. Varying the armature voltage with field current held constant armature control.
10. To study open circuits and load test on a dc shunt generator (separately excited)
    i. To determine magnetization characteristics
    ii. To determine V-I characteristics of a dc shunt generator