Purbanchal University

Faculty of Engineering

Biratnagar, Nepal

First Semester Structure

Program: Bachelor in Computer Engineering

Semester: First

Effective from: 2021 (2078) Batch

First Year / First Semester

S.N.	Course Code	Subjects	Credit Hrs.	L.	T.	P.	Total	Internal		Final		Total
								Th.	P.	Th.	P.	
1	BSH1001	Mathematics I	3	3	3	-	6	40	-	60	-	100
2	BSH1002	English for Technical Communication	4	3	2	2	7	40	10	60	15	125
3	BSH1004	Physics	3	4	2	2	8	40	10	60	15	125
4	BCE1001	Computer Programming	3	3	1	3	7	40	30	60	20	150
5	BCE1002	Fundamental of Computing Technology	3	3	1	2	6	40	15	60	10	125
6	BME1001	Engineering Drawing - I	3	1	-	3	4	-	60	-	40	100
7	BME1002	Workshop Technology	2	1	-	2	3	10	40	-	-	50
		Total	**21**	**18**	**9**	**14**	**41**					**775**

Note: **L**: Lecture **Th**: Theory **T**: Tutorial **P**: Practical

	Mathematics I BSH 1001									
Year: I										Semester: I

Teaching				Examination Scheme						Total Marks
				Internal		Final				
Hours/week				Theory	Practical	Theory		Practical		
Cr	Theory	Tutorial	Practical			Duration	Marks	Duration	Marks	
3	3	3		40		3hrs	60	-	-	100

Objective: The main objective of the course is to provide the students a sound knowledge of calculus (differential and integral), vector algebra and analytic geometry through theoretical explanations and numerical examples via problem solving techniques and applications.

Micro-Syllabus

Chapter 1: Derivatives and their Application

1.1 Review of limit, continuity and differentiability

1.2 Tangents and Normals: Equation of tangents and normal to the curves, Angle between two curves, Pedal equations.

1.3 Higher Order Derivatives, and Leibnitz's Theorem: Leibnitz's Theorem (without proof) and its applications to numerical problems.

1.4 Power Series of Single valued functions: Taylor's series (without proof) and Maclaurin's series (without proof), expansion of trigonometric, exponential and logarithmic functions using Macluarin's series.

1.5 Indeterminate forms and L' Hospital's Rule (without proof): Indeterminate forms and use of L'Hospital's rule to find the limit.

1.6 Curvature: Radius and chord of curvature

1.7 Asymptotes of Cartesian Curves

1.8 Partial Derivatives: Euler's theorem (proof only for two variables) and its applications.

1.9 Extreme values of functions of two and three variables: Criterion for extreme values, use of Lagrange's Multiplier.

Chapter 2: Antiderivatives and its Applications

2.1 Review of indefinite and definite integrals

2.2 Properties of definite integrals

2.3 Improper Integrals

2.4 Differentiation under integral sign: Lebinitz's Integral Rule (statement only) and problem related to constant limit of integration.

2.5 Reduction formula and Beta Gamma functions: Reduction of
$$\int x^n e^x dx, \quad \int \sin^n x \, dx, \quad \int \cos^n x \, dx, \quad \int \tan^n x \, dx, \quad \int cosec^n x \, dx,$$
$$\int \sec^n x \, dx \quad \int \cot^n x \, dx$$
Definition, properties, relation between Beta and Gamma function (without proof), numerical application of Beta Gamma function.

2.6 Applications of integrals: ideas of curve tracings; area, arc-length, volume and surface area in cartesian form: Basic concept of curve tracing related to ellipse, parabola, astroid, hypocycloid and loops generating Cartesian curves, curves bounded by horizontal and vertical assymptotes. Arc length, Area, Surface area and volume of solid of revolution related to above curves.

2.7 Multiple Integrals: Double Integral in Cartesian form; Triple Integral in rectangular form.

2.8 Change of order of integration in double integral: Cartesian form only.

Chapter 3: Plane Analytic Geometry

3.1 Translation and Rotation of axes.

3.2 Parabola: standard equations, tangent and normal: Standard equation of parabola, equation of tangents and normal, condition of tangency and condition of normality to the standard equations of parabola and related numerical problems.

3.3 Ellipse and Hyperbola: Standard Equations, foci, directrices, latera recta, equations of tangent and normal: Standard equation of ellipse and hyperbola, equation of tangents and normal, condition of tangency and condition of normality to the standard equations of ellipse and hyperbola and related numerical problems.

3.4 General Equation of conic sections.

Chapter 4: Vector Algebra

4.1 Review of product of two vectors.

4.2 Product of three and four vectors with applications.

4.3 Reciprocal System of vector triads.

4.4 Vector Equation of lines (parametric form, symmetric form and related numerical problems) and planes in space (line of intersection of two planes and angle between two planes) by vector method.

REFERENCE BOOKS:

1. M. B. Singh and B. C. Bajracharya, *Differential Calculus*, Sukunda Pustak Bhawan, Kathmandu, Nepal.

2. G. B. Thomas and R. L. Finney, *Calculus and Analytic Geometry*, Addison Wesley Publishing Company.

3. M. B. Singh and B. C. Bajracharya, *A textbook of Vector Analysis*, National Book Center, Kathmandu, Nepal

4. D. G. Zill an M. R. Cullen, *Advanced Engineering Mathematics*, 3rd Edition, Jones and Bartlett Publishers Inc.

5. E. Kreyszig , *Advanced Engineering Mathematics* , 9th Edition, John Wiley and Sons, Inc.

6. G. D. Pant and G. S. Shrestha, *Integral Calculus and Differential Equation*, Sunila Prakashan, Kathmandu, Nepal.

7. S. P. Shrestha, H. D. Chaudhary and P. R. Pokhrel, *A Text book of Engineering Mathematics*- Volume I, Vidhyarthi Pustak Bhandar, Kathmandu, Nepal.

8. S. P. Pradhanang and N. B. Khatakho, *Engineering Mathematics*- Volume I, Vidhyarthi Pustak Bhandar, Bhotahity, Kathmandu, Nepal.

Evaluation Scheme

Marks Division

Question Type	No. of Questions	Marks	Total Marks
Short	10	2	20
Long	10	4	40

Chapter wise marks division in final examination

SN	Chapter	Number of short questions	Number of long questions	Total
1	Derivatives and their Application	3	3	6
2	Antiderivatives and its Applications	4	3	7
3	Plane Analytic Geometry	2	2	4
4	Vector Algebra	1	2	3
	Total	10	10	20

Notes:

- Three long questions with one "OR" and three short questions from 1.2 to 1.9 and each question from different topics.
- One long question and two short questions from 2.2 to 2.5; one long question with "OR" and two short questions from 2.6; one long question from 2.7 to 2.8.
- One long and one short questions from 3.1 to 3.2; one long with "OR" and one short question from 3.3 to 3.4
- Two long questions and one short question from 4.2 to 4.4 with one "OR" long question.

PURBANCHAL UNIVERSITY
I SEMESTER (MODEL QUESTION)
LEVEL:- B. E. Civil / Computer / Electronics, Communication and Automation / Electrical / Biomedical /Geomatic

B. Architecture

SUBJECT:- BEG101SH, Engineering Mathematics-I

FULL MARKS:- 60

TIME:- 03:00 hrs.

PASS MARKS:- 24

Group A

Attempt all questions.   [10 x 2 = 20]

1) State L' Hospital's rule. What are indeterminate forms?

2) Define asymptotes of a curve. Find the vertical asymptotes of $x^2y - 9y + 3 = 0$.

3) Define curvature and radius of curvature of a curve. Illustrate with figure.

4) Integrate: $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x}\, dx$

5) Find the area of the region bounded by $y = x^2$, $x = 2$ and x-axis.

6) Evaluate the improper integral $\int_0^{\infty} \frac{1}{x^2+9}dx$.

7) Discuss the symmetry for the curve $x^3 + y^3 = 7xy$ with reasons.

8) Define foci, centers and directrices of an ellipse. Illustrate with a figure.

9) Find the equation of tangent to the parabola $y^2 = x$ at $(1, 1)$

10) Find the value of n if $2\vec{i}-\vec{j} + \vec{k}$, $\vec{i} + 2\vec{j} + 3\vec{k}$ and $3\vec{i} + 2\vec{j} + n\vec{k}$ are coplanar.

Group B

Attempt all questions.   [10 x 4 = 40]

11) If $y = (Sin^{-1}x)^2$, prove that $(1-x^2)y_{n+2} - (2n+1)x\, y_{n+1} - n^2\, y_n = 0$

12) Applying the Maclaurin's theorem find the expansion of $logsecx$ as far as the term x^6 and hence find the expansion of $tanx$.

13) Find the pedal equation of the curve $r^2 = a^2cos2\theta$.

OR

Find the minimum value of $x^2 + y^2 + z^2$ when $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$

14) Use Gamma function to evaluate: $\int_0^a x^3 (a^2 - x^2)^{5/2} \, dx$.

15) Find the area of the hypocycloid $\left(\frac{x}{a}\right)^{2/3} + \left(\frac{y}{b}\right)^{2/3} = 1$

OR

Prove that the volume and surface area of a sphere of radius r is $\frac{4}{3}\pi r^3$ and $4\pi r^2$, respectively.

16) Evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} \, dydx$ by changing the order of integration.

17) Transform the equation $3x^2 - 2xy + 4y^2 + 8x - 10y + 8 = 0$ by translating the axis in to an equation with linear terms missing.

18) Find the equations of tangents drawn from the point $(-15, -7)$ to the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$. Find the acute angle between them.

OR

Find the axis, the vertex, latus rectum and focus of the parabola $16x^2 - 24xy + 9y^2 - 104x - 172y + 44 = 0$.

19) Find the linear relation between four vectors $\vec{a}, \vec{b}, \vec{c}, \vec{d}$.

20) Find the equation of plane through $(1, 2, 3)$ and $(3, 2, 1)$ perpendicular to the plane $4x - y + 2z = 7$ by vector method.

OR

Find the equation of the line of intersection of the planes $3x - 6y - 2z = 15$ and $2x - y + 3z = 5$ in symmetric form by using vector method

Name	Campus	Signature
Prof. Dr. Gyan Bahadur Thapa	Pulchok Campus	
Dr. Dilip Kumar Bhagat	PUSOE	
Dr. Phanindra Prasad Bhandari	Khwopa Engineering College	
Toya Narayan Poudel	HWIC	
Prem Raj Bhatta	Acme Engineering College	
Hari Shankar Adhikari	Acme Engineering College	
Dilip Kumar Sah	Hillside College of Engineering	
Dhruba Bahadur Thapa	Hillside College of Engineering	
Dhan Raj Char	Kantipur City College	
Bharat Pokhrel	WHICH	

20th Asar 2079
Curriculum Development Workshop
Organized by:
Faculty of Engineering
Purbanchal University
Venue:
Khwopa Engineering College, Bhaktapur.

BSH 1002: ENGLISH FOR TECHNICAL COMMUNICATION

Teaching Schedule Hours/Week				Examination Scheme				Total Marks
				Internal Assessment		Final		
Cr	Theory	Tutorial	Practical	Theory	Practical	Theory	Practical	
3	3	2	2	40	10	60	15	125

Course objective: The basic objective of the course is to develop technical communicative competence of the Bachelor's level engineering students in English language with a special focus on the development of professional as well as academic communication skills required for facing the ever increasing global communicative challenges in the modern world.

Course Details:

Unit: 1. Speaking   (6 Hrs)

A. Pronunciation in English
1.1 Vowels in English (*Monophthongs and Diphthongs*)
1.2 Consonants in English
1.3 Description of English Vowels (*Four-term description*)
1.4 Description of English Consonants (*Three-term description*)
1.5 Stress/ Accent in English (*Primary*)
1.6 Strong and Weak pronunciation

B. Oral Presentation
1.1 Introduction
1.2 Fundamentals of Effective Oral Presentation: Facial Expression, Gesture, Eye Contact, Space distancing, Posture
1.3 Group Discussion (*Round table discussion*)
1.4 Debate
1.5 Public Speaking

Unit:2. Reading

2.1 Types of Reading: Intensive Reading, Extensive Reading, Skimming, Scanning

2.2 Note Taking

2.3 Reading Books: Koirala,B.P. 'A Tale', Achebe, C. 'Marriage Is A Private Affair', Russell, B. 'Keeping Errors At Bay', Malla, K.P. 'The Lure of English', Ruskin, J. Seven Lamps of Architecture *(for extensive reading)*

2.4 Summary / précis Writing

Unit: 3. Writing   (15Hrs)

A. Fundamentals of Writing

3.1 Fundamentals of effective writing: unity; length; coherence; conciseness; clarity

3.2 Writing Letters: Official letters; letters of request; complaint; apology and order, Circular letter, Reply letter, Thank you letter.

3.3 Curriculum Vitae and Resume *(with Job Application Letter)*

3.4 Conducting Meeting: Writing Notice, Agenda, Minutes

B. Technical Writing

3.1 Basic Principles in Technical Writing

3.2 Format for technical reports

3.3 Writing technical reports

3:4 Writing memoranda

3.5 Writing Users/Operation Manual

3.6 Proposal Writing: Format for technical proposal, writing technical proposals

Unit 4. Seminar   (10Hrs)

4.1 Purpose of Organizing Seminar

4.2 Writing a Seminar Paper

4.3 Elements of Seminar Paper : Title, Author's Name   Abstract or Executive Summary, Introduction, Objectives, Literature Review, Methodology, Results and discussions, Conclusion and recommendations, Acknowledgements, References (Bibliography), Appendices: Tables, Figures

4.4 Sample of Seminar Paper

4.5 Conducting a Seminar: Pre-Seminar Activities , Seminar Activities : Beginning the Seminar Ending the Seminar

Unit: 5.Elements of Structure and Varieties in English Language (6 Hrs)

5.1 Varieties in English Language *(Regional varieties: British/American, Formal/Informal, Polite/ Familiar, Written/ Spoken)*

5.2 Preposition; subject- verb agreement; voice; reported speech and conditional sentences

Practical

1. Practising English Pronunciation in the laboratory

2. Locating the stress in words and also to point out the features distinguishing American English and British English pronunciation.

3. Listening to the text played in the audio or visual and answer the given comprehension questions after it.

4. Critically analyzing the recorded speech played on audio or visual and finding the theme.

5. Practicing writing CV of each student.

6. Participating in a meeting and preparing the minutes of the meeting (Listening to English speakers and their speech).

7. Analyzing scientific paper of indexed journals

8. Writing Technical Proposals.

9. Getting students to involve in group discussion, debate and public speaking

10. Conducting a Demo Seminar.

EVALUATION SCHEME

Internal Assessment: 40 marks
Final examination: 60 marks
Pass Marks for each: 40%

Units	Loads	Marks	Total	No. of questions
1	6	2+2+4	8	3
2	8	3+3+8	14	3
3	10	5+5+8	18	3
4	15	4+8	12	2
5	6	4+4	8	2
	45		60	13

REFERENCES:

1. Adhikari , U; Yadav , R; Shrestha , R. N. **Technical Communication in English**, Research Ttraining Unit, Department of Science and Humanities, Institute of Engineering, Pulchowk Campus 2002.

2. Anne Eisenberg, **Effective Technical Communication**, Mc. Graw- Hill, 1982.

3. K.W Houp and T.E Pearsall, **Reporting Technical Information**, 5th Edition Macmillian Publishing Company, New York, 1984.

4. Leech, G, Savartivk, J. , **A Communicative Grammar of English**, ELBS 1975

5. **Oxford Advanced Learner's Dictionary of Current English**, New Edition, Oxford University Press.

6. Koirala, B.P.**'A Tale'**.

7. Achebe, C. **'Marriage is A Private Affair'**.

8. Russell, B. **'Keeping Errors at Bay'**.

9. Malla , K.P. **'The Lure of English'**

10. Ruskin, J. **' Seven Lamps of Architecture'**

English for Technical Communication

Teaching Schedule : Hours/ Week				Examination Scheme				
Cr	Theory	Tutorial	Practical	Internal Assessment		Final		Total Marks
				Theory	Practical	Theory	Practical	
3	3	2	2	40	10	60	15	125

Specification Chart

Unit	No. of Questions	Types of Questions	Nature of Questions	Marks	Remarks
1. A. B.	1 1	Very Short Short	Sound identification or Description of Sound Descriptive Question	4 (0.5 x 8 = 4) 4	A. One very short question with eight problems carrying 0.5 Marks should be asked. B. One short question of descriptive type carrying 4 marks should be asked.
2.	Sub. Unit (2.1; 2.2;2.4) Sub Unit : 2.3 (Reading Texts)	Short Long	Summary, notes, Precis, Creative/ Critical Answer, Opinions	6 8	• Two short questions related to writing summary, note or précis carrying 6 marks should be asked from sub-units 2.1;2.2;2.4 respectively. • One Long question carrying 8 marks on writing creative and critical answer should be asked.
3.	3	2 Short 1 Long	Writing Technical Documents	5+5 8	• Two short questions carrying 5 marks each should be asked on writing either short notes or the technical documents related to writing notice, minutes, agenda, resume, letters, operation/user manual and fundamentals of effective writing should be asked. • One long question carrying 8 marks should be asked for writing report, proposal.
4.	2	1 Short 1 Long	Descriptive Academic/ Technical	4 8	• One short question for writing descriptive answer carrying 4 marks should be asked

					• One long question of 8 marks for writing seminar paper should be asked.
5.	2	Very short	Grammar	4+4	• One very short question with 8 problems carrying 1 mark should be asked from grammar. • One very short question with 4 problems carrying 4 marks related to transformation of varieties of language should be asked.

Purbanchal University

Subject: English for Technical Communication Code:BSH 1002

BE Computer/ Electrical/Electronics Communication & Automation/Geomatic/ Final
Semester: First

F.M.: 60   P.M. :   24   Time: 3 hrs

Attempt ALL Questiuons

1. a. Locate the primary stress in the following words: [2]

    Table, develop, beautiful, intonation

    b. Write one word having each of the following in the initial position: [2]

    /k/, /s/, /i:/, /U/

2. Write a manuscript of public speech on ' Relevance of Democracy to the Development of
    Nepal"   [4]

                    OR

    What are the fundamentals of effective speaking? Briefly discuss at least two of them with
    illustrations.

3. a. Read the following text and take down 4-point notes: [3]

    b. Also, write a precis of the given text: [3]

The engineering profession engages in a wide range of activities, from large collaboration at the
societal level, and also smaller individual projects. Almost all engineering projects are obligated to
some sort of financing agency: a company, a set of investors, or a government. The few types of
engineering that are minimally constrained by such issues are *pro bono* engineering and open-
design engineering.

By its very nature engineering has interconnections with society, culture and human behavior. Every
product or construction used by modern society is influenced by engineering. The results of
engineering activity influence changes to the environment, society and economies, and its application
brings with it a responsibility and public safety.

Engineering projects can be subject to controversy. Examples from different engineering disciplines
include the development of nuclear weapons, the Three Gorges Dams, the design and use of sport
utility vehicles and the extraction of oil. In response, some western engineering companies have
enacted serious corporate and social responsibility policies.

Engineering is a key driver of innovation and human development. Sub-Saharan Africa, in particular,
has a very small engineering capacity which results in many African nations being unable to develop
crucial infrastructure without outside aid. The attainment of many of the Milleniul Development Goals
requires the achievement of sufficient engineering capacity to develop infrastructure and sustainable
technological development.

4. Apply four levels on ' A Tale" by B. P. Koirala OR 'Marriage is a Private Affair' by Chinua Achebe. [8]

5. a. You are a responsible citizen of Kathmandu Metropolitan city. The city still has a problem related to garbage. Now, write a letter to complain about the present status of waste management to the mayor of the city to take necessary action against garbage mismanagement. [5]

b. Supposing that you are the secretary of Lions Club of Biratnagar. Now prepare a minute of the last meeting. [5]

6. Prepare a technical report of Sano Khola Micro Hydro Project. [8]

OR

ABC construction company, Bharatpur, Chitwan, is looking for a few Civil Engineers. The vacancy announcement has been published in 'the Kantipur National Daily' on 4th July 2022. The interested candidates may apply by 15th July, 2022 along with the recent C.V. [8]

7. a. What do you mean by Seminar? List out the pre-seminar activities. [4]

b. Write the seminar paper to be presented on the occasion of Annual Anniversary of your college in the auditorium hall next week. [8]

8. a, Change the following as indicated in the brackets: [4]

i. I attended a remarkable program. (BrE)

ii. The price of petrol is likely to be higher in coming days. (AmE)

iii. Excuse me! May I know the way to Bhaktapur?(familiar)

iv. Show me your note book. (Polite)

b. Change the following sentences as directed in the brackets: [4]

i. He said to her, " Where are you going now?" (indirect speech)

ii. There is no thing to do. (passive voice)

iii. If I were a bird, I--------(fly). (supply correct form of the verb)

iv.We have been living here -------------(since/from/for/to) twenty years. (choose correct preposition)

PURBANCHAL UNIVERSITY
Faculty of Engineering
Micro Syllabus (New Course)

Subject: Physics . **Code: BSH 1004** **Semester I**
BE Computer/Electrical/Electronics Communication & Automation/Geomatic

Teaching Schedule Hours/Week				Examination Scheme				
Cr	Theory	Tutorial	Practical	Internal Assessment		Final		Total Marks
				Theory	Practical	Theory	Practical	
4	4	2	2	40	10	60	15	125

S. N.	Topics	Lecture hours	Sub topics		Depth
1	Mechanical oscillation	5 hrs	1.1	Physical Pendulum: Interchangeability of point of suspension and oscillation, minimum and maximum time period, Torsion pendulum	Definition, derivation, Proof, explanation, example,
			1.2	Free oscillation	Definition, explanation, example
			1.3	Damped oscillations: angular frequency, critical damping, overdamping, and under damping	Definition, explanation, example
			1.4	Forced oscillation: Damped oscillation with a periodic driving force, Resonance, and its consequences	Definition, explanation, example
2	Ultrasonics	3 hrs	2.1	Introduction; Production of ultrasonics: Mechanical method (introduction only); Piezoelectric generator; Magnetostriction oscillator	Definition, explanation, example
			2.2	Detection of ultrasonic; Applications of ultrasonics	explanation, example
			2.3	Acoustic grating: Determination of velocity of sound in a liquid	Definition, explanation, example
3	Relativity	5 hrs	3.1	Frame of reference; Inertial and non-inertial frames of references	Definition, explanation, example
			3.2	Postulates of the special theory of	explanation

				relativity
			3.3 Lorentz transformation equations; Length contraction; Time dilation. Twin paradox	Definition, derivation, Proof, explanation, example,
			3.4 Simultaneity; Relativistic mass; Mass and energy	Definition, derivation, Proof, explanation, example,
			3.5 Space-time diagram.	explanation
4	**Optics**	**Geometrical optics 3 hrs**	4.1.1 Sign Convention (Cartesian coordinate system), Equivalent focal length of two thin lenses separated by a finite distance; Cardinal points of an optical system.	Definition, derivation, Proof, explanation, example,
			4.1.2 Chromatic aberration in a lens (longitudinal chromatic aberration), Condition for achromatism of two thin lenses in contact and separated by a finite distance	Definition, derivation, Proof, explanation, example,
		Fiber optics 3 hrs	4.2.1 Introduction; Step index optical fiber, Graded index optical fiber.	Definition, explanation, example,
			4.2.2 Self-focusing; Acceptance angle; Numerical aperture.	derivation, explanation, example,
			4.2.3 Application of optical fiber.	explanation, example,
	10 hrs	**Interference**	**Interference:** Young's double-slit experiment; Analytical treatment of interference; Fresnel's Biprism; Interference in thin-film: reflected and transmitted light; Wedge shape thin film: determination of fringe width; Newton's rings: reflected and transmitted light; determination of the wavelength of light and refractive index of the liquid.	Definition, derivation, Proof, explanation, example,
		Diffraction	**Introduction:** Fresnel and Fraunhofer diffraction; Faunhofer's diffraction at a single slit; Intensity in single diffraction pattern (qualitative); Fraunhofer diffraction at double slit; Diffraction grating; Holography and Interference pattern	Definition, explanation, example
		Polarization	Malus Law, Double refraction; Nicol	Definition,

				prism Quarter wave plate; Half-wave plate; Optical activity; Specific rotation	explanation, example
5	Electrostatics	7 hrs	5.1	Electric field intensity, Electric dipole and dipole moment, Electric field intensity due to a dipole (at an axial and equatorial line), Electric quadrupole and quadrupole moment, Electric field intensity due to quadrupole (at an axial line)	Definition, derivation, Proof, explanation, example,
			5.2	Electric potential, Electric potential due to a dipole, Electric potential due to quadrupole (at an axial line)	Definition, derivation, Proof, explanation, example,
			5.3	Electric flux, Gauss's law (statement only), Application of Gauss's law: Spherical charge distribution (non-conducting and conducting)	Definition, Derivation explanation, example,
			5.4	Ink-jet printing; Volcanic lightning	Definition, explanation,
			5.5	Capacitor and capacitance, Parallel plate capacitor and Cylindrical capacitor, Supercapacitor (introduction only), Energy stored in electric field and energy density	Definition, explanation, example,
			5.6	Polar and non-polar dielectrics, Polarization, Gauss's law, and dielectrics (Relation between **E, D,** and **P**)	Definition, explanation, example,
6	Direct current	3 hrs	6.1	Electric Current; Current Density, Drift Speed	Definition, explanation, example,
			6.2	Effect of Temperature on Resistance and Resistivity; Microscopic view of Ohm's Law.	Definition, explanation, example,
			6.3	Superconductivity, Critical Magnetic field, ,The Meissner Effect, Types of Super conductors	Definition, explanation, example,
7.	Magnetism and Magnetic field	8 hrs	7.1	Magnetic properties of matter; Domain theory; Ferromagnetism; Saturation and hysteresis	Definition, explanation, example,
			7.2	Lorentz force; Cyclotron; Cyclotron frequency; Synchrotron; Hall effect	Definition, derivation, Proof, explanation, example,
			7.3	Current carrying coil as a magnetic	Definition,

				dipole; Magnetic field produced by a magnetic dipole	derivation, Proof, explanation, example,
			7.4	Faraday's law of electromagnetic induction; Lenz's law; Electric guitars	Definition, explanation, example,
			7.5	Self-induction; Inductance of a Solenoid; Metal detector	Definition, explanation, example,
			7.6	Eddy currents; Induction stoves	Definition, explanation, example,
			7.7	LR circuit, Energy stored in magnetic field; Energy density of magnetic field.	Definition, derivation, Proof, explanation, example,
			7.8	Induced Magnetic Field; Displacement Current	Definition, explanation, example,
8	Electromagnetic waves	5 hrs	8.1	Gauss divergence theorem and Stoke's theorem (statement only).	Definition, explanation, example,
			8.2	Maxwell's equation (integral to differential form); Equation of continuity.	Definition, derivation, explanation, example,
			8.3	Wave equation in free space and medium.	Definition, derivation, explanation, example,
			8.4	Speed of electromagnetic wave; Ratio of electric field and magnetic field.	Definition, explanation, example,
			8.5	Poynting vector	Definition, explanation, example,
9	Quantum Mechanics	5 hrs	9.1	Newtonian mechanics and Quantum mechanics	explanation, example,
			9.2	Matter wave: de-Broglie wave equation; Uncertainty Principle (qualitative); Phase velocity and group velocity: relation between phase velocity and group velocity	Definition, explanation, example,
			9.3	Wave function; Physical	Definition,

				interpretation of the wave function	explanation, example,
			9.4	Schrodinger wave equation (time-independent and time-dependent)	Definition, derivation, explanation, example,
			9.5	Applications of Schrodinger wave equation: Particle in one dimensional infinite potential well; Normalization and probability density; Potential barriers and Tunneling effect (transmission coefficient qualitative); Application of Tunneling	Definition, derivation, explanation, example,
10	Non-Destructive Testing	3 hrs	10.1	Introduction; Methods of non-destructive testing: Magnetic method; Electrical method; Radiographic method; Ultrasonic method; Thermal method	Definition, explanation, example,
			10.2	Comparisons of γ-ray radiography and X-ray radiography; Thermography	Definition, explanation, example,

Reference Books:

1. Halliday, Resnick, and Walker-**Fundamentals of Physics, 6th Edition**, John Wiley & Sons
2. Vasudeva A.S.-**Modern Engineering Physics**, S. Chand & Company Ltd, New Delhi
3. Subrahmanyam and Brij Lal-**A Text Book of Optics**, S. Chand & Company Ltd, New Delhi
4. B.K. Sapkota, B. Pokharel and B. K. Bhattarai, **Fundamentals of Engineering Physics**, Benchmark Publication, Kathmandu.
5. Sears and Zemansky's-**University Physics with Modern Physics, 12th Edition**, Pearson Education.
6. C. L. Arora-**BSc Practical Physics**, S. Chand & Company Ltd.
7. B. K. Sapkota and B. Pokharel, **Engineering Practical Physics**, Benchmark Publication, Kathmandu.

S. N.	Topics	Time allocation	Marks	Types of questions		
				Very short	Short	Long
1	Mechanical oscillation/relativity	10 hrs	14	1	1	1
2	Ultrasonics	3 hrs	4		1	
3	Geometrical Optics/Physical Optics	13 hrs	18	1	1 or 1	1
4	Fiber optics	3 hrs	4		1	
5	Electrostatics/ Direct current	10 hrs	14	1	1	1
6	Magnetism and Magnetic field/	13 hrs	14	1	1	1

	Electromagnetic waves					
7	Quantum Mechanics	5 hrs	6	1	1	
8	Non-Destructive Testing	3 hrs	4		1	
	Total	**60 hrs**	**60/78**	**4/5**	**7/9**	**3/4**

There will be 4 questions in very short type, carrying 2 marks each. There must be at least 2 theoretical questions and 2 compulsory numerical.

There will be 7 questions in **short** type, carrying 4 marks each. There must be at least 2 theoretical questions and 5 compulsory numerical.

There will be 3 questions in **long** type carrying 8 marks each. There may be some breakdown in this type of question. All questions can be of derivation/analysis/explanatory type.

Recommendation: The credit hours allocated seems to be 3 which is insufficient with the depth of the course. Therefore, this workshop recommends the university **to allocate 4 credit hours** for the prescribed curriculum so that the objective mentioned will be fulfilled.

Purbanchal University
Model Question - I

Time: 03 hrs.

BSH 1004: Physics   Semester: I

BE Computer/Electrical/ Electroncs Communication & Automation/ Geomatic/ Final

Full Marks: 60

Pass Marks: 24

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks

Answer ALL questions.

Group A   (4 2 = 8)

1. Is it possible to have damped oscillation when a system is at resonance? Explain. **(2)**

2. If the plane of polarization of a given solution is turned through 6.6°, calculate the specific rotation of the sample. The length of 20% solution is 10 cm. **(2)**

3. In parallel plate capacitor the capacitance increase from 4 μF to 80 μF on introduction dielectric medium between the plates. What is the dielectric constant of the medium? **(2)**

4. Discuss in brief the similarities between the energy stored in the electric field of a charged capacitor and energy stored in the magnetic field of a current -carrying coil. **(2)**

Or

If matter has a wave nature, why is this wave-like characteristic not observable in our daily experiences?   **(2)**

Group B   (7×4=28)

5. Discuss the principal of producing ultrasonics by Piezo-electric method. **(4)**

6. Define accepatance angle. Show that accepatance angle , where and are the refractive index of the core and cladding. **(1+3)**

Or

How X-ray radiography differ from γ-ray radiography. Illustrate your answer with important of each technique. **(4)**

7. A thin converging lens and a thin diverging lens are placed co-axially at a distance 5 cm. If the focal length of each lens is 10 cm, find for the combination (i) focal length (ii) power (iii) positions of the principal points. **(1+1+2)**

Or

Calculate the first and second-order angles for the light of wavelength 400 nm, if the grating contains 10,000 lines/cm.

8. A certain process requires 10^{-6} sec to occur in an atom at rest in the laboratory. How much time will this process require to an observer in the laboratory when the atom is moving with a speed of 5×10^7 m/s. **(4)**

9. What is the drift speed of the conduction electrons in a copper wire with radius when it has a uniform current ?Assume that each copper atom contributes one conduction electron to the current and the current density is uniform across the wire's cress section. **(4)**

10. A radio station on the surface of the earth radiates a sinusoidal waves with an average total power of 50 Kw. Assuming that the transmitter equally in all directions above the ground(which is unlikely in real situations), find the amplitudes and detected by a satellite at a distance 100 km from the antenna. **(4)**

11. A beam of electrons having the energy of each 3 eV is incident on a potential barrier of height 4 eV. If the width of the barrier is 20 Å. Calculate the percentage transmission of the beam through the barrier. **(4)**

Group C   (8 3 = 24)

12. Point out the similarities and dissimilarities between the oscillations of the physical pendulum and torsional pendulum. Derive an expression for the time period and modulus of the rigidity of the suspension wire incase of the torsional pendulum. **(2+3+3)**

13. Give the theory of wedge shaped thin film for determining the fringe width. **(8)**

14. What is a quadrupole moment? Is it vector quantity? Derive an expression for electric field intensity due to quadrupole at a point on the axial line. Draw the graphical representation of electric field intensity E with axial distance r from mid-point. **(1+1+5+1)**

Or

What is Hall effect? Derive an expression for the Hall coefficient and establish a relation between the mobility of the charge carrier and the conductivity of the metallic conductor. Elaborate on quantized Hall Effect. **(1+5+2)**

Purbanchal University
Model Question - II

Time: 03 hrs.

BSH 1004: Physics   Semester: I

BE Computer/Electrical/ Electroncs Communication & Automation/ Geomatic/ Final

Full Marks: 60
Pass Marks: 24

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks
Answer ALL questions.

Group A   (4 × 2 = 8)

1. Is there any real difference between a polarizer and an analyzer? In other words, can a polarizer be used as an analyzer, and vice versa?   **(2)**

2. Why does a dipole produce an electric field at all? After all, the dipole has no net charge. **(2)**

OR

List some similarities and difference between inductors and capacitors. **(2)**

3. Calculate the thickness of a quarter-wave plate. (Given that, μ_e = 1.5334, μ_o = 1.544 and = λ = 5000 Å)

4. What is the de Broglie wavelength of a 15 kV proton of mass 1.67 × 10^{-27} kg?

Group B   (7×4=28)

5. The amplitude of a lightly damped oscillator decreases by 3.0 % during each cycle. What fraction of the mechanical energy of the oscillator is lost in each full oscillation.   **(4)**

6. Discuss in brief various methods for detecting ultrasonic. **(4)**

OR

What are γ-ray radiography and X-ray radiography? Explain.   **(2+2)**

7. A glass-cladding fiber is made with the core glass of a refractive index of 1.5 and the cladding is doped to give a fractional index change of 0.0005. Calculate: (a) the R.I. of the cladding (b) the acceptance angle, and (c) the numerical aperture.   **(1.5+1.5+1)**

8. Two thin lenses (same material) of focal length f_1 and f_2 separated by a certain distance d have an equivalent focal length of 50 cm. The combination satisfies the condition for no chromatic aberration and minimum spherical aberration. Find the values of f_1, f_2, and d.   **(1.5+1.5+1)**

OR

A plane transmission grating having 600 lines/cm is used to obtain a spectrum of light from a sodium lamp in the second order. Calculate the angular separation between the two sodium lines whose wavelengths are 5890 Å and 5896 Å.   **(4)**

9. A conductor of uniform radius 1.2 cm carries a current of 3 A due to the potential gradient of 120 V/m. What are the value of current density and specific resistance of the materials? **(2+2)**

10. A copper strip 150 m thick is placed in a magnetic field of strength 0.65 T perpendicular to the plane of the strip and a current of 23 A is set up in the strip. Calculate: (a) the Hall voltage, (b) the Hall coefficient, and (c) Hall mobility. (Given, number of electrons per unit volume = 8.5× 10^{28} m^{-3} and resistivity = 1.72 × 10^{-8} ohm-m)   **(1.5+1.5+1)**

11. What is the significance of t h e wave function? Derive the time-independent Schrodinger wave.   **(1+3)**

Group C (3 × 8 = 24)

12. (a) Write down the basic postulates of the special theory of relativity. **(4)**

    (b) Derive the Lorentz space-time transformation formulae. Also, discuss time dilation and length contraction. **(4)**

13. For interference in thin film show that the film which appears bright in reflected light appear dark in transmitted light. **(4+4)**

14. A current carrying coil behaves as magnetic dipole. What magnetic field does the magnetic diploe produce at a point in the surrounding space. **(8)**

OR

Write Maxwell's equations in integral form and convert them into differential form. **(2+6)**

♦ ♦ ♦

Purbanchal University
Model Question - III

Time: 03 hrs.

BSH 1004: Physics **Semester: I**

BE Computer/Electrical/ Electroncs Communication & Automation/ Geomatic/ Final

Full Marks: 60

Pass **Marks:** 24

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks

Answer ALL questions.

Group A   (4 2 = 8)

1. Why is critical damping desirable in a car's suspension system?   **(2)**

2. Suppose that the electric field of an electromagnetic wave decreases in magnitude. Does the magnetic field increase, decrease or remains the same? Account for your answer.   **(2)**

OR

A capacitor is said to carry a charge Q. What's the net charge on the entire capacitor?

(1+1)

3. To make a quarter-wave plate of calcite for the light of wavelength 589 nm, how thick it should be? (Given, $\mu_0 = 1.658$; $\mu_e = 1.486$)   **(2)**

4. A beam of aluminum atoms is used to dope a semiconductor chip to set its electrical properties. If atom's velocity is known to within 0.2 m/s, how accurately can they be positioned?   **(2)**

Group B   (7 4 = 28)

5. A rod 1 m long is moving along its length with a velocity of 0.6 c. Calculate its length as it appears to an observer.   **(1.5+1.5+1)**

    (a) On the earth

    (b) Moving with the rod itself

    (c) Calculate the percentage of contraction.

6. In a proton accelerator used in elementary particle physics experiments, the trajectories of protons are controlled by bendings magnets that produce a magnetic field of 6.6 T. What is the energy density in this field in the vacuum between the poles of such magnet?   **(4)**

7. Two thin lenses having the power 5 D and 4 D are placed at a distance of 10 cm apart. Calculate the power of the equivalent lens of these two lenses.   **(4)**

OR

How many orders will be visible if the wavelength of the incident radiation is 5000 Å and the number of the lines on the grating is 2620 in one inch?   **(4)**

8. Assume that an electron is moving along an x axis and that you measure its speed to be , which can be known with a precision of . What is the minimum uncertainty with which you can simultaneously measure the position of the electron along the x axis? **(4)**

9. An observer is 1.8 m from an isotropic point light source whose power is 250 W. Calculate the rms values of the electric and magnetic fields due to the source at the position of the observer.

    (2+2)

10. What is acoustic grating? Explain how an acoustic grating is used to determine the velocity of ultrasonic waves in liquids. **(1+3)**

11. What is the importance of non-destructive tests? How X-ray radiography differs from γ-ray radiography? **(2+2)**

OR

Explain the mechanism of light propagation in optical fiber. Discuss in brief different types of optical fibers. **(2+2)**

Group C (8+3 = 24)

12. What is free oscillation? Derive an expression for the time period of a physical pendulum. Show that point of oscillation and the point of suspension are interchangeable. **(1+4+3)**

OR

Discuss the necessary theory in determining the wavelength of light using Fresnel Biprism. **(8)**

13. State Gauss's law and use it to find an electric field at a point inside and outside the uniformly charged insulating sphere. **(4+4)**

14. Discuss in brief the principle operation of the cyclotron. Derive an expression for the maximum kinetic energy achieved by a particle and mass m in terms of the applied magnetic field and the radius. **(3+5)**

PURBANCHAL UNIVERSITY

Course Title: Computer Programming
Course Code: BCE 1001
Credit hours: 3

Full Marks: 60

Pass Marks: 24

Teaching Schedule Hours/Week			Examination Scheme				
Theory	**Tutorial**	**Practical**	**Internal**		**Final**		**Total**
3	1	3	**Theory**	**Practical**	**Theory**	**Practical**	150
			40	30	60	20	

Duration: 3 hours

Course Objective: To study the foundation of computer programming.

Goals: This course provides a thorough understanding of the fundamentals of C programming to a student so that he/she will be able to code, compile and test C programs as well as to take up Systems programming or Advanced C programming course.

Micro Syllabus

Chapter	Course content-breakdown	Lecture Hours	Remarks

1	**Problem Solving Using Computer**
	1.1 Problem Analysis
	  • *Introduction to the problem with real example*
	  • *Problem analysis with practical example*
	
	1.2 Algorithm development & Flowcharting
	  • *Algorithm*
	  ➢ *Definition with rules and guidelines and also include examples*
	  • *Flowchart*
	  ➢ *Definition with standard symbols, rules and guidelines and also include examples*
		2 hrs.	

		1.3 Coding		
		• *Basic concept of coding with the proper indentation and uses*		
		1.4 Compilation & Execution		
		1.5 Debugging & Testing		
		• *Define the concept of bugs or errors*		
		• *Types of errors*		
		• *Debugging process*		
		• *Testing with types (White box and Black box)*		
		1.6 Program Documentation		
		• *Basic introduction*		
2		**Introduction to C** 2.1 Historical development of C 2.1 Importance of C 2.3 Basic Structure of C programs 2.4 Executing a C program	2 hrs.	

3		**C Fundamentals**
		3.1 Character set (letters, digits, special characters, white space, etc.)
		3.2 Identifiers & Keywords
		3.3 Data types and modifiers
		   • *Basic, derived and user-defined*
		   • *Type conversion (implicit & explicit)*
		3.4 Constants and variables
		   • *Use of constants (using const keyword)*
		   • *Rules for variable naming*
		3.5 Declarations and initialization of variables
		3.6 Expression, statement and delimiter
		3.7 Escape sequences
		3.8 Preprocessor directives
		3.9 typedef statement
		3.10 Symbolic Constants (#define)
			3 hrs.	

4		**Operators & Expression** 4.1 Operators:	3 hrs.	

		4.1.1 Arithmetic, relational, logical, bitwise, assignment, increment and decrement (prefix & postfix), sizeof(), conditional operator/ ternary operator, comma operator, *address/reference operator (&) and pointer operator (*)* 4.2 Precedence, associativity and order of execution		
5		**Input and Output** 5.1 Types of I/O 5.2 Format Specifier (%d,%ld, %c, %s, %f, %lf,%Lf, etc.) 5.3 Reading & Writing data 5.4 Formatted I/O (scanf(), printf())and Unformatted I/O statements (getchar(), putchar(), gets(), puts(), getch(), putch(), getche())	2 hrs.	
6		**Control Statements** 6.1 Loop/Repetitive control statements: for, while, do-while 6.2Selection/ Conditional control statements: if, if...else, nested if, else if ladder 6.3 Multiple branching control statement: switch...case 6.4 Unconditional control statements: break, continue, goto 6.5 exit() function	6 hrs.	
7		**Functions** 7.1 Introduction and advantages of using functions 7.2 User defined and library functions 7.3 Function prototypes, definition and return statements 7.4 Call by value & Call by reference 7.5 Concept of local, global and static variable 7.6 Recursive function	6 hrs.	

	7.7 Storage classes and visibility, automatic or local variables, global variables, static variables, external variables		
8	**Arrays and Strings** 8.1 Introduction 8.2 Single and Multi-dimension arrays (declaration, initialization) 8.3 Processing an array 8.4 Passing arrays to Functions 8.5 Arrays of Strings 8.6 String Handling Function *(strlen, strcpy, strcat, strcmp, strrev, etc.)*	6 hrs.	
9	**Pointers** 9.1 Fundamentals 9.2 Pointer Declarations and initialization 9.3 Null and wild pointer 9.4 Pointer to a pointer 9.5 Accessing value through a pointer 9.6 Similarities between Pointers and one dimensional arrays 9.7 Pointer with one dimensional and two dimensional arrays 9.8 Passing Pointers to Functions 9.9 Dynamic Memory Allocation *(calloc(), malloc(), realloc(), free())*	5 hrs.	
10	**Structures and Unions** 10.1 Defining a Structure, Arrays of Structures, Structures within Structures 10.2 Processing a Structure 10.3 Structures & Pointers 10.4 Passing Structures to Functions 10.5 Union & its importance	5 hrs.	
11	**Data Files** 11.1 Concept of file with Opening *(fopen())* & Closing *(fclose())* a Data File • File modes (read, write, append)	3 hrs.	

	11.2 Creating a Data File (Binary and text files) • *fread(), fwrite(), fprintf(), fscanf(), fgets(), fputs()* • *Random access file (ftell(), fseek(), rewind())* 11.3 Error Handling during I/O Operations (feof(), ferror()) 11.4 Processing a Data File *(Insert, update and delete of data to/from the file)*			

12	**Graphics**
	     12.1 Concept of graphics and Initialization
	     12.2 Graphical mode
	     12.3 Simple programs using built in graphical function *(line(), arc(), circle(), ellipse(), getmaxx(), getmaxy(), etc.)*
		2 hrs.		

Assignments:

Assignment should be given for each chapter.

Laboratory Work:

There shall be lab exercises covering concepts mentioned in syllabus of Computer programming.

Text Books:

1. Kelly & Pohl, " A Book on C ", Benjamin/Cummings
2. Brian W. Keringhan & Dennis M. Ritchie, " The „C" Programming Language",PHI
3. Brtons G. Gotterfried, "Programming with „C"", Tata McGraw-Hill
4. Stephen G. Gotterfried, "Programming in C", CBS Publishers & Distributors
5. E. Balguruswamy, "Programming in C", Tata McGraw-Hill
6. Yashvant Kanetkar, "Let us C", BPB Publications

Marks distribution for Computer-Programming:

Chapters	Hrs.	Marks Distribution
Chapter 1	2	4
Chapter 2	2	2
Chapter 3	3	4
Chapter 4	3	4
Chapter 5	2	4
Chapter 6	6	8
Chapter 7	6	8
Chapter 8	6	8
Chapter 9	5	6
Chapter 10	5	6
Chapter 11	3	4
Chapter 12	2	2
Total	45	60

Model Question
PURBANCHAL UNIVERSITY

BE Biomedical/Computer/Electrical/Electronics Communication & Automation/ Final

Time: 3:00 hrs.   Full Marks: 60/Pass Marks: 24

BCE 1001: Computer Programming

GROUP-A   4x2=8

1. Write the feature of C programming language.
2. Define variables and keywords of C.
3. What is DMA?
4. Write the output of following program:

```
#include<stdio.h>
#include<conio.h>
void main()
        (
        int a=5, b,c;
        b= ++a + a++;
        printf("a=%d and b=%d", a,b);
        getch();
        }
```

GROUP-B   7X4=28

5. What is an operator? List of operator and explain any two of them with appropriate example.
6. Write a program to convert US dollar currency into Nepalese currency vice-versa using function.

   OR,

   Write a program to draw line and circle in C programming.
7. What is function? Differentiate between Library function and User defined function.
8. What is difference between while and do while loop? Give suitable example.
9. Write a program to compute the product of nth terms of the following series
   1*2*3*4*5* ....*nth
10. What is structure and union? Write difference between structure and union in c programming.

11. What is recursive function? Explain with any desire example.

   OR,

   Write a program to solve following equation:

   $KP = 1/2(mv^2) + mgh$ [Where KP is Kinetic and Potential energy]

GROUP-C   3X8=24

12. a) What is pointer? Declare and access of pointer variable name ptr. Write function of pointer.
    b) Write a program in C to perform arithmetic (addition, subtraction, multiplication and division) operation by using pointer.

13. Write a program to create a structure name called STUDENT, add member as Rollno, Name, and Age of the student and store student information to file specified by user using structure and binary file.

14. Discuss basic concept of array. Write a program to accept n numbers of marks and display

Purbanchal University

Subject: Fundamental of Computing Technology   Subject Code: BCE 1002
Program: BE Computer/Electrical/ Final

Year: I   **Semester: I**

Teaching Schedule Hours/week				Examination Scheme				
Credits Hours	Theory	Tutorial	Practical	Internal Assessment		Final		Total Marks
				Theory	Practical	Theory	Practical	125
3	3	1	2	40	15	60	10	

Course Objective: To provide the basic concept of computer system and application

Unit	Course content-breakdown	Lecture Hours	Remarks

1	**Introduction to computer**
	• Introduction
	   o Definition
	   o Background
	   o Characteristics of computer
	   o Basic block diagram of computer system
	• Evolution of Computer
	   o History of computer
	• Von Neumann architecture
	   o Basic block diagram
	• Generation of computer
	   o Characteristics
	      ▪ Electronic circuit
	      ▪ Memory
	      ▪ Speed
	      ▪ Programming language
	      ▪ I/O device
	      ▪ Example
	• Classification of computer
	   o On the basis of working principle
	   o On the basis of size
	   o On the basis of purpose
	• Application of computer
	• Capabilities and Limitation of computer
		5 hrs.	

2	**Basic Computer Organization** • Role of Input/ Output device	6 hrs.	

- Input Unit:
  - *Definition of input device*
  - Types of input device
    - Keyboard:
      - *Definition, Working Principle and Types (Basic and Extended)*
    - Pointing Devices:
      - *Definition, Examples and Working Principles, Types (Optical and Mechanical)*
    - Scanner:
      - *Definition*
      - *Working Principles*
      - Types (Flat-bed, Sheet-fed, Handheld, Photo)
    - Digitizer:
      - *Definition*
      - *Working Principle*
      - *Types*
    - Voice Recognition System:
      - *Definition*
      - *Working principles*
    - Vision Input:
      - *Definition*
      - *Working principle*
    - Touch Screen:
      - *Definition and characteristics*
- Output unit
  - *Definition*
  - *Types*
    - Monitor:
      - *Definition*
      - Types (LCD, LED, CRT)
        - *Working principle*
    - Printer:
      - *Definition*
      - *Types*
        - Impact printer
          - *Daisy wheel and dot matrix (definition and characteristics)*
        - Non-impact printer:
          - *Ink-jet, Thermal, laser (definition and characteristics)*

3	**Storage Fundamentals**
	• *Definition of Storage/Memory*
	• *Types of Storage: Primary and Secondary (Comparison Chart)*
	• Data Storage and Retrieval Method
	   ○ *Data Storage Method*
	     ▪ *File storage*
	     ▪ *Block storage*
	     ▪ *Object storage*
	   ○ *Data Retrieval Method*
	     ▪ *Without Indexing*
	     ▪ *With Indexing*
	Primary Storage:
	• RAM
	   ○ *Definition*
	   ○ *Types (SRAM, DRAM)*
	   ○ *Characteristics*
	• ROM
	   ○ *Definition*
	   ○ *Types (PROM, EPROM, EEPROM)*
	   ○ *Characteristics*
	Secondary Storage:
	• Magnetic Tapes
	   ○ *Definition*
	   ○ *Characteristics*
	• Magnetic Disks
	   ○ Types
	     ▪ Floppy Disk
	     ▪ Hard Disk
	       • *Definition,*
	       • *Working Principle*
	       • *Characteristics*
	     ▪ Optical Disk
	       • *Definition*
	       • *Characteristics*
	       • *CD: CD-R and CD-RW*
	       • *DVD: DVD-R and DVD-RW*
	     ▪ Cartridge tape
	     ▪ Zip Drive:
	       • *Definition*
	       • *Characteristics*
	     ▪ Flash Drive
	       • *Definition*
	       • *Characteristics*
		7 hrs.	

4	**Software**	7 hrs.	

	• *Definition of software*
	 • *Application of Software:*
	    ○ *Scope*
	    ○ *Area*
	 • Language (Advantages and Disadvantages)
	    ○ Machine Language
	    ○ Assembly Language
	    ○ High Level Language
	 • Types of Software:
	    ○ System Software
	       ▪ Operating Software
	       ▪ Utilities Software
	    ○ Application Software
	       ▪ *Packaged Software*
	       ▪ *Tailored Software*
	    Application software Specialization:
	       ▪ Word Processing
	       ▪ Spreadsheets
	       ▪ Presentation
	       ▪ Graphics
	       ▪ DBMS		

5	**Operating System**
	 • *Definition of operating system*
	 • Function of operating system
	 • Types of Operating System
	    ○ Batch
	       ▪ *Definition*
	       ▪ *Basic Diagram*
	       ▪ *Advantage and disadvantage*
	    ○ Multiprogramming
	       ▪ *Definition*
	       ▪ *Basic Diagram*
	       ▪ *Advantage and disadvantage*
	    ○ Multi-tasking
	       ▪ *Definition*
	       ▪ *Basic Diagram*
	       ▪ *Advantage and disadvantage*
	    ○ Time Sharing
	       ▪ *Definition*
	       ▪ *Basic Diagram*
	       ▪ *Advantage and disadvantage*
	 • Dos, Unix, Windows
	    ○ Definition
	    ○ Characteristics
		7 hrs.	

6	**Data Communication**	6 hrs.	

- Definition
- Communication Process (Diagram)
- Data Transmission Speed:
  - Definition and Types
    - Broadband
    - Narrow Band
    - Voice Band
- Communication Types (Modes)
  - Definition
  - Types
    - Simplex
    - Duplex
    - Hybrid
- Data Transmission Media
  - Guided Media
    - Definition
    - Types
      - Twisted pair
      - Coaxial cable
      - Optical fiber
  - Unguided Media
    - Definition
    - Types
      - Radio, Microwave, Infrared
        - Definition
- Modem:
  - Definition
  - Working Principles
  - Characteristics
- Types of Network:
  - Based on Geographical Area
    - LAN
    - MAN
    - WAN
  - LAN Topologies
    - Bus
    - Ring
    - Star
    - Mesh
    - Hybrid
- Computer Protocols:
  - Definition
- Concepts relating to Networking:
  - Definition
  - Significance of Networking

	Introduction to contemporary technology and trends		
· 7	- Multimedia: ○ *Definition* ○ *Characteristics* - Ecommerce: ○ *Definition* ○ *Characteristics* - E-learning: ○ *Definition* ○ *Characteristics* - E-Governance: ○ *Definition* ○ *Characteristics* - E-Banking: ○ *Definition* ○ *Characteristics* - Hypermedia: ○ *Definition* ○ *Characteristics* - Geographical Information System: ○ *Definition* ○ *Characteristics* - Artificial Intelligence: ○ *Definition* ○ *Characteristics* - Robotics: ○ *Definition* ○ *Characteristics* - Bit Coin ○ *Definition* ○ *Characteristics* - Data Mining ○ *Definition* ○ *Characteristics* - Machine Learning: ○ *Definition* ○ *Characteristics* - Cloud Computing: ○ *Definition* ○ *Characteristics* - Quantum Computing ○ *Definition*	7 hrs.	

	o *Characteristics*
	• Wireless Sensor Network:
	   o *Definition*
	   o *Characteristics*
	• Big Data:
	   o *Definition*
	   o *Characteristics*
	• Blockchain:
	   o *Definition*
	   o *Characteristics*
	• Social Media & Digital Marketing
	   o *Definition*
	   o *Characteristics*
	• IOT:
	   o *Definition*
	   o *Characteristics*
	• Immersive Technology
	   o *Definition*		

Mark Distribution

Chapter	Marks Distribution
Chapter 1	8
Chapter 2	6
Chapter 3	10
Chapter 4	10
Chapter 5	8
Chapter 6	8
Chapter 7	10
Total	60

Laboratory Work:

There shall be laboratory exercises covering computer hardware and software, and demonstration of computer technology

Text Books:

1. Anita Goel "Computer Fundamentals" Pearsons Education India

2. P.K Sinha "Computer Fundamentals"

3. Peter Nortons's "Introduction to Computer" Tata MC-Graw -Hill publishing Company Limited

Full marks: 60
Pass marks: 24
Time: 3 hours

Subject: Fundamental of Computing Technology   Code: BCE 1002
Program: BE Computer/ Electrical /Final

Candidates are required to give their answer in their own words as fas as practicable. The figures in the margin indicate full marks.

Group - A

Very short question (4*2=8)

1. What do you mean by input device. Write any two roles of output device.
2. What is floppy disk and hard disk?
3. Write the application of software.
4. What is data mining and machine learning ?

Group – B

Short Answer question (7*4=28)

1. What is scanner? Explain the different types of scanner
2. What Is printer? Explain the types of impact printer.
3. What is unix and window? Write the function of operating system.
4. what Is data communication? Explain the basic communication process.
5. Explain the different types of unguided media.
6. Explain about cloud computing and quantum computing
7. What Is the impact of social media and digital marketing in our daily life?

Group - C

Long answer Question (3*8=24)

1. Explain the basic block diagram of computer system. Explain the different types of generation of computer.
2. What is primary memory and secondary memory. Explain the different types of primary memory.
3. Differentiate application software and system software? Explain the different types of Application software.

Engineering Drawing-I
BME1001

Year: I

Semester: I

Teaching Hours/ Week				Examination Scheme						Total Marks
				Internal		Final				
				Theory	Practical	Theory		Practical		
Cr	L	P	T			Duration	Marks	Duration	Marks	
3	1	3	-		60	-	-	3 Hrs.	40	100

Course Objectives:

To develop basic projection concepts with reference to points, lines, planes and geometrical solids. To develop sketching and drafting skills to facilitate communication.

Course Contents:

1. **Instrumental Drawing, Technical Lettering Practices & Techniques** (2 hrs)
    1.1   Equipment and materials; Description of drawing instruments, auxiliary equipment and Drawing materials
    1.2   Techniques of Instrumental Drawing, securing paper, proper use of T-squares, triangles, scales, dividers, and compasses, crashing shields, French curves, Inking pens
    1.3   Lettering strokes, letter proportions, use of pencils and pens, uniformity and appearance of letters, freehand techniques, inclined and vertical letters and numerals, upper and lower cases, standard English lettering forms

2. **Dimensioning** (4 hrs)
    2.1   Fundamentals and Techniques; Size and location dimensioning, SI Conventions. Use of Scales, measurement units, reducing and enlarging drawings
    2.2   General Dimensioning practices, placement of dimensions; aligned and unidirectional recommended practice

3. **Applied Geometry** (8 hrs)
    3.1   Plane Geometrical construction; Bisecting and trisecting lines and angles, proportional Division of lines, Construction of angles, triangles, square, polygons. Construction using Tangents and circular areas.
    3.2   Techniques to reproduce a given drawing (by construction)
    3.3   Methods for drawing standard curves such as ellipses, parabolas, hyperbolas, involutes, cycloids, spirals and helices.

4. **Basic Descriptive Geometry** (8 hrs)
    4.1   Introduction to Orthographic projection, Principal Planes, Four Quadrant or Angles
    4.2   Projection of points on first, second, third and fourth quadrants

4.3   Projection of Lines: Parallel to one of the principal planes, Inclined to one of the principal plane and parallel to other, Inclined to both principal planes

4.4   Projection Planes: Perpendicular to both principal planes, Parallel to one of the principal planes and Inclined to one of the principal planes, perpendicular to other and Inclined to both principal planes

4.5   True length of lines: horizontal, inclined and oblique lines

4.6   Rules for parallel and perpendicular lines

4.7   Point view or end view of a line

4.8   Shortest distance from a point to a line

4.9   Edge View and True shape of an oblique plane

4.10   Angle between two intersecting lines

4.11   Intersection of a line and a plane

4.12   Angle between a line and a plane

4.13   Dihedral angle between two planes

4.14   Shortest distance between two skew lines

4.15   Angle between two non- intersecting (skew) lines

5.   Theory of Projection   (2 hrs)

5.1   Common types of projections- Pictorial (Perspective, Isometric, Oblique) and Orthographic Projection

5.2   System of orthographic projection: 1st angle projection and 3rd angle projection

6.   Multi view (Orthographic projection Drawings)   (12 hrs)

6.1   Principal Views: Methods for obtaining orthographic views, projection of lines, angles and plane surfaces, analysis in three views projection of curved lines and surfaces. Object orientation and selection of views for best representation, Full and hidden lines

6.2   Orthographic Drawings: Making an orthographic drawing, visualizing objects from the given views, Interpretation of adjacent areas, True- length lines, Representation of holes, Conventional practices.

7.   Sectional Views   (5 hrs)

7.1   Full Section, half section, broken section, revolved section, removed (detail) section, phantom or hidden section, auxiliary section views, specifying cutting planes for section, conventions for hidden lines, holes, ribs, spokes

8.   Auxiliary Views   (5 hrs)

8.1   Basic Concept and Use of Auxiliary Views

8.2   Drawing Methods and Types of Auxiliary Views

8.3   Symmetrical and Unilateral Auxiliary Views

8.4   Projection of Curved Lines and Boundaries

8.5   Line of Intersection Between two Planes

8.6   True size and shape of plane surfaces

9.   Developments and Intersections   (14 hrs)

9.1   Introduction and Projection of Solids

9.2 Developments: general concepts and practical considerations, development of a right or oblique prism, cylinder, pyramid, and cone, development of truncated pyramid and cone, Triangulation method for approximately developed surfaces, transition pieces for connecting different shapes, constructing a development using auxiliary views

9.3 Intersections: Intersection of – two cylinders, two prisms, prism and cylinder, a cylinder/prism & a cone, pyramid and prism/cylinder

Practical:
1. Freehand Technical Lettering and Use of Drawing Instruments
2. Dimensioning
3. Geometrical and Projection Drawing
4. Descriptive Geometry
5. Projection and Multi view Drawing
6. Sectional Views
7. Auxiliary views
8. Developments and Intersections

Final Examination Scheme:

Chapters	Marks	Remarks
1, 3	8 to10	
4	4 to 6	
2,5,6,7,8	14 to 16	
9	14	
Total	**40**	

References:

1. French, T., Vierck, C., & Foster, R. (1981). *Engineering Drawing and Graphic Technology.* McGraw Hill.
2. Giesecke, F., Mtichell, A., H.C, S., & Dygdone, J. (1986). *Technical Drawing.* 8th Edition. Macmillan.
3. Luzadder, W. J. (1981). *Fundamentals of Engineering Drawing, Eighth Edition.* Prentice Hall.

Workshop Technology
BME 1002

Year: I

Semester I

Teaching Hours/ Week				Examination Scheme						Total Marks
				Internal		Final				
				Theory	Practical	Theory		Practical		
Cr	L	P	T			Duration	Marks	Duration	Marks	
2	1	2	-	10	40	-	-	-	-	50

Course Objective:
The subject aims at imparting knowledge and skill components in the field of basic workshop technology. It deals with different hand and machine tools required for manufacturing simple metal components and articles. After completion of this course, the students will be acquainted with basic hand tools and their use as well as different metal working processes.

Course Contents:

1. **Introductory Concepts** (3 hrs)

    1.1. Introduction to the subject.
    - What will be discussed in this subject?
    - Application of this subject to Civil/ Computer/ Electrical/Electronics, Communication and Automation…Engineer.
    - Differentiate between Ferrous and Non-ferrous metals.

    1.2. Manufacturing Processes: Primary and Secondary forming processes
    - What is meant by process?
    - Difference between Primary and Secondary process.
    - List of Primary Processes: Casting, Rolling, Forging, Drawing, Shearing, Bending and Extruding.
    - Classification of Secondary Process; 1. Machining process, 2. Surface Finishing Process and 3. Joining Process.
    - List and describe the Machining Processes; i. Shaping, ii. Turning, iii. Milling, iv. Drilling, v. Grinding, vi. Threading, vii. Sawing, viii. Knurling, ix. Broaching.
    - List and describe the Surface Finishing Processes; i. Lapping, ii. Buffing, iii. Honing, iv. Polishing, v. Electroplating, vi. Metal Spraying and vii. Galvanizing.
    - List and describe the Joining Processes; 1. Temporary and 2. Permanent.
      Temporary: Fastening (Fasteners, Nut and Bolt, Screws)
      Permanent: Welding. ii. Brazing, iii. Soldering, iv Riveting, v. Pressing, vi. Shrink Fit, vii. Adhesive Joining, viii.
    - Describe these processes using figures or showing videos of these processes.

    1.3. Mechanization and Automation.

- - Describe the terms Mechanization and Automation.
- Give some Examples of Mechanization and Automation.

1.4. Processes affecting change in properties
- List and describe the properties of metals; Hardness, Ductility, Malleability, Toughness..
- List and describe the processes applied to change in properties; i. Annealing, ii. Normalizing, iii. Hardening, iv. Tempering

2. Industrial Safety (1 hrs)

2.1. Introduction
- What is meant by safety?
- Classification of Safety; i. Personal Safety, ii. Machine/Tool/Equipment safety, iii. Product or Job Safety and iv. General Safety.
- Describe how these safety can be maintained. DOs and Dot

2.2. Concept of accident and its causes
- Explain the meaning of Accident
- List and describe the causes of accident; Negligence, Unawareness, Over confidence, Improper or Defective Tools, Natural Disasters.
- Personal Safety gadgets. (De.monstrate)

3. Bench Work and Fitting Shop (4 hrs)

3.1. Introduction, Types and Use of various hand tools (Vice, Hammer, File, Hacksaw, Scriber, Chisel, Scraper, Center Punch, Screw Driver, Spanner, Plier, Wrench, Reamers).
- Describe the application and types of above listed tools by showing them.
- Name the different parts of the tools.
- Show the methods of application of these tools.

3.2. Types and Use of fasteners (Nut and Bolt, Screw, Rivet)
- Types of each component and name the different parts of these component.
- Show the application of these components.

3.3. Sheet Metal Works Tools, Marking & Layout, Bending & Cutting Operations
- Types and application of Sheet
- Describe and demonstrate marking, Bending and Cutting operation

4. Measuring and Gauging (1 hrs)

4.1. Introduction.
- Units used in measuring length in various system; FPS, MKS, CGS, SI. (Suta, Line, Thou.).

4.2. Application of Feeler Gauge, Radius Gauge, Thread Gauge, Standard Wire Gage (SWG), Calipers (Outside, Inside, Odd-leg).
- Describe the application of above listed tools.
- Demonstrate the application.

5. **Machine Shop**   (2 hrs)
   5.1. Function of Machine Tools: Lathe, Power-saw, Drilling Machine, Grinding Machine.
   - Describe the application of each machine.
   - Describe different function of these machine,
   - Name the different parts of the machine.
   - Demonstrate the different function of the above listed machines.

6. **Welding and Joining Shop**   (2 hrs)
   6.1. Gas welding principle, equipment and types of flames
   6.2. Arc welding, principle and equipment
   6.3. Arc welding elements and gas welding rods.
   6.4. Principle and application of brazing and soldering

7. **Plumbing Shop**   (2 hrs)
   7.1. Types of pipes, its material and Uses of different pipe.
   7.2. Various fittings used in metal and non-metal pipes
   7.3. Methods of bending

Practicals:
   1. Making of various components using fitting tools,
      - Bottle Opener/Hammer/.......
   2. Carryout various processes (Cutting, Filing, Grinding, Drilling, Threading, Joining etc.) using various hand and machine tools,

   3. Making various sheet metal components,
      - Dust collector/Bucket/Pans/Trays....
   4. Make pipe joints using various fittings,

References:

1. Anderson, J., & Tatro, E. E. (1942). *Shop Theory, Fifth Edition*. McGraw – Hill.
2. Khurmi, R. S., & Gupta, J. K. (2010). *A text book of Workshop Technology*. New Delhi: S. Chand and Company Ltd.
3. Krar, S., Gill, A., Smid, P., & Gerritsen, R. J. (2020). *Technology of Machine Tools, Eighth Edition*. Mc Graw Hill – Ryerson.
4. Lascoe, O. D., Nelson, C. A., & W., H. (1973). *Machine shop operations and setups*. American Technical society.
5. Moltrecht, K. H. (1981). *Machine shop Practice – Vol. I, Second Edition*. New York: Industrial Press, Inc.
6. Oberg, y. E., Jones, F. D., Horton, H. L., Ryffell, H. H., & Heald, R. M. (2000). *Machinery's Handbook, Twenty Sixth Edition*. New York: Industrial Press, Inc.