PURBANCHAL UNIVERSITY
FACULTY OF ENGINEERING

Revised Course Structure of Bachelor in Computer Engineering (2021)

S.N	Course code	Subjects	Credit Hours	Lecture/Week	Tutorial/Week	Practical /Week
First Semester						
1		Mathematics I	3	3	2	-
2		Physics	3	3	2	2
3		English for Technical Communication	3	3	1	2
4		Computer Programming	3	3	1	3
5		Fundamental of Computing Technology	3	3	1	2
6		Engineering Drawing I	3	1	-	3
7		Workshop Technology	2	1	-	2
		Total	**20**	**17**	**7**	**14**
Second Semester						
1		Mathematics II	3	3	2	-
2		Chemistry	3	3	2	2
3		Object Oriented Programming	3	3	1	3
4		Digital Logic	3	3	1	3
5		Applied Mechanics	3	3	2	-
6		Basic Electrical Engineering	3	3	1	2
		Total	**18**	**18**	**9**	**10**
Third Semester						
1		Mathematics III	3	3	2	-
2		Python Programming	3	3	1	3
3		Object Oriented Analysis and Design	3	3	1	-
4		Data Structure and Algorithm	3	3	1	3
5		Electronic Devices and Circuits	3	3	1	2
6		Project-1	3	1	-	3
		Total	**18**	**16**	**6**	**11**
Fourth Semester						
1		Computer Graphics	3	3	1	3
2		Database Management System	3	3	1	3
3		Discrete Structure	3	3	2	-
4		Microprocessor	3	3	2	3
5		Communication System	3	3	1	2
6		Applied Sociology	2	2	1	-
7		Probability & Statistics	3	3	2	-
		Total	**20**	**20**	**10**	**11**
Fifth Semester						
1		Algorithm Analysis and Design	3	3	2	-
2		Computer Architecture and Design	3	3	1	2

3		Numerical methods	3	3	1	3
4		Operating system	3	3	1	3
5		Engineering Economics	3	3	1	-
6		Research Methodology	2	2	1	-
7		Project-II	3	1	-	3
		Total	**20**	**18**	**7**	**11**
Sixth Semester						
1		Artificial Intelligence	3	3	1	3
2		Computer Network	3	3	1	3
3		Embedded and IoT System	3	3	1	-
4		Software Engineering	3	3	2	-
5		Theory of Computation	3	3	1	3
6		Control system	3	3	2	-
		Total	**18**	**18**	**8**	**9**
Seventh Semester						
1		Distributed & Cloud Computing	3	3	1	2
2		IT Project Management	3	3	1	-
3		Simulation and Modeling	3	3	1	3
4		Elective-I	3	3	*	*
5		Elective-II	3	3	*	*
6		Project-A	2	1	-	2
		Total	**17**	**16**	**3+**	**7+**
Eighth Semester						
1		Cyber Security	3	3	2	-
2		Engineering Professional Practice	2	2	-	-
3		Elective-III	3	3	*	*
4		Elective-IV	3	3	*	*
5		Project-B	3	1	-	4
6		**Internship**	**2**			
		Total	**16**	**12**	**2+**	**4+**

Grand Total	**147**	**135**	**52+**	**77+**

Note: * indicates that number of tutorial as well as practical classes will be assigned from detailed syllabus after choosing elective subjects.

MATHEMATICS I
BEG101SH

YEAR: I **SEMESTER: I**

Teaching Schedule Hours/Week			Examination Scheme		
Credit Hours	Theory	Tutorial	Internal Assessment	Final	Total Marks
3	3	2	Theory Marks 40	Theory Marks 60	100

OBJECTIVES: The main aim of this 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.

Course Details:

1. Derivatives and their Applications 15 hrs

1.1 Review of limit, continuity and differentiability
1.2 Tangents and Normals
1.3 Higher order derivatives, Leibnitz's theorem
1.4 Power series of single valued functions: Taylor's and Maclaurin's series
1.5 Indeterminate forms, L. Hospital's Rule
1.6 Curvature: Radius and chord of curvature
1.7 Asymptotes of Cartesian curves
1.8 Partial derivatives
1.9 Extreme values of functions of two and three variables

2. Anti-derivatives and their Applications 15 hrs

2.1 Review of indefinite and definite integrals
2.2 Properties of definite integrals
2.3 Improper integrals
2.4 Differentiation under integral sign
2.5 Reduction formula and Beta Gamma functions
2.6 Applications of integrals: ideas of curve tracings; area, arc-length, volume and surface areas in Cartesian form
2.7 Multiple integrals: double integrals and triple integrals
2.8 Change of order of integration in double integral

3. Plane Analytic Geometry 8 hrs

3.1 Translation and Rotation of Axes
3.2 Parabola: standard equations, tangent and normal

3.3 Ellipse and Hyperbola: Standard equations, foci, directrices, latera recta; equations of tangent and normal

3.4 General equation of conic section

4. Vector Algebra 7 hrs

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, symmetrical form and some problem) 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, Kathmandu, Nepal.

PHYSICS
BEG103SH

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

Course Objective: To provide the concept and knowledge of classical, quantum and relativistic physics with the emphasis of their present day applications.

Course Details:

1. Mechanical oscillation [5Hrs]

1.1 Physical Pendulum**:** (Interchangeability of point of suspension and oscillation, minimum and maximum time period); Torsion pendulum

1.2 Free oscillation

1.3 Damped oscillations: angular frequency, critical damping, overdamping and underdamping

1.4 Forced oscillation: Damped oscillation with a periodic driving force, Resonance and its consequences

2. Ultrasonics [3Hrs]

2.1 Introduction; Production of ultrasonics: Mechanical method (introduction only); Piezoelectric generator; Magnetostriction oscillator

2.2 Detection of ultrasonic; Applications of ultrasonics

2.3 Acoustic grating: Determination of velocity of sound in a liquid

3. Relativity [5Hrs]

3.1 Frame of reference; Inertial and non-inertial frame of references

3.2 Postulates of special theory of relativity

3.3 Lorentz transformation equations; Length contraction; Time dilation. Twin paradox

3.4 Simultaneity; Relativistic mass; Mass and energy

3.5 Space-time diagram.

4. Optics

4.1 Geometrical Optics [3Hrs]

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.

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.

4.2 Fibre Optics [3Hrs]

4.2.1 Introduction; Step index optical fibre, Graded index optical fibre.

4.2.2 Self-focusing; Acceptance angle; Numerical aperture.

4.2.3 Application of optical fibre.

4.3 Physical Optics
[10Hrs]

4.3.1 **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 wavelength of light and refractive index of liquid.

4.3.2 **Diffraction:** Introduction: Fresnel and Fraunhoffer diffraction; Faunhoffer's diffraction at a single slit; Intensity in single diffraction pattern (qualitative); Fraunhoffer diffraction at double slit; Diffraction grating; Holography and Interference pattern.

4.3.3 **Polarization:** Malus Law, Double refraction; Nicol prism; Quarter wave plate; Half wave plate; Optical activity; Specific rotation

5. Electrostatics [7Hrs]

5.1 Electric field intensity, Electric dipole and dipole moment, Electric field intensity due to dipole (at axial and equatorial line), Electric quadrupole and quadrupole moment, Electric field intensity due to quadrupole (at axial line)

5.2 Electric potential, Electric potential due to dipole, Electric potential due to quadrupole (at axial line)

5.3 Electric flux, Gauss's law (statement only), Application of Gauss's law: Spherical charge distribution (non-conducting and conducting)

5.4 Ink-jet printing; Volcanic lightning

5.5 Capacitor and capacitance, Parallel plate capacitor and Cylindrical capacitor, Super capacitor (introduction only), Energy stored in electric field and energy density

5.6 Polar and non-polar dielectrics, Polarization, Gauss's law and dielectrics (Relation between **E**, **D** and **P**)

6. Direct Current [3Hrs]

6.1 Electric Current; Current Density, Drift Speed

6.2 Effect of Temperature on Resistance and Resistivity; Microscopic view of Ohm's Law.

6.3 Superconductivity, Critical Magnetic field, ,The Meissner Effect, Types of Super conductors

7. Magnetism and Magnetic Field [8Hrs]

7.1 Magnetic properties of matter; Domain theory; Ferromagnetism; Saturation and hysteresis

7.2 Lorentz force; Cyclotron; Cyclotron frequency; Synchrotron; Hall effect

7.3 Current carrying coil as a magnetic dipole; Magnetic field produced by a magnetic dipole

7.4 Faraday's law of electromagnetic induction; Lenz's law; Electric guitars

7.5 Self-induction; Inductance of a Solenoid; Metal detector

7.6 Eddy currents; Induction stoves

7.7 LR circuit, Energy stored in magnetic field; Energy density of magnetic field.

7.8 Induced Magnetic Field; Displacement Current

8. Electromagnetic waves [5Hrs]

8.1 Gauss divergence theorem and Stoke's theorem (statement only).

8.2 Maxwell's equation (integral and differential form); Equation of continuity.

8.3 Wave equation in free space and in medium.

8.4 Speed of electromagnetic wave; Ratio of electric field and magnetic field.

8.5 Poynting vector.

9. Quantum Mechanics [5Hrs]

9.1 Newtonian mechanics and Quantum mechanics

9.2 Matter wave: de-Broglie wave equation; Uncertainty Principle (qualitative); Phase velocity and group velocity: relation between phase velocity and group velocity

9.3 Wave function; Physical interpretation of the wave function

9.4 Schrodinger wave equation (time independent and time dependent)

9.5 Applications of Schrodinger wave equation: Particle in one dimensional infinite potential well; Wave functions of infinite potential well; Normalization and probability density; Potential barriers and Tunneling effect (transmission coefficient qualitative); Application of Tunneling

10. Non-Destructive Testing [3Hrs]

10.1 Introduction; Methods of non-destructive testing: Magnetic method; Electrical method; Radiographic method; Ultrasonic method; Thermal method

10.2 Comparisons of γ-ray radiography and X-ray radiography; Thermography

Laboratory Works: (Perform minimum 8 experiments choosing at least one from each group of the followings)

GROUP A

1. To determine the value of acceleration due to gravity at a place and radius of gyration using bar pendulum.
2. To determine modulus of rigidity of the given material and M. I. of the circular disc using torsional pendulum.
3. To determine the Young's modulus of the material of a rectangular bar by bending.
4. To determine the velocity of ultrasonic waves in a given liquid (say Kerosene oil).

GROUP B

5. To determine the unknown resistance of unknown wire and resistance per unit length of the bridge wire using Carey-Foster Bridge.
6. To determine the capacitance of a given capacitor by charging and discharging method.
7. To study the growth and decay of current in LR circuit using magnetic core inductor.
8. To determine the dielectric constant of given material.
9. To study common base characteristics of PNP junction transistor.

GROUP C

10. To determine the refractive index of the prism using spectrometer.
11. To determine the wavelength of sodium light by Newton's ring method.
12. To find the wavelength of sodium light using Fresnel's biprism.
13. To determine the specific rotation of cane-sugar dissolved in water.

GROUP D

14. To determine the wavelength of He-Ne laser light by using diffraction grating.

To determine the Planck's constant

ENGLISH FOR TECHNICAL COMMUNICATION

BEG105SH

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

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
1.2 Consonants in English
1.3 Description of English Vowels
1.4 Description of English Consonants
1.5 Stress/ Accent in English
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
1.4 Debate
1.5 Public Speaking

Unit: 2. Reading (8 Hrs)

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'**.
2.4 Summary / précis Writing

Unit: 3. Writing (10 Hrs)

A. Fundamental 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
3.3 Curriculum Vitae and Resume
3.4 Conducting Meeting: Writing Notice, Agenda, Minutes

B. Technical Report 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. Research Methodology (15Hrs)

4.1 Introduction: Definition, Types of Research

4.2 Research Approaches: Qualitative, Quantitative and Mixed
4.3 Research Process**:** Formulating the research problem, Extensive literature Review, Developing the hypothesis, Preparing the Research Design, Determining Sample Design, Collecting the Data, Execution of the Project, Analysis of Data, Hypothesis testing, Generalization and interpretation, Preparation of the report
4.4 Journal and Research Paper: Structure, style, voice, narrative, Journal Indexing, Journal Impact, Peer Reviewed Journal

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

5.1 Varieties in English Language
5.2 Preposition; subject- verb agreement; voice; reported speech and conditional sentences

Practical Works

At least 6 practical works should be performed.

1. To practice 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. Technical Proposal writing practice.
9. Getting students to involve in group discussion, debate and public speaking

REFERENCES:

1. Adhikari , U; Yadav , R; Shrestha , R. N .**Communicative Skills 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'**

COMPUTER PROGRAMMING
BEG175CO

Year: I **Semester: I**

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

Course objectives:

·To provide 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.

Course Details:

1. Problem Solving Using Computers **2**
- 1.1 Problem Analysis
- 1.2 Algorithm Development & Flowcharting
- 1.3 Coding
- 1.4 Compilation & Execution
- 1.5 Debugging & Testing
- 1.6 Program Documentation

2. Introduction to C **2**
- 2.1 Historical Development of C
- 2.2 Importance of C
- 2.3 Basic Structure of C Programs
- 2.4 Executing a C Program

3. C Fundamentals **3**
- 3.1 Character Set
- 3.2 Identifiers & Keywords
- 3.3 Data Types and modifier
- 3.4 Constants, Variables
- 3.5 Declarations and initialization of variables
- 3.6 Escape Sequences
- 3.7 Preprocessors Directives
- 3.8 Typedef statement
- 3.9 Symbolic Constants

4. Operators & Expression **3**
- 4.1 Operators:
  - 4.1.1 Arithmetic, Relational, Logical, Bitwise, Assignment, Increment, Decrement, sizeof(), Conditional operators
- 4.2 Precedence, Associativity, and order of evaluation

5. Input and Output **2**
- 5.1 Types of I/O

5.2 Format Specifier
5.3 Reading & Writing data
5.4 Formatted and Unformatted I/O statements

6. Control Statements **6**

6.1 Repetitive control statements : for, while, do-while
6.2 Conditional control statements: if, if else, Nested if, else if ladder
6.3 Multiple branching control statement: switch
6.4 Unconditional control statements: break, continue, goto
6.5 exit( ) function

7. Functions **6**

7.1 Advantages of using Function
7.2 User Defined & Library Functions
7.3 Function Prototypes, definition & return statement
7.4 Call by Value & Call by reference
7.5 Concept of Local, Global & Static variables
7.6 Recursive Function
7.7 Storage Classes and Visibility, Automatic or local variables, Global variables, Static variables, External variables

8. Arrays and Strings **6**

8.1 Introduction
8.2 Single and Multi-dimension arrays
8.3 Processing an array
8.4 Passing arrays to Functions
8.5 Arrays of Strings
8.6 String Handling Function

9. Pointers **5**

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

10. Structures and Unions **5**

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

11. Data Files **3**

11.1 Opening & Closing a Data File
11.2 Creating a Data File
11.3 Error Handling during I/O Operations
11.4 Processing a Data File

12. Graphics **2**

12.1 Initialization
12.2 Graphical mode
12.3 Simple programs using built in graphical function

Laboratories:

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

References:

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

FUNDAMENTAL OF COMPUTING TECHNOLOGY
BEG170CO

Year: I **Semester: I**

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

Course Objectives: To provide basic concept of computer system and its application

Unit 1: Introduction to Computers: 5 hrs

Introduction, Definition, .Characteristics of computer, Evolution of Computer, Von Neumann architecture, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer.

Unit 2: Basic Computer Organization: 6 hrs

2.1 Role of I/O devices in a computer system

2.2. **Input Units**: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Digitizer and its types, Voice Recognition Systems, Vision Input System, Touch Screen,

2.3 Output Units: Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printer and its types, Plotter and its, types, Sound cards, Speakers.

Unit 3: Storage Fundamentals: 7 hrs

3.1 Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM.

3.2 Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

Unit 4: Software: 7 hrs

4.1 Software and its needs,
4.2 Applications of Software
4.3 Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages
4.4 Type of software: ***System Software*****:** Operating System, Utility Programs ***Application Software S/W and its types:*** Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w.

Unit 5: Operating System: 7 hrs

1.1 Functions of Operating System,
1.2 Assemblers, Compilers and Interpreters.
1.3 Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing
1.4 DOS, Windows, Unix/Linux.

Unit 6: Data Communication: 6 hrs

6.1 Communication Process, Data Transmission speed, Communication Types (modes),
6.2 Data Transmission Media, Modem and its working, characteristics,
6.3 Types of Networks, LAN Topologies, Computer Protocols, Concepts relating to networking.

Unit 7: Introduction to Contemporary Technologies and Trends 7 hrs

7.1 Multimedia, e-Commerce, e Learning, e Governance, e-Banking, Hypermedia, Geographical Information System, Virtual Reality, Augmented Reality, Artificial Intelligence, Robotics, Bit Coin.

7.2 Data Mining, Machine Learning, Cloud Computing, Quantum Computing, Wireless Sensor Network, Big Data, Blockchain, Social Media & Digital Marketing, IoT, Immersive Technology

Laboratory:
There shall be lab exercises covering computer hardware and software, & demonstration of computer network.

References:

1. Anita Goel "Computer Fundamentals" Pearson Education India
2. P.K.Sinha, "Computer Fundamentals"
3. Peter Nortons's Introduction to Computers Tata McGraw-Hill Publishing Company Limited

ENGINEERING DRAWING I

BEG146ME

Year: I **Semester: I**

Teaching Schedule Hours/Week				Examination Scheme				
Credit Hours	Theory	Tutorial	Practical	Internal Assessment		Final		Total Marks
3	1	-	3	Theory Marks	Practical Marks	Theory Marks	Practical Marks	100
				10	50	-	40	

Course objective:
To develop the basic understanding and the skills of Engineering graphic technology to the students.

1.0 Instrumental Drawing; Practices & Techniques (2 hrs)

1.1 Equipment and materials; Description of drawing instruments, auxiliary equipment and Drawing materials

1.2 Techniques of Instrumental Drawing, Pencil Sharpening, securing paper, proper use of T-squares, triangles, scales, dividers, and compasses, crashing shields, French curves, Inking pens

2.0 Freehand Technical lettering (2 hrs)

2.1 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.

3.0 Dimensioning (5 hrs)

3.1 Fundamentals and Techniques; Size and location dimensioning, SI Conventions. Use of Scales, measurement units, reducing and enlarging drawings

3.2 General Dimensioning practices placement of dimensions; aligned and unidirectional Recommended practice; some 50 items

4.0 Applied Geometry (8 hrs)

4.1 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. Methods for drawing standard curves such as ellipses Parabolas, hyperbolas, involutes, spirals and cam or heart wheel

4.2 Solid Geometrical Construction; Classification and pictorial representation of solid Regular objects such as; Prisms: square, cubical, triangular and oblique Cylinders: right And oblique Cones: right and oblique, Pyramid: square, triangular, oblique, truncated, Doubly-Curved and Warped Surfaces: Sphere, torus, oblate ellipsoid, conoid, serpentine, paraboloid, hyperboloid (Definition)

5.0 Basic Descriptive Geometry (8 hrs)

5.1 Introduction; Application of descriptive geometry, principles to the solution of problems Involving positioning of objects in three-dimensional space

5.2 The projection of points, Lines and planes in space

5.3 Parallel Lines

5.4 True Length of Lines: horizontal, inclined and oblique lines
5.5 Perpendicular Lines

5.6 Bearing of a Line
5.7 Point view or End View of a Line
5.8 Shortest Distance from a point to a Line
5.9 Principal Lines of a Plane
5.10 Edge View of a Plane
5.11 True shape of a Line and a plane
5.12 Intersection of a Line and a Plane
5.13 Angle between a line and a plane
5.14 Angle between two intersecting lines
5.15 Angle between two Non-Intersecting (Skew) lines
5.16 Angle between two planes
5.17 Shortest Distance between Two Skew Lines

6.0 Theory of Projection (2 hrs)
6.1 Common types of projections- Pictorial (Perspective, Isometric, Oblique) and Orthographic Projection
6.2 System of orthographic projection 1st angle projection and 3rd angle projection

7.0 Multi view (Orthographic projection Drawings (10 hrs)
7.1 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
7.2 Orthographic Drawings; Making an orthographic drawing, visualizing objects from the given views, Interpretation of adjacent areas, True- length lines, Representation of holes- Conventional practices.

8.0 Sectional Views (5 hrs)
8.1 Full Section
8.2 Half Section
8.3 Broken Section
8.4 Revolved Section
8.5 Removed (Detail) Section
8.6 Phantom or Hidden Section
8.7 Auxiliary Section views
8.8 Specifying Cutting planes for Section
8.9 Conventions for hidden lines, holes, ribs, spokes

9.0 Auxiliary Views (5 hrs)
9.1 Basic Concept and Use of Auxiliary Views
9.2 Drawing Methods and Types of Auxiliary Views
9.3 Symmetrical and Unilateral Auxiliary Views
9.4 Projection of Curved Lines and Boundaries
9.5 Line of Intersection Between two Planes
9.6 True size of Dihedral Angles
9.7 True size and shape of plane surfaces

10.0 Freehand Sketching and Visualization (4 hrs)
10.1 Sketching and Design; Value of Sketching as part of design
10.2 Techniques of Sketching; pencil hardness, squared paper, line densities Techniques for horizontal, vertical and circular lines

10.3 Multi view Sketches; Choice of views, adding detail, dimensioning, title, notes Proportioning and comparative sizing

10.4 Sketching pictorial Views; General pictorial sketching Mechanical methods of sketching And proportioning Isometric sketching perspective Oblique sketching perspective Sketching conventional treatment of fillets, rounds and screw threads sketches of an Exploded view to show assembly of components

11.0 Developments, Intersections and Interpenetration (9 hrs)

11.1 Development General concepts and practical considerations. Developments of a rigid or oblique prism, cylinder, pyramid and cone. Development of a truncated pyramid and Cone Triangulation method for approximately developed surfaces Transition pieces of Connecting different shapes Development of a sphere

11.2 Intersection & Interpretation Lines of intersection of geometric surfaces Piercing point of a line and a geometric solid Intersection lines of two planes Intersection of prisms and pyramids Intersection of a cylinder and an oblique plane Intersection of a sphere and an oblique plane Constructing a development using auxiliary views Intersection of two Cylinders Intersection of a cylinder and a cone

LABORATORY 3 hrs/week

1. Freehand Technical Lettering and Use of Drawing Instruments
2. Freehand Technical Lettering and Use of Drawing Instruments (cont)
3. Dimensioning
4. Geometrical and Projection Drawing
5. Descriptive Geometry
6. Descriptive Geometry (contd.)
7. Projection and Multi view Drawing
8. Projection and Multi view Drawing (contd.)
9. Sectional Views
10. Auxiliary views
11. Freehand Sketching and Visualization
12. Developments and Intersections
13. Developments and Intersections(contd.)

Recommended Books:

1. "Fundamentals of Engineering Drawing", W.J.Luzadder, Prentice Hall, 8th Edition, 1981
2. "Engineering Drawing and Graphic Technology", TE. French, C.J. Vierck & R.J. Foster, MCGraw Hill,1981
3. "Technical Drawing" F.E. Giesecke, A. Mtichell, H.C, Spencer & J.T. Dygdone, Macmillan, 8th Edition,1986

WORKSHOP TECHNOLOGY

BEG 148ME

Year-I **Semester-I**

Teaching Schedule Hours/Week				Examination Scheme				
Credit Hours	Theory	Tutorial	Practical	Internal Assessment		Final		Total Marks
2	1	-	2	Theory Marks	Practical Marks	Theory Marks	Practical Marks	50
				20	30	-	-	

Course Objective: To familiarize the students about the basic mechanical and plumbing workshop practices as well as brick works**,** using various hand tools and machine tools.

Course Contents:

1.0 Introductory Concepts **(2 hrs)**

1.1 Introduction to the subject
1.2 Manufacturing Processes: Primary and Secondary forming processes
1.3 Mechanization and Automation

2.0 Industrial Safety **(1 hrs)**

2.1 Introduction
2.2 Concept of accident and its causes

3.0 Bench Work an Fitting Shop **(2 hrs)**

3.1 Introduction and familiarization with various hand tools used in bench shop and its applications
3.2 Sheet Metal Works Tools, Marking & Layout, Bending & Cutting Operations

4.0 Machine Shop **(2 hrs)**

4.1 Function of Machine Tools: Lathe, Power-saw, Milling Machine, Drilling Machine, Grinding Machine, Shaping Machine

5.0 Welding Shop **(3 hrs**)

5.1 Gas Welding principle, equipment and types of flames
5.2 Arc Welding, principle and equipment
5.3 Arc Welding elements and gas welding rods.
5.4 Principle and application of Brazing and Soldering

6.0 Plumbing Shop **(3hrs**)

6.1 Types of pipe and its materials
6.2 Various fittings used in metal and non-metal pipes
6.3 Methods of bending

7.0 Brick Works **(2 hrs)**

7.1 Types of bricks and its applications
7.2 Methods of laying the bricks and its advantages and disadvantages

Workshop Practice:

Project Work and Report on the following (any two)
i) Making of various components using fitting tools
ii) Carryout various processes using various machine tools
iii) Cut threads on the pipes and make various joints using various fittings
iv) Carryout various bricklaying exercise using common hand tools.

Industrial Visit (S)
Arrangements to be made with local industries (if available) for students industrial visits

Recommended Books:-

1. Shop Theory, J. Anderson and E.E. Tatro, McGraw Hill.
2. A course in workshop technology volume I & II, Prof B.S.Raghubanshi, Dhanpat Rai & Sons, Delhi
3. Workshop Technology Volume I & II, H.S. Bawa, Tata Mcgraw Hill Publishing Company Limited,
New Delhi
4. A Course in Workshop Technology Volume I & II , Hazra & Choudhary
5. Machine Shop Operations and Setups, O.D.Lascoe, C.A.Nelson and H.W.Porter, American Technical
Society.
6. Machine Shop Practice Volume -I & II Industrial Press, New York
7. Technology of Machine Tools, K.Oswald, Mc Graw Hill
8. Machinery's Hand Book, Oberg, Jones and Horton, Industrial Press
9. CNC Machines