

SECOND SEMESTER (CIVIL ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME			Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
		Periods/Week				INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		L	T	P		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
2.1	*Applied Mathematics - II	5	-	-	4	20	-	20	50	2 ½	-	-	50	70
2.2	Computer Aided Drawing	-	-	8	3	-	40	40	-	-	60	3	60	100
2.3	+Applied Mechanics	5	-	2	5	20	10	30	50	2 ½	20	3	70	100
2.4	Basics of Mechanical and Electrical Engg.	6	-	2	5	20	10	30	50	2 ½	20	3	70	100
2.5	*Basics of Information Technology	-	-	6	2	-	40	40	-	-	60	3	60	100
2.6	General Workshop Practice -II	-	-	8	2	-	40	40	-	-	60	4	60	100
#Student Centred Activities (SCA)		-	-	6	1	-	30	30	-	-	-	-	-	30
Total		16	-	32	22	60	170	230	150	-	220	-	370	600

* Common with other diploma programmes

+ Common with diploma in Mechanical Engg. and Chemical Engg

Student Centred Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self study etc.

2.1 APPLIED MATHEMATICS - II

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RATIONALE

Basic elements of integral calculus, differential calculus, numerical methods, differential equations included in this course will play a vital role in understanding engineering problem mathematically. This will also develop analytical as well as conceptual abilities among students.

LEARNING OUTCOMES

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

- Calculate simple integration by methods of integration
- Evaluate the area under curves, surface by using definite integrals.
- Calculate the area and volume under a curve along areas
- Solve the engineering problems with numerical methods.
- Understand the geometric shapes used in engineering problems by co-ordinate geometry.

DETAILED CONTENTS

1. Integral Calculus - I (20 Periods)

Methods of Indefinite Integration :-

- 1.1 Integration by substitution.
- 1.2 Integration by rational function.
- 1.3 Integration by partial fraction.
- 1.4 Integration by parts.
- 1.5 Integration of special function

2. Integral Calculus - II: (20 Periods)

- 2.1 Meaning and properties of definite integrals, Evaluation of definite integrals..
- 2.2 Application : Length of simple curves, Finding areas bounded by simple curves Volume of solids of revolution, centre of mean of plane areas.
- 2.3 Simpsons 1/3rd and Simpsons 3/8th rule and Trapezoidal Rule : their application in simple cases. Numerical solutions of algebraic equations; Bisections method, Regula-Falsi method, Newton-Raphson's method(without proof), Numerical solutions of simultaneous equations; Gauss elimination method(without proof)

3. Co-ordinate Geometry (2 Dimension) (18 Periods)

3.1 Circle

Equation of circle in standard form, Centre - Radius form, Diameter form, Two intercept form.

4. Co-ordinate Geometry (3 Dimension)

(12 Periods)

4.1 Straight lines and planes in space

Distance between two points in space, direction cosine and direction ratios, Finding equation of a straight line (without proof)

INSTRUCTIONAL STRATEGY

Basic elements of Differential Calculus, Integral Calculus and differential equations can be taught conceptually along with real engineering applications in which particular algorithm and theory can be applied. Numerical examples will be helpful in understanding the content of the subject.

MEANS OF ASSESSMENT

- Assignments and Quiz/Class Tests
- Mid-term and End-term Written Tests
- Model/Prototype Making

RECOMMENDED BOOKS

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,
3. Applied Mathematics-II by Chauhan and Chauhan, Krishna Publications, Meerut.
4. Applied Mathematics-I (B) by Kailash Sinha and Varun Kumar; Aarti Publication, Meerut

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1.	20	28
2.	20	28
3.	18	24
4	12	20
Total	70	100

2.2 COMPUTER AIDED DRAWING

L T P
- -8

RATIONALE

A diploma holder is expected to prepare and interpret CAD Drawings. Hence this subject.

LEARNING OUTCOMES

On completion of this course, students will be able to :

- Know the advantages of using CAD in comparison with conventional method.
- Draw and interpret CAD drawings using drawing, editing and viewing in CAD software.
- Create 2D plans of building
- Create 3 D views from given 2D plans

DETAILED CONTENTS

1. Introduction to Computer Aided Drafting (2D) commands of any one software (Auto CAD, ProE, Solid works, Unigraphics etc. (6 drawing sheets)
 - 1.1 Concept of AutoCAD, Tool bars in CAD software, coordinate system, snap, grid, and ortho mode (Absolute, Relative and Polar), setting of units and layout.
 - 1.2 Drawing commands – point, line, arc, circle, ellipse,
 - 1.3 Editing commands – scale, erase, copy, stretch, lengthen and explode.
 - 1.4 Dimensioning and placing text in drawing area
 - 1.5 Sectioning and hatching
 - 1.6 Inquiry for different parameters of drawing entity
 - 1.7 Create layers within a drawing
 - 1.8 Specifying Geometrical Dimensioning & tolerancing (GD&T) parameters in drawing
2. 2-D Plan of a 2-Room Building
3. Isometric Drawing by CAD using any part modeling Software (3D) (one sheet)
Drawings of following on computer:
 - Cone
 - Cylinder
 - Cube
 - Spring
 - Isometric view of objects
4. Introduction to any part modeling software(ProE, Solid works, AutoCAD, Unigraphic , Catia etc.)
Introduction to Sketcher: Sketch Entities, Sketch Tools, Blocks, Dimensioning

- 4.1 Part modeling (4 models)
Part Modeling Tools:-
 - 4.1.1 Creating reference planes
 - 4.1.2 Creating Extrude features Creating Revolve Creating Swept features
 - 4.1.3 Creating Loft features
 - 4.1.4 Creating Reference - points, axis, coordinates
 - 4.1.5 Creating curves
 - 4.1.6 Creating Fillet features
 - 4.1.7 Inserting Hole types
 - 4.1.8 Creating Chamfer
 - 4.1.9 Creating Shell
 - 4.1.10 Creating Rib
 - 4.1.11 Environment & Utilities - Working with views and manipulating views.
- 4.2. Preparing 3-D view of existing 2-D plan.

INSTRUCTIONAL STRATEGY

1. Teachers should show model or realia of the component/part whose drawing is to be made.
2. Emphasis should be given on cleanliness, dimensioning, & layout of sheet.
3. Teachers should ensure use of IS codes related to drawing.

MEANS OF ASSESSMENT

- Drawings
- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Software installation, operation, and viva-voce

LIST OF RECOMMENDED BOOKS

1. Engineering Drawing with AutoCAD 2000 by T. Jeyapooran; Vikas Publishing House, Delhi.
2. AutoCAD for Engineering Drawing Made Easy by P. Nageswara Rao; Tata McGraw Hill, New Delhi.
3. AutoCAD 2000 for you by Umesh Shettigar and Abdul Khader; Janatha Publishers, Udupi.
4. Auto CAD 2000 by Ajit Singh, TMH, New Delhi.
5. Instruction Manual of the software used (AutoCAD, ProE, Solidwors, Unigraphic etc.)
6. E-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh.

Websites for Reference

<http://swayam.gov.in>

2.3 APPLIED MECHANICS

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5 - 2

RATIONALE

The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion 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.
- 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 lamina and solid bodies.
- Determine velocity ratio, mechanical advantage and efficiency of simple machines

DETAILED CONTENTS

- | | | |
|----|---|--------------|
| 1. | Introduction | (06 periods) |
| | 1.1 Concept of engineering mechanics definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields. Definition of Applied Mechanics. | |
| | 1.2 Definition, basic quantities and derived quantities of basic units and derived units | |
| | 1.3 Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another for density, force, pressure, work, power, velocity, acceleration | |
| | 1.4 Concept of rigid body, scalar and vector quantities | |
| 2. | Laws of forces | (12 periods) |
| | 2.1 Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & Uniformly distributed force, effects of force, characteristics of a force | |
| | 2.2 Different force systems (coplanar and non-coplanar), principle of transmissibility of forces, law of superposition | |

- 2.3 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
- 2.4 Free body diagram
- 2.5 Equilibrant force and its determination
- 2.6 Lami's theorem (concept only)
[Simple problems on above topics]
- 2.7 Type of Load, supports, Beams- analysis for simply supported, cantilever beams
3. Moment (14 periods)
- 3.1 Concept of moment
- 3.2 Moment of a force and units of moment
- 3.3 Varignon's theorem (definition only)
- 3.4 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 (14 periods)
- 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 (10 periods)
- 5.1 Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies
- 5.2 Determination of centroid of plain and composite lamina using moment method only, centroid of bodies with removed portion
- 5.3 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 (14 periods)
- 6.1. Definition of effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machines
 - 6.2. Simple and compound machine (Examples)
 - 6.3. Definition of ideal machine, reversible and self locking machine
 - 6.4. Effort lost in friction, Load lost in friction, determination of maximum mechanical advantage and maximum efficiency
 - 6.5. System of pulleys (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency
 - 6.6. 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.

INSTRUCTIONAL STRATEGY

Applied Mechanics being a fundamental subject, the teacher are expected to emphasize on the application of "Applied Mechanics" in various subjects so that students are able to appreciate the importance of the subject. Students should also be made conversant with the use of scientific calculator to solve numerical problems

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid and end-term written tests
- Model/prototype making.

RECOMMENDED BOOKS

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

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	8
2	12	18
3	14	20
4	14	20
5	10	14
6	14	20
Total	70	100

2.4 BASICS OF MECHANICAL & ELECTRICAL ENGINEERING

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6 - 2

RATIONALE

A part from the common core subjects, some engineering subjects are included in the diploma course of electrical engineering. One of these subjects is Elementary Mech. Engg. to impart some necessary knowledge and skill about mechanical nature. Inclusion of the subject is further justified by the fact that in practical field, any job of electrical and civil technician is intermingled with either civil or mechanical engineering. As such the relevant basic topics of these disciplines are included in the content of the subject.

Some study exercises along with some field work have been suggested to give feel of jobs and equipments involved.

LEARNING OUTCOMES

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

- Apply thermodynamics Laws.
- Use of various energy sources.
- Solve basics problems related to fuel and combustion.
- Have an idea of loading on machine components.
- Explain the application of different types of bearings.
- Explain the uses of different types of gears and springs.
- Explain the working principle of different lubrication systems.
- **Identify and take readings on various electrical equipments**
- **Determine voltage-current relationship in a DC circuit under specific physical conditions**
- **Measure resistance of an ammeter and a voltmeter**
- **Verify DC circuits (Thevenin and Norton Theorem)**
- **Verify Kirchhoff's Current and Voltage Laws in a dc circuit**
- **Find the ratio of inductance of a coil having air-core and iron-core respectively and observe the effect of introduction of a magnetic core on coil inductance**
- **Test a lead - acid storage battery**
- Measure power and power factor in a single phase R-L-C Circuit and calculation of active and reactive powers in the circuit.
- Measure voltages and currents in polyphase a.c. circuits for star and delta connections.

SECTION A - MECHANICAL ENGINEERING DETAILED CONTENTS

1. Thermal Engineering (08 periods)

1.1 Sources of Energy:

Definition, Concept of thermodynamic system and surroundings, Closed system, Open system, Isolated system, Thermodynamics definition of work. Zeroth law of thermodynamics

Basic ideas, conventional and nonconventional forms- Thermal, Hydel, Tidal, wind, Solar, Biomass and Nuclear and their uses.

1.2 Fuels & Combustion:

Combustion of fuels- their higher and lower calorific values. Combustion equations for carbon, sulphur, hydrogen and their simple compounds. Calculation of minimum amount of air required for complete combustion.

Combustion analysis on mass basis and on volume basis. Concept of excess air in a boiler furnace combustion. Heat carried away by flue gases. Analysis of flue gases by Orsat apparatus. Simple numerical problems

Idea of specific properties of liquid fuels such as detonation, knock resistance (cetane and octane numbers), viscosity, solidification point, flash point and flame point.

2. Machine Components (12 periods)

Brief idea of loading on machine components.

(i) Pins, Cotter and Knuckle Joints.

(ii) Keys, Key ways and spline on the shaft.

(iii) Shafts, Collars, Cranks, Eccentrics.

(iv) Couplings and Clutches.

(v) Bearings-Plane, Bushed, Split-step, ball, Roller bearing, Journal bearing, Foot step bearing, thrust bearing, collar bearing and Special type bearings and their applications.

(vi) Gears :

Different types of gears, gear trains and their use for transmission of motion. Determination of velocity ratio for spur gear trains; spur gear, single and double helical gears, Bevel gears, Mitre wheel, worms, Rack and Pinion. Simple and compound and epicyclic gear trains and their use. Definition of pitch and pitch circle & module.

(vii) Springs:

Compression, Tension, Helical springs, Torsion springs, Leaf and Laminated springs. Their use and material.

3. Lubrication (04 periods)

Different lubrication system for lubricating the components of machines.

Principle of working of wet sump and dry sump system of lubrication. (Explain with simple line diagram). Selection of lubricant based on different application (Requirement with the help of manufacturer catalogue).

SECTION B: ELECTRICAL ENGINEERING

4. Overview of DC Circuits (06 periods)

4.1 Definition of basic terms, such as current, EMF, Potential Difference (PD); Ohm's Law and its limitations; Factors affecting resistors and capacitors; simple problems on series and parallel combinations of resistors with their wattage considerations.

4.2 Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits. Star – Delta connections and their conversion.

5. DC Circuit Theorems (06 periods)

Thevenin's theorem, Norton's theorem, application of network theorems in solving D.C. circuit problems.

6. Voltage and Current Sources (04 periods)

6.1 Concept of voltage source, symbol and graphical representation characteristics of ideal and practical sources.

6.2 Concept of current sources, symbol, characteristic and graphical representation of ideal and practical current sources.

7. Electro Magnetic Induction (08 periods)

7.1 Concept of electro-magnetic field produced by flow of electric current, magnetic circuit, concept of magneto-motive force (MMF), flux, reluctance, permeability, analogy between electric and magnetic circuit.

7.2 Faraday's laws of electro-magnetic induction, principles of self and mutual induction, self and mutually induced e.m.f, simple numerical problems.

7.3 Concept of current growth, decay and time constant in an inductive (RL) circuit.

7.4 Energy stored in an inductor, series and parallel combination of inductors.

8. Batteries (06 periods)
- 8.1 Basic idea of primary and secondary cells
 - 8.2 Construction, working principle and applications of Lead-Acid, Nickel-Cadmium and Silver-Oxide batteries
 - 8.3 Charging methods used for lead-acid battery (accumulator)
 - 8.4 Care and maintenance of lead-acid battery
 - 8.5 Series and parallel connections of batteries
 - 8.6 General idea of solar cells, solar panels and their applications
 - 8.7 Introduction to maintenance free batteries
9. AC Fundamentals (10 periods)
- 9.1 Concept of alternating quantities
 - 9.2 Difference between ac and dc
 - 9.3 Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value, form factor and peak factor.
 - 9.4 Representation of sinusoidal quantities by phasor diagrams.
 - 9.5 Equation of sinusoidal wave form for an alternating quantity and its derivation
 - 9.6 Effect of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.
10. AC Circuits (14 periods)
- 10.1 Concept of inductive and capacitive reactance
 - 10.2 Alternating voltage applied to resistance and inductance in series.
 - 10.3 Alternating voltage applied to resistance and capacitance in series.
 - 10.4 Introduction to series and parallel resonance and its conditions
 - 10.5 Power in pure resistance, inductance and capacitance, power in combined RLC circuits. Power factor, active and reactive power and their significance, definition and significance of power factor.
 - 10.6 Definition of conductance, susceptance, admittance, impedance and their units
 - 10.7 Introduction to polyphase a.c. systems, advantages of polyphase system over single phase system. Relations between line and phase value of voltages and currents for star and delta connections and their phasor diagram, power in polyphase circuits.
11. Various Types of Power Plants (06 periods)

- 11.1 Brief explanation of principle of power generation practices in thermal, hydro and nuclear power stations and their comparative study. A Visit to a nearby Power Station(s) may be organized for better understanding and exposure.
- 11.2 Elementary block diagram of above mentioned power stations

LIST OF PRACTICALS

1. Study and Sketch of Pins and Cottor
2. Study and Sketch of Keys and Key ways
3. Study and sketch of Couplings and Clutches
4. Study and Sketch of Bearings
5. Study and Sketch of Springs
6. Study of green energy
- 7 Study of Maintenance and safety aspects of lifts in buildings
- 8 Operation and use of measuring instruments viz voltmeter, ammeter, CRO, Wattmeter, multi-meter and other accessories
- 9 Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions.
- 10 Measurement of resistance of an ammeter and a voltmeter
- 11 Verification of dc circuits:
 - a. Thevenin's theorem,
 - b. Norton's theorem,
- 12 Observation of change in resistance of a bulb in hot and cold conditions, using voltmeter and ammeter.
- 13 Verification of Kirchoff's Current and Voltage Laws in a dc circuit
- 14 To find the ratio of inductance of a coil having air-core and iron-core respectively and to observe the effect of introduction of a magnetic core on coil inductance
- 15 Charging and testing of a lead - acid storage battery.
- 16 Measurement of power and power factor in a single phase R-.L-.C. circuit and calculation of active and reactive powers in the circuit.
- 17 Verification of line to line and line to neutral voltages and current in star and delta connections.
- 18 Study of Wiring system of Public Buildings & Residential buildings.

Note: Visit to a nearby Power Station(s) may be arranged to demonstrate various aspects of subject.

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on basic principles and use charts in class, visits to labs and industry may be arranged to demonstrate certain materials and practices.

MEANS OF ASSESSMENT

- Sessional Tests
- End term Tests
- Practicals
- Viva-Voce

RECOMMENDED BOOKS

1. Thermal Engineering by RK Rajput; Laxmi Publications, Delhi.
2. Theory Machines by SS Rattan; Tata McGraw Hill, New Delhi.
3. Basic Electrical Engineering by PS Dhogal, Tata McGraw-Hill Education Pvt Ltd., New Delhi.
4. Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.
5. Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
6. Basic Electrical Engineering by JB Gupta; SK Kataria and Sons, New Delhi.
7. Basic Electrical Engineering by Asfaque Husain, Jain Book Depot, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1.	08	10
2.	12	15
3.	04	05
4.	06	08
5.	06	06
6.	04	05
7.	08	09
8.	06	08
9.	10	12
10.	14	16
11.	06	06
Total	84	100

2.5 BASICS OF INFORMATION TECHNOLOGY

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- - 6

RATIONALE

Information technology has great influence on all aspects of life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools using MS Office/Open Office/Libre Office using internet etc., form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

Note:

Explanation of Introductory part should be demonstrated with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

LEARNING OUTCOMES

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

- Identify Computer Hardware Components, Network Components and Peripherals.
- Explain the role of an Operating System.
- Install System and Application Software.
- Explain the function of the system components including Processor, Motherboard and Input-output devices.
- Use Word Processing Software to prepare document.
- Use Spreadsheet Software to create workbooks and automate calculation.
- Use Presentation Software to create interactive presentation.
- Perform fundamental tasks common to most application software including print, scan, save, edit, cut, copy, paste, format, spell and grammar check.
- Find and evaluate information on the Web.
- Install Antivirus.

- Safeguard against Online Frauds, threats and crimes.
- Use online office tools(Google suits)

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Introduction to Computers and Peripherals.

Components of Computer, Types of Computer, CPU, RAM, ROM, Hard disk, USB, Flash drive, CD, DVD, Blue ray, Keyboard, Mouse, Monitor, LCD, Printer, Plotter, Scanner, Modem, Sound Cards, Speakers, CMOS battery, Sharing of Printers.

2. Operation System and Application Software

System Software, Application Software, Virtualization Software, Utility Software, MS Office/Open Office/Libreoffice, Working with window, Desktop components, Menu bars, creating shortcut of program. Installation of Application softwares, Antivirus and Drivers.

3. Word Processing, Spreadsheet and Presentation

Usage and creation of word document, spreadsheets and presentation, Google Suits (Google drive, google sheet, google doc. Google presentation)

4. Internet

Basics of Networking – LAN, WAN, Wi-Fi technologies, Concept of IP Addrsses, DNS, Search Engines, e-mail, Browsing and cyber laws.

LIST OF PRACTICAL EXERCISES

1. Identify various components, peripherals of computer and list their functions.
2. Installation of various application software and peripheral drivers
3. Installation of operating system (windows/linux/others)
4. Creation and Management (Rename, delete, search of file and folders)
5. Installation of Antivirus and remove viruses
6. Scanning and printing documents
7. Browsing, Downloading, Information using Internet
8. E-Mail ID creation, comparing, sending and receiving e-mail. Attaching a file with e-mail message.
9. Word Processing (MS Office/Open Office)
 - a) File Management
 - Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, giving password protection for a file
 - b) Page set up
 - Setting margins, tab setting, ruler, indenting
 - c) Editing a document
 - Entering text, cut, copy, paste using tool- bars
 - d) Formatting a document

- Using different fonts, changing font size and colour, changing the appearance through bold/italic/underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
 - Aligning of text in a document, justification of document, inserting bullets and numbering
 - Formatting paragraph, inserting page breaks and column breaks, line spacing
 - Use of headers, footers: Inserting footnote, end note, use of comments, autotext
 - Inserting date, time, special symbols, importing graphic images, drawing tools
- e) Tables and Borders
- Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
 - Print preview, zoom, page set up, printing options
 - Using find, replace options
- f) Using Tools like
- Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelopes and labels
 - Using shapes and drawing toolbar,
 - Working with more than one window .

10. Spread Sheet Processing (MS Office/Open Office/Libre Office)

- a) Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, save worksheet, switching between different spread sheets
- b) Menu commands:
Create, format charts, organise, manage data, solving problem by analyzing data. Programming with Excel Work Sheet, getting information while working
- c) Work books:
Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations
Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet, conditional formatting
- d) Creating a chart:
Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
Using a list to organize data, sorting and filtering data in list
- e) Retrieve data with query:
Create a pivot table, customizing a pivot table. Statistical analysis of data
- f) Exchange data with other application:
Embedding objects, linking to other applications, import, export document.

11. PowerPoint Presentation (MS Office/Open Office/Libre office)

- a) Introduction to PowerPoint
 - How to start PowerPoint
 - Working environment: concept of toolbars, slide layout & templates.
 - Opening a new/existing presentation
 - Different views for viewing slides in a presentation: normal, slide sorter.
- b) Addition, deletion and saving of slides
- c) Insertion of multimedia elements
 - Adding text boxes
 - Adding/importing pictures
 - Adding movies and sound
 - Adding tables and charts etc.
 - Adding organizational chart
 - Editing objects
 - Working with Clip Art
- d) Formatting slides
 - Using slide master
 - Text formatting
 - Changing slide layout
 - Changing slide colour scheme
 - Changing background
 - Applying design template

12. Google Suits

Using Google drive, Google shut, Google docs, Google slides.

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connections and proficient in making use of MS Office/Open Office/Libre office/Google Suit in addition to working on internet. The student should be made capable of working on computers independently.

MEANS OF ASSESSMENT

- Class Tests/Quiz
- Software Installation and Use
- Viva-Voce
- Presentation

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Information Technology for Management by Henery Lucas, Tata McGraw Hills, New Delhi

3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
4. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.
5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
9. On Your Marks - Net...Set...Go... Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi
10. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

Reference websites

1. www.tutorialspoint.com
2. www.sf.net
3. Gsuite.google.com
4. Spoken-tutorial.org
5. Swayam.gov.in

2.6 GENERAL WORKSHOP PRACTICE –II

(Common for Civil Engineering, Electrical Engineering and Chemical Engineering)

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RATIONALE

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practice. General workshop practices are included in the curriculum in order to provide hands-on experience about use of different tools and basic manufacturing practices. This subject aims at developing general manual and machining skills in the students. In addition, the development of dignity of labour, safety at work place, team working and development of right attitude are the other objectives.

LEARNING OUTCOMES

After completing the course, the students will be able to:

- Identify tools and equipment used and their respective functions.
- Identify different types of materials and their basic properties.
- Use and take measurements with the help of basic measuring tools/equipment.
- Select proper tools for a particular operation.
- Select materials, tools, and sequence of operations to make a job as per given specification/drawing.
- Prepare simple jobs independently and inspect the same.
- Follow safety procedures and precautionary measures.
- Use safety equipment and Personal Protection Equipment.

DETAILED CONTENTS (PRACTICAL EXERCISES)

Note: The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their practical Notebook.

The following shops are included in the syllabus:

- 1 Fitting Shop
- 2 Sheet Metal Shop
- 3 Mason Shop
- 4 Machine Shop

1. FITTING SHOP

- 1.1 Use of personal protective equipment and safety precautions while working.

- 1.2 Basic deburring processes.
- 1.3 Introduction to fitting shop tools, marking and measuring devices/equipment.
- 1.4 Identification of materials. (Iron, Copper, Stainless Steel, Aluminium etc.)
- 1.5 Identification of various steel sections (flat, angle, channel, bar etc.).
- 1.6 Introduction to various fitting shop operations/processes (Hacksawing, Drilling, Chipping and Filing).
- 1.7 Job Practice
 - Job I Marking of job, use of marking tools, filing and use of measuring instruments. (Vernier caliper, Micrometer and Vernier height gauge).
 - Job II Filing a rectangular/square piece to maintain dimensions within an accuracy of ± 0.25 mm.
 - Job III Making a cut-out from a square piece of MS flat using hand hacksaw and chipping
 - Job IV Drilling and tapping practice on MS Flat.

2. SHEET METAL SHOP

- 2.1. Introduction to sheet metal shop, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material.
- 2.2 Introduction and demonstration of hand tools used in sheet metal shop.
- 2.3 Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. Shearing Machine, Bar Folder, Burring Machine,
- 2.4 Introduction and demonstration of various raw materials used in sheet metal shop e.g. black-plain sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheet etc.
- 2.5 Study of various types of nuts, bolts, rivets, screws etc.
- 2.6 Job Practice
 - Job I: Shearing practice on a sheet using hand shears.
 - Job II: Practice on making Single riveted lap joint/Double riveted lap Joint.
 - Job III: Practice on making Single cover plate chain type, zig-zag type and single rivetted Butt Joint.

3 MASON SHOP

- 3.1. Introduction and importance of Mason shop
- 3.2. Introduction of tools, equipment and machines used in Mason shop
- 3.3. Job Practice

Job I : Preparation of simple bond