

2.1 ENGLISH AND COMMUNICATION SKILLS - II

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RATIONALE

Communication skills play an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Make proper oral presentations.
- Speak confidently.
- Debate properly.
- Write accurate official/business letters.
- Respond to telephone calls effectively.
- Overcome communication barriers.

DETAILED CONTENTS

1. Functional Grammar and Vocabulary (12 hrs)

Theory and Practical exercises on following:

One word substitution

Functional Grammar and Vocabulary

Prefixes and Suffixes

Punctuation

Narration

Idioms and Phrases

2. Reading (9 hrs)

Comprehension, Vocabulary enrichment and grammar exercises based on the following readings:

Section-I

- The Last Leaf - O' Henry
- Sparrows - K A Abbas
- The Postmaster - Rabindra Nath Tagore

Section-II

- Night of the Scorpion - Nissim Ezekiel
- All the World is a Stage - William Shakespeare
- Success – Emily Dickenson
- Daffodils – William Wordsworth

3. Writing (24 hrs)

Writing Resume and Cover letter
Correspondence: Business and Official
Report Writing – Introduction and features of good report.
Press Release
Memos and Circulars
Notices (lost, found, and auction)
Agenda and Minutes of Meetings
Filling-up different forms such as bank form and on-line form for placement etc.
Precis Writing
E mail writing

LIST OF PRACTICALS

1. Group discussion on some current topic of interest.
2. Small speech using voice modulation.
3. Debate
4. Manners and Etiquette
5. Power point presentation
6. Telephonic conversation: General etiquette for making and receiving calls.
7. Mock interviews

INSTRUCTIONAL STRATEGY

Open source software should be used to help the students in developing listening skills. Student centred activities such as group discussions, role play should be used to ensure active participation of students in the classroom.

RECOMMENDED BOOKS

1. Revathi, Srinivas, “Communicating Effectively in English, Book-I”, Abhishek Publications, Chandigarh.
2. Mohan, Krishna & Meera Banerji, “Developing Communication Skills (2nd Edition)”, Published by Macmillan Publishers India Ltd; New Delhi.
3. Eastwood, John, “Oxford Practice Grammar”, Oxford University Press, London

4. Chadha, R. K., “Communication Techniques and Skills”, Dhanpat Rai Publications, New Delhi.
5. Wren & Martin, “High School English Grammar and Composition”, S. Chand & Company Ltd., Delhi.
6. Kumar, Sanjay & Pushp Lata, “Communication Skills”, Oxford University Press, New Delhi

WEBSITES FOR REFERENCE

1. [http://www.mindtools.com/ page 8.html](http://www.mindtools.com/page 8.html)
2. <http://www.letstalk.com.in>
3. <http://www.englishlearning.com>
4. <http://learnenglish.britishcouncil.org/en/>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	12	12
2	9	12
3	24	26
Total	45	50

2.2 APPLIED MATHEMATICS – II

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RATIONALE

Applied mathematics forms the backbone of engineering students. Basic elements of differential calculus, integral calculus and differential equations have been included in this course. This will develop analytical abilities to apply in engineering field and will provide continuing educational base to the students.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- Apply differential calculus to solve max/min and related rate measure problems.
- Apply concepts of definite integrals to calculate the area of a curve bounded by axes.
- Evaluate complex integrals in a simpler way by applying definite integral.
- Solve engineering problems by making use of ordinary differential equations.

DETAILED CONTENTS

1. Differential Calculus (18 hrs)

Definition of function; Introduction to limit and continuity(definition only).

Standard differentiation of algebraic, trigonometric, inverse trigonometric functions, logarithmic function and exponential function.

Differentiation of sum, product and quotient of functions, Differentiation of function of a function, differentiation of implicit functions and parametric functions.

Logarithmic differentiation and successive differentiation (excluding nth order).

Application of differential calculus in:

- (a) Rate Measures
- (b) Maxima and minima (single variable functions) using second order derivative only
- (c) Equation of tangent and normal to a curve (for explicit functions only)

2. Integral Calculus (22 hrs)

Indefinite integrals, Integration as inverse operation of differentiation with simple examples.

Standard integrals and related simple problems

Simple integration by substitution, by parts and by partial fractions (for linear factors only)

Evaluation of definite integrals (simple problems)

$$\text{Evaluation of } \int_0^{\pi/2} \sin^n x \, dx, \int_0^{\pi/2} \cos^n x \, dx, \int_0^{\pi/2} \sin^m x \cos^n x \, dx$$

using formulae without proof (m and n being positive integers only).

Applications of integration for evaluation of area bounded by a curve and axes (Simple problems).

3. Differential Equations (5 hrs)

Definition, order, degree of ordinary differential equations.

Formation of differential equation (up to 2nd order). Solution of Differential equations with Variable separation and Linear Differential equations.

INSTRUCTIONAL STATREGY

Basic elements of Differential Calculus, Integral Calculus, and Differential Equations can be taught in the light of their applications in the field of engineering and technology. By laying more stress on applied part, teachers can also help in providing continuing education base to the students.

RECOMMENDED BOOKS

1. Grewal, BS, "Elementary Engineering Mathematics", Khanna Publishers, New Delhi
2. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
3. Sabharwal, SS & Dr Sunita Jain, "Applied Mathematics, Vol. I & II", Eagle Parkashan, Jalandhar

4. Engineering Mathematics, Vol I, II & III by V Sundaram et al, Vikas Publishing House (P) Ltd., New Delhi
5. Sastry, SS, “Engineering Mathematics, Vol I & II”, Prentice Hall of India Pvt. Ltd.,
6. Pal, Srimanta and Subodh C. Bhunia, “Engineering Mathematics”, Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	18	20
2	22	25
3	5	05
Total	45	50

2.3 APPLIED PHYSICS – II

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RATIONALE

Applied physics includes the study of a large number of diverse topics related to things that go in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology

LEARNING OUTCOMES

After undergoing this subject, the student will be able to;

- Apply the concept of wave motion
- Illustrate laws of reflection and refraction of light.
- Comprehend the phenomenon related to electrostatics
- Comprehend the terms and laws related to electricity and magnetism.
- Make use of laser for engineering applications.

DETAILED CONTENTS

1. Wave motion and its Applications (6 hrs)

Wave motion, transverse and longitudinal wave motion with examples, sound and light waves, relationship among wave velocity, frequency and wave length and its application

Free, forced and resonant vibrations with examples

Acoustics of buildings reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications

Ultrasonics Introduction and applications.

2. Optics (6 hrs)

Laws of reflection and refraction, refractive index, lens formula for thin lenses, power of lens, magnification

Total internal reflection and its applications, Critical angle and conditions for total internal reflection

Simple and compound microscope, astronomical telescope in normal adjustment, magnifying power (Only formula).

3. Electrostatics (6 hrs)

Coulombs law, unit of charge,
Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference
Capacitor and its working principle, Capacitance and its units. Capacitance of parallel plate capacitor (No derivation), Series and parallel combination of capacitors (numericals)
Dielectric and its effect on capacitance, dielectric break down

4. Electricity and Magnetism (9 hrs)

Electric Current and its Unit, Direct and alternating current,
Resistance and its Units, Specific Resistance, Conductance, Specific Conductance, Series and Parallel combination of Resistances. Factors affecting Resistance, Superconductivity (concept only)
4.3 Ohm's law and its verification
Kirchhoff's laws, Wheatstone bridge principle
Heating effect of current, Electric power, Electric energy and its units(related numerical problems)
Introduction to magnetism, Types of magnetic materials. Dia, para and ferromagnetic materials with their properties,
Magnetic field and its units, magnetic lines of force, magnetic flux and their units
Concept of electromagnetic induction, Faraday's Laws and Lenz's Law,
Galvanometer and its use.

5. Modern Physics (3 hrs)

Lasers: its characteristics, spontaneous and stimulated emission, population inversion; Principle, construction and working of Ruby laser, engineering applications of lasers.

LIST OF PRACTICALS (To perform minimum 8 experiments)

1. To find the time period of a simple pendulum
2. To determine and verify the time period of cantilever
3. To verify laws of reflection from a plane mirror.
4. To find the focal length of convex lens by parallax method.
5. To determine the magnifying power of an astronomical telescope
6. To verify ohm's laws by drawing a graph between voltage and current.
7. To verify laws of resistances in series and parallel combination.
8. To find resistance of galvanometer by half deflection method
9. To measure very low resistance and very high resistances using Slide Wire bridge
10. Use of CRO in plotting AC and DC waveforms.
11. To find wave length of the laser beam.

INSTRUCTIONAL STATREGY

Teacher may use various instructional media like models, charts and graphs while imparting instructions. The field application should be made clear before teaching the basics to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

RECOMMENDED BOOKS

1. Text Book of Physics (Part-I, Part-II); N.C.E.R.T., Delhi
2. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
3. Practical Physics by C. L. Arora, S Chand Publications
4. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (hrs)	Marks Allotted (Out of 50)
1	06	10
2	06	10
3	06	10
4	09	15
5	03	05
Total	30	50

ENVIRONMENTAL STUDIES

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2 -

RATIONALE

Engineering activities require the use of natural resources which results in wide-ranging adverse effects on the environment. Natural replenishment of these resources is practically impossible. This necessitates that all technicians should know about the basics of ecology, environment and its functions, environmental pollution and management and environmental legislation which will enable them to accomplish their professional work with environmental compatibility. Hence this subject.

LEARNING OUTCOMES

After undergoing the subject, the student will be able to:

- Comprehend the importance of ecosystem and environment.
- Demonstrate interdisciplinary nature of environmental issues.
- Identify different types of environmental pollution and control measures.
- Take corrective measures for the abatement of environmental pollutions.
- Compute the impact of human activities on the environment.
- Understand purpose of environmental legislation acts.
- Define energy management, energy conservation and energy efficiency
- Demonstrate positive attitude towards judicious use of energy and environmental protection
- Practice energy efficient techniques in day-to-day life and industrial processes.
- Adopt cleaner productive technologies
- Identify the role of non-conventional energy resources in environmental protection.

DETAILED CONTENTS

1. Introduction: (4 hrs)
Basics of ecology, eco system and environment. Review of carbon, nitrogen, sulphur and water cycle)
2. Conservation of land reforms: (3 hrs)
Desertification, Causes, effects and prevention. rain water harvesting, maintenance of ground water, deforestation – its effects and control measures
3. Environmental Pollution: (10 hrs)
Sources of pollution - natural and man made, causes, effects and control measures of pollution (air, water, noise, soil and radioactive). Concept of BOD, COD and AQI, Prevention of Pollution- Introduction to Cleaner Production Technologies, Waste Minimization Techniques, Concept of Zero Discharge, Impact of Energy

Usage on Environment: Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain.

4. Solid Waste management (3 hrs)
Classification of refuse material, sources, effects and control measures.
Introduction to E-waste Management
5. Environmental Legislation (4 hrs)
Introduction to Water (prevention and control of pollution) Act, Air (Prevention and Control of Pollution) Act and Environmental Protection Act, Role and Function of State Pollution Control Board, Introduction to Energy Conservation Act & its importance, Concept of Environmental Impact Assessment (EIA)
6. Energy Conservation and Sustainable Development (6 hrs)
Introduction to Energy Management, Energy Conservation, Energy efficiency and its need. Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio mass energy, hydro energy) in environmental protection. Sustainable development, Concept of Green building and eco friendly materials.

INSTRUCTIONAL STRATEGY

In addition to theoretical instructions, different activities pertaining to Environmental Studies like expert lectures, seminars, visits etc. may also be organized.

RECOMMENDED BOOKS

1. Sharma, BR, "Environmental and Pollution Awareness", Satya Prakashan, New Delhi.
2. Khitoliya, Dr. RK, "Environmental Pollution", S Chand Publishing, New Delhi.
3. Deswal and Deswal, "Environmental Science", Dhanpat Rai and Co. (P) Ltd. Delhi.
4. Bharucha, Erach, "Environmental Studies", University Press (India) Private Ltd., Hyderabad.
5. Dhamija, Suresh K, "Environmental Engineering and Management", SK Kataria and Sons, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	4	06
2	3	05
3	10	16
4	3	05
5	4	06
6	6	12
Total	30	50

APPLIED MECHANICS

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RATIONALE

The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, laws of motion, moment, friction, centre of gravity, and simple machines which are required by the students for further understanding of other allied subjects. The subject enhances the analytical ability of the students.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:

- Interpret various types of units and their conversion from one to another.
- Analyze different types of forces acting on a body and draw free body diagrams.
- Determine the resultant of coplanar concurrent forces.
- Solve problems by using principle of moment.
- Calculate the co-efficient of friction for different types of surfaces.
- Calculate the least force required to maintain equilibrium on an inclined plane.
- Determine the centroid/centre of gravity of plain and composite laminar and solid bodies.
- Determine velocity ratio, mechanical advantage and efficiency of simple machines

DETAILED CONTENTS

1. Introduction (2 hrs)
Concept of engineering mechanics definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields. Definition of Applied Mechanics.
1,2 Concept of rigid body, scalar and vector quantities
2. Laws of forces (10 hrs)
Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & Uniformly distributed force, contact and non contact forces, effects of force, characteristics of a force
motion, Newton's laws of gravitation, Newton's laws of Difference
between mass and weight
Different force systems (coplanar and non-coplanar), principle of transmissibility of forces, law of super-position

Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces, resolving a force into two rectangular components

Free body diagram

Equilibrant force and its determination

Lami's theorem (concept only) [Simple problems on above topics]

3. Moment (9 hrs)

Concept of moment

Moment of a force and units of moment

Varignon's theorem (definition only)

Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve, reaction at support)

3.5 Parallel forces (like and unlike parallel force), calculating their resultant

3.6 Concept of couple, its properties and effects

3.7 General conditions of equilibrium of bodies under coplanar forces

3.8 Position of resultant force by moment

[Simple problems on the above topics]

4. Friction (9 hrs)

4.1 Definition and concept of friction, types of friction, force of friction

4.2 Laws of static friction, coefficient of friction, angle of friction, angle of repose, cone of friction

4.3 Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane.

4.4 Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force:

- a) Acting along the inclined plane Horizontally
- b) At some angle with the inclined plane

5. Centre of Gravity (6 hrs)

Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies

Determination of centroid of plain and composite lamina using moment method only, centroid of bodies with removed portion

Determination of center of gravity of solid bodies - cone, cylinder, hemisphere and sphere; composite bodies and bodies with portion removed

[Simple problems on the above topics]

6. Simple Machines (9 hrs)

Definition of effort, velocity ratio, mechanical advantage and efficiency of -a machine and their relationship, law of machines

Simple and compound machine (Examples)

Definition of ideal machine, reversible and self locking machine

Effort lost in friction, Load lost in friction, determination of maximum mechanical advantage and maximum efficiency

System of pulleys (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency

Working principle and application of wheel and axle, Weston's Differential

Pulley Block, simple screw jack, worm and worm wheel, single and double winch crab. Expression for their velocity ratio and field of their application

[Simple problems on the above topics]

LIST OF PRACTICALS

1. Verification of the polygon law of forces using gravesend apparatus.
2. To verify the forces in different members of jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
5. To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
6. To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel.

7. To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
8. To find out center of gravity of regular lamina.
9. To find out center of gravity of irregular lamina.
10. To determine coefficient of friction between three pairs of given surface.

RECOMMENDED BOOKS

1. Ramamurtham, S, "A Text Book of Applied Mechanics", Dhanpat Rai Publishing Co. Ltd.
2. Khurmi, RK, "A Text Book of Engineering Mechanics (Applied Mechanics)", S Chand and Co. Ltd., New Delhi.
3. Rajput, RK, "A Text Book of Applied Mechanics", Laxmi Publications, New Delhi.
4. Singh, Birinder, "Text Book of Applied Mechanics", Kaption Publishing House, New Delhi.
5. Upadhya, AK, "Text Book of Applied Mechanics", SK Kataria & Sons, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	2	2
2	10	12
3	9	10
4	9	10
5	6	6
6	9	10
Total	45	50

2.6 CONSTRUCTION MATERIAL

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RATIONALE

Civil Engineering diploma holders have to supervise construction of various types of civil works involving use of various materials like stones, bricks and tiles, cement and cement based products, lime, timber and wood based products, metals and other miscellaneous materials. The students should have requisite knowledge regarding characteristics, uses and availability of various building materials and skills in conducting tests to determine suitability of materials for various construction purposes. In addition, specifications of various materials should also be known as per BIS code for effective quality control.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Classify rocks and identify particular type of stones
- Classify different types of bricks and tiles
- Perform laboratory tests of cement to determine properties of cement
- Identify types of defects of timber
- Identify and use different types of metals/alloys
- Select different materials used for wall paneling and false ceiling such as PVC, POP etc.

DETAILED CONTENTS

1. Building Stones (04 hrs)

Classification of Rocks: (General Review)

Geological classification: Igneous, sedimentary and metamorphic rocks

Chemical classification; Calcareous, argillaceous and siliceous rocks

Physical classification: Unstratified, stratified and foliated rocks

**1.2 Identification of common building stones

- 1.3 Various uses of stones in construction
2. Bricks and Tiles (06 hrs)
- Introduction to bricks
Raw materials for brick manufacturing and properties of good brickmaking earth
Manufacturing of bricks
Preparation of clay (manual/mechanically)
**2.3.2 Moulding: hand moulding and machine moulding brick table;
drying of bricks, burning of bricks, types of kilns (Bull's Trench
Kiln and Hoffman's Kiln), process of burning, size and weight of
standard brick; traditional brick, refractory brick, clay-flyash
bricks, sun dried bricks, only line diagram of kilns
Classification and specifications of bricks as per BIS: 1077
Tiles
Building tiles; Types of tiles-wall, ceiling, roofing and flooring tiles
Ceramic, terrazo and PVC tiles: their properties and uses,
Vitrified tiles, Paver blocks, interlocking tiles
3. Cement (04 hrs)
- **3.1 Introduction, raw materials and their composition, flow diagram of
manufacturing of cement.
3.2 Various types of cements such as Ordinary Portland Cement, Portland
Pozzolana cement, Rapid Hardening cement, low heat cement, white
cement, quick setting cement, light weight cement etc., their properties and
uses.
4. Timber and Wood Based Products (04 hrs)
- Identification and uses of different types of timber: Teak, Deodar,
Shisham, Sal, Mango, Kail, Chir, Fir, Hollock, Champ
Seasoning of timber: Purpose, methods of seasoning as per BIS Code
Defects in timber, decay in timber, methods of preservation of timber

Other wood based products, their brief description of manufacture and uses:
Laminated Board, Fibre Board, Hard board, Sunmica,
Plywood and Veneers, HPL (High Pressure Laminate)

5. Metals (04 hrs)

Ferrous metals: Composition, properties and uses of cast iron, mild steel, HYSD steel, high tension steel as per BIS.

Commercial forms of ferrous, metals.

Aluminium & Stainless Steel.

6. Miscellaneous Materials (08 hrs)

Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC pipes

Fibre Sheets and their size and uses

Types and uses of insulating materials for sound and thermal insulation

Construction chemicals like water proofing compound, epoxies, polymers

Glass-types and uses

Materials used in interior decoration works like POP, PVC panelling

NOTE: **A field visit may be planned to explain and show the relevant things

PRACTICAL EXERCISES

1. To determine the fineness of cement
2. To determine the setting time of cement
3. To determine the consistency of cement
4. To determine the soundness of cement
5. To determine the compressive strength of cement
6. To perform the field test of cement
7. To identify the stones used in building works by visual examination
8. To determine the crushing strength of bricks
9. To determine the water absorption of bricks and efflorescence of bricks
10. To identify various types of timbers such as: Teak, Sal, Chir, Shisham, Deodar, Kail & Hollock by visual examination only

NOTE: The students should submit a report work on the construction materials, covering water proofing material, cements, steel, and timber products available in the local market. They will also show the competitive study based upon the cost, brand name, sizes available in the local market.

INSTRUCTIONAL STRATEGY

Teachers are expected to physically show various materials while imparting instructions. Field-visits should also be organized to show manufacturing processes and use of various materials in Civil engineering works. Students should be encouraged to collect sample of various building materials so as to create a museum of materials in the polytechnic.

RECOMMENDED BOOKS

1. Sharma, SK and Mathur, GC, “Engineering Materials”, S. Chand and Co., Delhi.
2. TTTI, Chandigarh, “Civil Engineering Materials”, Tata McGraw Hill Publication, New Delhi.
3. Kulkarni, GJ, “Engineering Materials”, Ahmedabad Book Depot, Ahmedabad.
4. Gurcharan Singh, “Engineering materials”, Standard Publishers Distributors, Delhi.
5. SC Rangawala, “Construction Materials”, Charotar Publishers Pvt Co Ltd, Anand.
6. Hemant Sood, “Lab Manual in Testing of Engineering Materials”, New Age International (P) Ltd., New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (out of 50)
1	4	7
2	6	10
3	4	7
4	4	7
5	4	7
6	8	12
Total	30	50

2.7 INTRODUCTION TO CAD

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RATIONALE

Computer Aided Drawings plays a very vital role in a in the professional life of a Civil engineer. These days Pen, Pencil and Paper drawings have been replaced by the CAD software. In order to enable the students to use and understand the CAD Software effectively in drawing making this course offers practical applications and understanding of various CAD Software.

LEARNING OUTCOMES

After going through the subject, the students will be able to:

- Explain commands and keyboard shortcuts of any CAD software
- Create new drawings in CAD
- Edit, modify and manipulate CAD drawings
- Make drawing templates
- Create 2D drawing figures.
- Print and plot CAD drawings at given scale

DETAILED CONTENTS CUM PRACTICAL EXERCISES

1. Introduction

Different Type of CAD Software (AutoCAD, ZWCAD, LibreCAD), Graphic user interface of CAD Software, Practical Applications, Workspaces Settings, Menu bar, Ribbons, Command line, Co-ordinate systems, File Types, File Management, Drawing Settings, Options.

Practical Exercise 1:

- To install any CAD Software and Customize the User Interface.

2. Drafting and Drawing Settings

Units Settings, Limits Setting, Ortho Mode, Polar Mode, Grid, Grid Setting, Snap, Object snap, Polar Tracking, Isometric Drafting, Dynamic Inputs, Quick Properties, Selection Cycling, Workspace Switching

Practical Exercise 2:

- To Set drawing units & customize the Grids
- To work with object Snap, Ortho and Polar Mode
- To use the Selection Cycling, Dynamic Inputs, Quick Properties

3. Drawing a line (Using Commands and Menu bar)

Point, Line, Spline, Multiline, 2D Polyline, 3D Polyline, X-line, Ray, Line Type, Line Weight, Line Type Scale, Creating line using Coordinates, Creating line using dimensions and angles, Purpose and uses of different types of lines

Practical Exercise 3:

- To create a point and change point style.
- To draw line, multiline, Spline, X Line and Poly Line.
- To change line type, line type scale and line color.

4. Drawing Shapes (Using Commands and Menu bar)

Rectangle, Polygon, Circle (Using 2 Points, 3 points, Tangents, Radius, Diameter), Arc, Ellipse, Donut, Helix, Creating shapes using Coordinates, Creating shapes using dimensions

Practical Exercise 4:

- To draw a rectangle and polygons using co-ordinates and sides.
- To draw a Circle using 2 Points, 3 points, Tangents, Radius, Diameter
- To draw arcs using various parameters
- To draw other shapes such as Ellipse, Donut and Helix

5. Modify Tools

Erase, Undo, Redo, Explode, Move, Copy, Offset, Rotate, Mirror, Scale, Stretch, Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet, Divide, Measure, Multiline style, Multiline edit, Poly edit, Spline edit, Array, Polar Array, Match Properties, Transparency, List, Properties

Practical Exercise 5:

- To create offsets of various line types.
- To edit a line using trim, extend, join, divide, measure, polyedit
- To use fillet and chamfer tool with two intersecting lines
- To create array and polar array of an object
- To edit the properties, transparency of various objects and use match property tool

6. Text

Single Line Text, Multiline Text, Symbols, Text Style, Bullets and Numbering, tcount, Fonts, Text Scaling, Spell, Table, Table style, Table Editing, Find and Replace

Practical Exercise 6:

- To write a single line &multiline text
- To change text styles, line height, bullets, numbering and fonts
- To create and edit a table
- To use find and replace option to modify text

7. Display Control

Visual Styles, Zoom, Pan, Redraw, Regen, Clean Screen, Steering wheels

Practical Exercise 7:

- To use the above options in a given drawing

8. Working with Layers

Layers and Layer Properties, New Property Filter, New Group Filter, Layer State Manager

Practical Exercise 8:

- To create a drawing using layers
- To modify properties of drawing objects using layers

9. Annotation Tools

Dimension (Linear, Aligned, Radius, Diameter, Center Mark, Angle, Arc length, Continuous, Baseline, Tolerance, Dimension Space, Dimension Break, Jogged radius, Ordinate dimensions, Centre Mark, Centerline), Dimension Style, Dimension Edit, Leader, Align Leader lines.

Practical Exercise 9:

- To use linear, aligned, angular and radial dimensions in a given drawing.
- To customize, change and create dimensions styles in a given drawing.

10. Hatching Objects

Boundary Creation, Hatch, Hatch Edit, Hatch Patterns, Hatch Angle, Hatch Scale, Gradient, Gradient Colors, Wipeout

Practical Exercise 10:

- To create a boundary and hatch in a given drawing.
- To change the hatch pattern, angle and scale in a given drawing
- To create a color gradient in a given drawing
- To use wipeout tool in a given drawing

11. Selection Methods

Select, Quick Select, Draw order, Filter, Creating and inserting Blocks, Group, Understanding difference between block and group

Practical Exercise 11:

- To select particular types of objects in a given drawing using quick select tool.
- To create and insert blocks of repetitive objects in a given drawing.
- To modify a block in the drawing
- To change the order of various objects in a given drawing

12. Plotting and Publishing

Introduction to plotting, Purging, Layout, Data Extract, Viewports, Page setup, Plot Options, Plotting Scales, Plot as Drawing, Save Drawing as PDF, Export in other Formats

Practical Exercise 12:

- To delete unused objects and blocks from drawing using purge method.
- To create drawing layout.
- To set the page for printing of a given drawing.
- To export drawing in PDF, EPS, WMF or in any other format.
- To extract the data of a given drawing in Excel or CSV Format.

13. Miscellaneous

Practical Exercises 13:

- Draw plan of a plot with 4 sides and calculate area using CAD
- Create a given drawing using decimal unit system
- Create a given drawing using engineering Unit System
- Create a traverse with given dimensions and included angles
- Import KML drawing from google earth into CAD
- Print a drawing with and without Line weight

RECOMMENDED BOOKS

1. Kyles, Shannon R, "AutoCAD Workbook for Architects and Engineers "
2. Mastering ZwcAD, ZwcAD Softwares Co. Ltd.
3. Venugopal, K, "New Age International Engineering Drawing AutoCAD and Building Drawing"
4. Kulkarni, D.M., "Engineering Graphics with AutoCAD "

WEBSITES FOR REFERENCES

1. <https://www.cdeep.iitb.ac.in/slides/A18/ME119/ME119-L1.pdf>
2. <https://www.youtube.com/watch?v=Woc4jUXBFtM&list=PLMtzJAOD3B7Z0kAGbqdVPZuT91pNIsF-R>

TRAFFIC AWARENESS & ROAD SAFETY CAMP (II)

A diploma holder must have knowledge of various types of traffic rules and regulations. Road safety education is vital for people of all ages. As a responsible citizen, you should be aware of each and every road safety rules. Observation is the key skill you need in ensuring road safety. By obeying safety rules and regulations, you can save yourself and others on the road. This camp covers the basic concepts of traffic rules and safety. Lectures will be delivered on following broad topics with the coordination of Distt. Traffic police. There will be no exam for this camp.

1. Time management
2. Traffic light signals
3. Speed limits of vehicles
4. Schedule of offences
5. Dividing lines
6. Proper road Maintenance and Warnings
7. Test yourself

