







# Participant Handbook









Skilling India in Electronics

Address: 155, 2nd Floor, ESC House, Okhla Industrial Area,

Phase 3, New Delhi- 110020, India

Email: info@essc-india.org
Web: www.essc-india.org
Phone: +91 8447738501

Sector **Electronics** 

Sub - Sector

**Security & Surveillance** 

Occupation

After sales support

Reference ID: ELE/Q4605, Version 2.0

**NSQF Level 4** 



CCTV Installation Technician

### **Published by**

#### **Electronics Sector Skills Council of India (ESSCI)**

155, 2nd Floor, ESC House, Okhla Industrial Area, Phase 3, New Delhi - 110020, India

Email: info@essc-india.org Website: www.essc-india.org

Phone: +91 11 46035050, +91 8447738501

All Rights Reserved©2022 First Edition, July 2022

### Copyright@2022

#### **Electronics Sector Skills Council of India (ESSCI)**

155, 2nd Floor, ESC House, Okhla Industrial Area, Phase 3, New Delhi - 110020, India

Email: info@essc-india.org Website: www.essc-india.org

Phone: +91 11 46035050, +91 8447738501

This book is sponsored by Electronics Sector Skills Council of India (ESSCI)

Under Creative Commons Licence: CC-BY-SA

Attribution-ShareAlike: CC BY-SA



This license lets others remix, tweak, and build upon your work even for commercial purposes, as long as they credit you and license their new creations under the identical terms. This license is often compared to "copyleft" free and open-source software licenses. All new works based on yours will carry the same license, so any derivatives will also allow commercial use. This is the license used by Wikipedia and is recommended for materials that would benefit from incorporating content from Wikipedia and similarly licensed projects.

### Disclamer

The information contained here in has been obtained from sources reliable to ESSCI. ESSCI disclaims all warranties to the accuracy, completeness or adequacy of such information. ESSCI shall have no liability for errors, omissions, or inadequacies, in the information contained herein, or for interpretations thereof. Every effort has been made to trace the owners of the copyright material included in the book. The publishers would be grateful for any omissions brought to their notice for acknowledgements in future editions of the book. No entity in ESSCI shall be responsible for any loss whatsoever, sustained by any person who relies on this material. The material in this publication is copyrighted. No parts of this publication may be reproduced, stored or distributed in any form or by any means either on paper or electronic media, unless authorized by the ESSCI.





Skilling is building a better India.

If we have to move India towards development then Skill Development should be our mission.



Shri Narendra Modi
Prime Minister of India







### Certificate

### COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARD

Is hereby issued by the

**Electronics Sector Skills Council of India** 

for

### ${\bf Skilling\ Content:\ CCTV\ Installation\ Technician}$

Complying to National Occupational Standards of

Job Role/QP: CCTV Installation Technician, QP No: ELE/Q4605 Level 4

Date of Issuance: 27.01.2022 Valid up to\*: \_02.06.2025\_\_\_

\*Valid upto the next QP Review Date or the date mentioned above (whichever is earlier)

Authorized Signatory
Electronics Sector Skill Council of India

### **Acknowledgements**

The need for having a standard curriculum for the Job Role based Qualification Packs under the National Skills Qualification Framework was felt necessary for achieving a uniform skill based training manual in the form of a Facilitator Guide.

I would like to take the opportunity to thank everyone who contributed in developing this Guide for the QP CCTV Installation Technician.

The Guide is the result of tireless pursuit to develop an effective tool for imparting the Skill Based training in the most effective manner.

I would like to thank the team of Kontent Edge for their support to develop the content, the SME and the team at the ESSCI along with the industry partners for the tireless effort in bringing the Guide in the current format.

CEO

**Electronics Sector Skills Council of India** 

### **About this Book**

This Facilitator Guide is designed to enable training for the specific Qualification Pack (QP). Each National Occupational (NOS) is covered across Unit/s.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS.

- Define electricity
- Identify the difference between electrical and electronic devices
- Define the basic concepts related to electricity
- Define electronic security system
- List the types of electronic surveillance
- Recognize the roles of a CCTV installer
- List pre-installation activities
- Identify the factors to be considered for designing process
- Analyse customer needs and requirements
- Explain the positioning of camera
- Identify the protection grades
- Perform the steps for installing a dome
- List the steps of DVR installation
- Explain the operation of DVR
- Identify the controls of DVR
- Identify the basic communication skills
- Define listening, communication, critical thinking and decision making
- Identify reflective and critical thinking skills
- · Recognize factors that limit decision making skills
- Identify work requirements
- Describe the right work ethics

The symbols used in this book are described below.

### **Symbols Used**



Key Learning Outcomes



Steps



**Role Play** 



Tips



Notes



Unit Objectives



Activity

### **Table of Contents**

S. No	Modules and Units	Page No.
1.	Fundamentals of CCTV System (ELE/N4610)	1
	Unit 1.1 – Basics of electricity	3
	Unit 1.2 – Basics of electronics	14
	Unit 1.3 – Connectors and Cables	22
	Unit 1.4 – Basics of Networking	29
	Unit 1.5 – Tools and Equipment	51
2.	Electronic Surveillance (ELE/N4611)	59
	Unit 2.1 – Introduction to Electronic Surveillance	61
	Unit 2.2 – Introducing CCTV	68
	Unit 2.3 – CCTV Technology	83
3.	Designing of the CCTV System (ELE/4609, ELE/4610)	93
	Unit 3.1 – Pre-Installation Activities	95
	Unit 3.2 – Customer Requirements and Site Analysis Unit 3.3 – Selection of Components	98 110
4.	CCTV Camera Installation (ELE/4611)	131
4.	Unit 4.1 – Planning for CCTV Camera Installation	133
	Unit 4.2 – Installing the Camera	139
	Unit 4.3 – Checking the Camera Functions	151
5.	Set Up CCTV Surveillance System (ELE/4611, ELE/4610, ELE/4609)	157
	Unit 5.1 – Connecting Camera and DVR with System	159
	Unit 5.2 – Configuring Network Settings	170
	Unit 5.3 – Checking the Functioning of the System	176
6.	Soft Skills and Work Ethics (ELE/N9905)	181
	Unit 6.1 – Effective Communication and Coordination at Work	183
	Unit 6.2 – Working Effectively and Maintaining Discipline at Work	190
	Unit 6.3 – Maintaining Social Diversity at Work	201
7.	Basic Health and Safety Practices (ELE/N1002)	209
	Unit 7.1 – Workplace Hazards	211
	Unit 7.2 – Fire Safety	223
	Unit 7.3 – First Aid	227
	Unit 7.4 – Waste Management	231
8.	Employability and Entrepreneurship Skills	237
	Unit 8.1 – Personal Strengths and Value System	241
	Unit 8.2 – Digital Literacy: A Recap	260
	Unit 8.3 – Money Matters	265
	Unit 8.4 – Preparing for Employment and Self-Employment	275
	Unit 8.5 – Understanding Entrepreneurship	285
	Unit 8.6 – Preparing to be an Entrepreneur	306













# 1. Fundamentals of CCTV System

Unit 1.1 - Basics of Electricity

Unit 1.2 - Basics of Electronics

Unit 1.3 – Connectors and Cables

Unit 1.4 - Basics of Networking

Unit 1.5 – Tools and Equipment



# Key Learning Outcomes



### At the end of this module, you will be able to:

- 1. Define electricity
- 2. Identify the difference between electrical and electronic devices
- 3. Define the basic concepts related to electricity
- 4. Identify the features of testing instruments
- 5. Use various electronic components in a CCTV system
- 6. Work with different cables and connectors in a CCTV system

### **UNIT 1.1: Basics of Electricity**

### **Unit Objectives**



### At the end of this unit, you will be able to:

- 1. Define electric charge, electric current and electric circuit
- 2. Differentiate between alternating current and direct current
- 3. Define voltage and current
- 4. Differentiate between conductors and Insulators
- 5. Explain insulators and connectors
- 6. Explain electric charge, electric current and electric circuit



### 1.1.1 Fundamentals of Electricity

Electricity is a natural force that comes into existence whenever there is a flow of electric charge between any two components. When working with circuits, there is a need for the users to be aware of some of the basic concepts of electricity, otherwise wrong connection in a circuit may cause high damage to people and the circuit components.

The following figure lists the main terms associated with electricity:

Current (I)

- When electrons inside any material move, flow of electricity takes place. This flow is called current.
- •The flow of electrons through a wire is similar to the flow of water through a pipe. The water current is the number of molecules flowing past a fixed point. Similarly, electrical current is the amount of charge flowing past a fixed point.

Voltage (V)

- •Voltage is the potential difference between a negatively charged component and a component with positive charge.
- •In an electrical circuit, the current flows only when there is a voltage source. Voltage is the force pushing electrons through the wire.
- Electric power is the rate at which electric energy is transferred by an electric circuit.
- •The electric power produced by an electric current I consisting of a charge of Q coulombs every t seconds passing through an electric potential (voltage) difference of V is:

P= work done per unit time =VQ/t = VI

- Electric power is usually produced by electric generators but can also be supplied by sources such as electric batteries and is usually measured in kilowatt.
- •Electric utilities measure power using an electricity meter, which keeps a running total of the electric energy delivered to a customer.

Energy (E)

Power (P)

- •If the electrical power is the rate or speed of work done, then electrical energy is the total amount of work done in a given time period.
- •It is product of power of electrical appliance and duration of its usage. To determine electrical use the following equation:

Electrical Energy (E) = Power (P) x Duration of Energy usage (T) = Power (Watt) x Time (hour) E (Wh) = P (W) x T (h)

Fig. 1.1.1: Main terms associated with electricity

### Tips

- 1. The unit of electric power is Watt that is one joule per second.
- 2. The term wattage means electric power in Watts.

### 1.1.2 Ohm's Law

According to the Ohm's law, the current flowing through a conductor is directly proportional to the voltage across the conductor. The mathematical equation of Ohm's law is:

I = V/R

Where, I is the current flowing through the conductor measured in units of amperes, V is the potential difference measured across the conductor in units of volts, and R is the proportionality constant, known as the resistance of the conductor. Resistance of the conductor is independent of current flowing through a conductor.

### 1.1.3 Electrical Circuit

The interconnection of various electrical components is called electrical circuit. The simplest circuit has:

- A power source, such as a battery or an outlet
- A wire running from the hot side to a load
- A wire from the load back to the power source

There is also, usually a switch to open or close the circuit. The load will function only when the circuit is closed or complete. The following figures show an open and a close circuit:

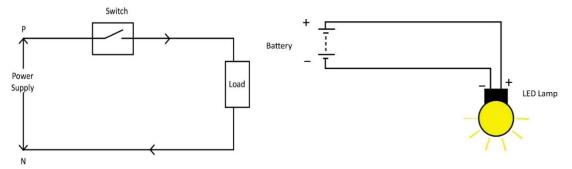


Fig. 1.1.2: An open and a close circuit

### Alternating Current (AC) and Direct Current (DC)

Alternating current (AC) is an electric current which reverses its direction at a regular interval. Direct current (DC) is the one which flows in one direction. For example, the battery cell in a flashlight is a source of DC power. Power source with alternating current such as AC generator, is used to deliver electric power to businesses and residences as shown in the following figures:

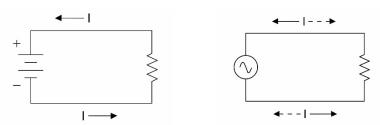


Fig. 1.1.3: Direct current

Fig. 1.1.4: Alternating current

In AC circuit, current flows in both the directions; clockwise and counter clockwise. For the time period 0 to T/2 current flows in clockwise direction and for the time period T/2 to T, the

charge flow reverses to counter clockwise direction. It is not only the direction but the value of current that keeps changing with time.

The AC current changes its direction 50 times in one second which means the power supply has 50 Hertz frequency. The following figure shows the voltage-time relationship between AC and DC:

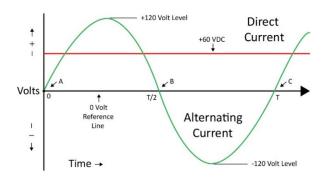
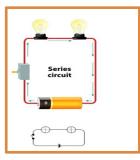


Fig. 1.1.5: Voltage-Time relationship for AC and DC

### **Series and Parallel Circuit**

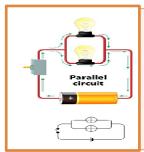
Most of the circuits are a combination of series and parallel circuits. The following figure describes series and parallel circuits:



In a series circuit, all the components are connected as a chain and the current flowing through the components is same all over the circuit.

There is only one path in the circuit in which the current can flow. So, the current passes through each component.

Opening or breaking any point of a series circuit causes the whole circuit to stop functioning and the entire circuit needs to be replaced.



In a parallel circuit, two or more components are connected in parallel.

All the components have the same voltage across them. The current flow varies across the components.

If any point of the circuit gets damaged, only that part needs to be replaced.

Fig. 1.1.6: Series and parallel circuits

### 1.1.4 Electrical Signal

Fig: 1.1.8: Elements of the voltage-time relationship graph

A signal represents a function containing information related to attributes and behaviour of a particular phenomenon. The information can be represented in the form of varied voltage, electric signal and its frequency, and current. The following figure shows a voltage-time relationship graph of an electrical signal:

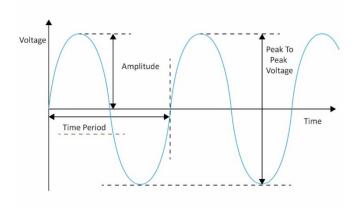


Fig: 1.1.7: Voltage-time relationship graph of an electrical signal

The following figure lists the different elements of the voltage -time relationship graph:

Amplitude	Maximum value of voltage of a signal. It is represented by either of the two peaks of the sine wave.  This voltage level is also referred to as the peak voltage, and can be either be positive or negative.
Peak-peak voltage	Twice the peak voltage.  When reading an oscilloscope trace it is required to measure peak-peak voltage.
Time period	Time taken for the signal to complete one cycle. It is measured in seconds (s). Time periods tend to be short so milliseconds (ms) and microseconds ( $\mu$ s) are often used. 1ms = 0.001s and 1 $\mu$ s = 0.000001s.
Frequency	Number of cycles per second.  It is measured in hertz (Hz). Frequencies tend to be high, so kilohertz (kHz) and megahertz (MHz) are often used.  1kHz = 1000Hz and 1MHz = 1000000Hz.

### 1.1.5 Types of Power Supply

A device that supplies electrical energy to an electric load is known as a power supply. Its main function is conversion of electrical energy to different forms, and therefore it is also known as electric power converter.

Most types of power supply are meant to transmit electricity mains of high voltage to an appropriate low voltage supply for circuits and other electrical devices. The following figure lists different types of power supplies:

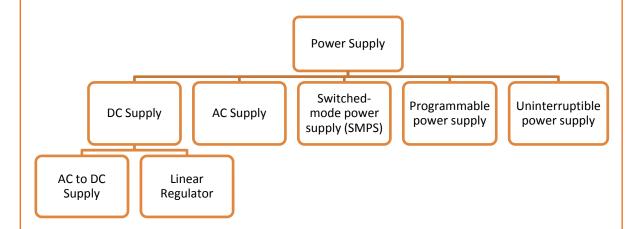


Fig: 1.1.9: Types of power supply

#### **DC Power Supply**

A power supply transmitting a constant voltage of DC current to its load is known as DC power supply. In power mains, depending on the design, an AC/DC source can power a DC power supply. The following image shows a DC power supply:



Fig: 1.1.10: DC Power Supply

### **AC-to-DC Supply**

AC mains of electricity are utilized by DC power supplies as a source of energy. A transformer is employed for the conversion of input voltage to a high/low AC voltage in such cases. Output voltage of a transformer is converted to a varied DC voltage which in turn is converted to unregulated DC voltage by passing it through an electronic filter. The filter

mainly removes most variations of AC voltage and the AC voltage left behind is referred to as a ripple.

### **Linear Regulator**

Varying DC voltage is converted to a constant (low DC voltage) by a linear voltage regulator, the function of a linear voltage regulator prevents power supply or an over current load, by limiting the current.

Most power supply applications require an output voltage that is constant but the energy sources providing voltage varies with load impedance changes. Moreover, the output voltage varies with changes in input voltage when a DC power supply being the source of energy is unregulated. To avoid this, linear voltage regulator is used by a few power supplies for maintenance of output at a constant value, free from any variance in load impedance and input voltage. Ripple's magnitude and output voltage noise can be reduced by linear regulators. The following figure shows a linear regulator:

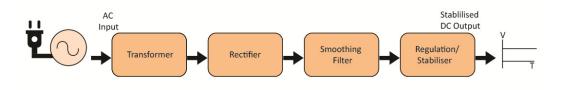


Fig: 1.1.11: A linear regulator

### **AC Power Supply**

The wall outlet is the main supply that gives voltage to an AC power supply and brings it down to the required voltage along with some filtration.

The division of AC supply is into three phase or single phase systems. The two differ in consistency of delivery between the two systems. Both frequency and voltage can be changed using AC power supply. Suitability of products and compatibility in other countries are checked by manufacturers.

### **Switched-mode Power Supply (SMPS)**

In such a supply, power handling electronic components are continuously switching on and off with high frequency in order to provide the transfer of electric energy via energy storage components (inductors and capacitors). By varying duty cycle, frequency or a relative phase of these transitions the average value of output voltage or current is controlled. The frequency range of a commercial SMPS unit varies typically from 50 kHz to several MHz.

The following image shows an SMPS:



Fig: 1.1.12: SMPS

The following figure shows a schematic diagram of SMPS:

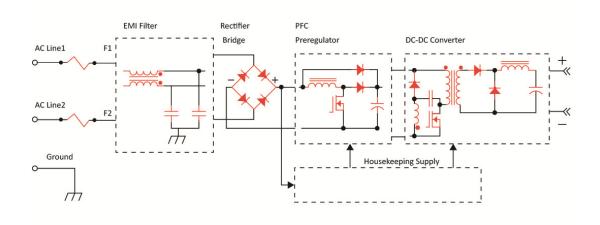


Fig: 1.1.13: A schematic diagram of SMPS

### **Programmable Power Supply**

A power supply allowing its operation with the help of a remote control though a digital interface of GPIB/RS232 or an analog input is referred to as a programmable power supply. Current and voltage are controlled properties in this power supply. It is used in various applications:

- Automatic equipment testing
- Fabrication of semiconductor
- Monitoring crystal growth
- X-ray generators

The following figure shows a programmable power supply:



Fig: 1.1.14: Programmable power supply

### **Uninterruptible Power Supply (UPS)**

A UPS derives power from multiple sources at the same time. AC mains directly power a UPS and charges the storage battery simultaneously. In case of a failure/dropout of mains, the load is never interrupted because the battery switches on. The following image shows an uninterruptible power supply:



Fig: 1.1.15: Uninterruptible power supply

### **Multiple Output Power Supply**

There are usually two to three outputs in a multiple output power supply. It is considered to be a cost-effective choice if it is used to test multiple voltages. Triple-output is the most sought power supply that has two outputs of bipolar analog circuitry and one of digital logic output. Following are some common features:

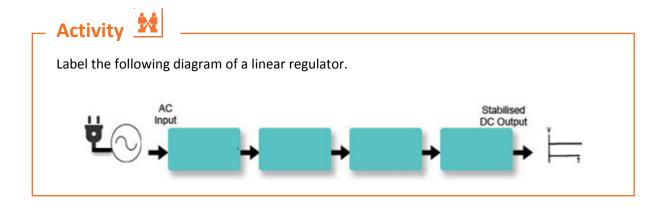
- Storage registers for up to fifty instrument states
- Two channels are connected in series/parallel for higher current/voltage
- Settable voltage limitations

### • Timed operation

A power distribution unit (PDU) that provides power to cameras is known as Multi-Camera power supply. It has the capacity of providing power to numerous cameras and is available with channel options of 4, 8, 16 or 32. It may give either option for power:

- AC only
- DC only
- Both AC and DC

PDUs usually have a protected built in fuse option for additional protection of cameras.



### **UNIT 1.2: Basics of Electronics**

### **Unit Objectives** <a>©</a>



### At the end of this unit you will be able to:

- 1. Identify the electronic components in a CCTV system
- 2. Identify the function of resistors
- 3. Use resistor color codes
- 4. Define capacitance
- 5. Identify the main types of capacitors



### 1.2.1 Electronic Components

Any basic physical entity or discrete device with an electronic system that is used to affect electrons or its associated fields is termed as electronic components. These have numerous electrical leads or terminals, which when connected result in an electronic circuit with specific functions. Basic components can be packed as networks or arrays of similar components, integrated circuits of semiconductor, thick film device or hybrid integrated circuits. The following figure lists the categories of electronic components:

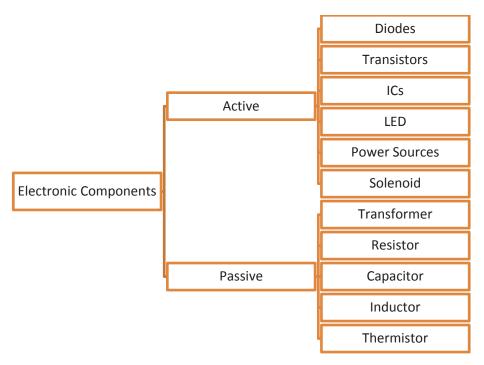


Fig. 1.2.1: Categories of electronic components

### 1.2.2 Active Components

Active components depend on a source of energy to perform their functions. These components can amplify current and can produce a power gain.

#### Diode

A diode is a specialized electronic component with two terminals known as the anode and the cathode. It has asymmetric conductance, which means that it conducts mainly in one direction. It has very less resistance, ideally zero, to the flow of current in one direction whereas it has high resistance, ideally infinite, in the other direction. Diodes are usually made up of semiconductor materials such as germanium, silicon or selenium. The following figure shows diodes:



Fig. 1.2.2: Diodes

### **Forward Voltage Drop of a Diode**

A little energy is required to push electricity through diode. This means that there is a small voltage across a conducting diode, it is called the forward voltage drop and is about 0.7V for all normal diodes which are made from silicon. A diode's forward voltage drop is constant regardless of the current passing through and that is why it has steep current voltage graphs.

#### **Reverse Voltage of a Diode**

On application of reverse voltage, all diodes have a tendency of a small amount of current leak (less than a  $\mu A$ ). It is a much smaller amount than the forward flowing current and hence, can be ignored. However, the maximum reverse voltage of diodes are typically 50V or more. A diode cannot transmit a large current if the maximum limit of reverse voltage is exceeded. This condition is known as breakdown.

### **Integrated Circuit (IC)**

An IC, also known as a microchip, is a semiconductor wafer on which a number of small resistors, capacitors and transistors are fabricated. It can work as an oscillator, an amplifier, a timer, a counter, a microprocessor or as computer memory. The following figure shows an integrated circuit:



Fig. 1.2.3: Integrated Circuit (IC)

### **Light Emitting Diode (LED)**

An LED is a p-n junction diode which gives out light when it is activated. It is a two-lead semiconductor source of light. Energy is released as photons when a suitable voltage is applied to the leads.

The following figure shows an LED:



Fig. 1.2.4: Light Emitting Diode (LED)

### **1.2.3 Passive Components**

Passive components are those components which do not require any power source to perform their specific functions. These components are not capable of controlling current.

#### **Transformer**

A transformer consists of a metal core with coils of wire around it. It is a device used to convert alternating voltages (AC) to the required values by decreasing or increasing the alternating voltages in an electronic or electric system. The following figure shows a transformer:



Fig. 1.2.5: Transformer

#### **Resistors**

A resistor is a component in an electronic circuit which is built to resist or restrict the circuit's flow of current. It may be a small carbon device or a big wire-wound power resistor. Its size varies in length from 5mm up to 300mm. The following figure show resistors:



Fig. 1.2.6: Resistors

Ohms ( $\Omega$ ) is the unit by which resistance is measured. 1  $\Omega$  is quite small so resistor values are often given in k  $\Omega$  and M  $\Omega$ .

#### 1 k $\Omega$ = 1000 $\Omega$ 1 M $\Omega$ = 1000000 $\Omega$

Coloured bands are used to show values of a resistior. There are four bands:

- First digit is represented by the first band.
- Second digit is represented by the second band.
- Number of zeroes is represented by the third band.
- Tolerence of resistor is represented by the fourth band which is mostly ignored by all circuits.

#### **Capacitors**

A capacitor is a device which is made up of one or more pairs of conductors and an insulator separating them. It is used to store electric charge. Capacitor takes time to get fully charged hence it is used in conjunction with a resistors in timing circuits. Fluctuating DC supplies are stabilized as a capacitor acts as a pool of charge. The tendency of capacitors to pass AC signals and block DC signals enable it to be used as filter circuits. The following figure show capacitors:



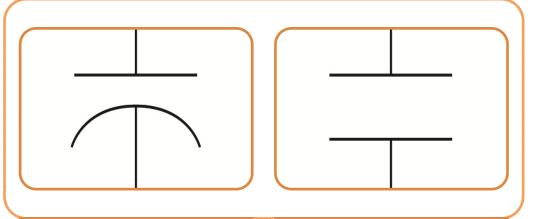
Fig. 1.2.7: Capacitors

Capacitance is a measure of a capacitor's ability to store charge. More charge is likely to get stored due to large capacitance. Farads (F) is the unit used to maeasure capacitance. 1F being large, prefixes represent smaller values.

Three prefixes (multipliers) are used,  $\mu$  (micro), n (nano) and p (pico)

- $\mu$  means 10-6 (millionth), so 1000000 $\mu$ F = 1F
- n means 10-9 (thousand-millionth), so  $1000nF = 1\mu F$
- p means 10-12 (million-millionth), so 1000pF = 1nF

Since a capacitor has different labelling system, its values are typically difficult to find. Capacitors are mainly split into two groups:



### Polarized capacitors (large values, 1μF +)

Polarized electrolytic capacitors are connected with one of its leads marked + or -.

Heat in the process of soldering does not damage it.

Similar to electrolytic capcitors, polarized tantalum bead capacitors have low voltage. They are small and expensive; and used in a smaller size where capcitance required is large.

### Unpolarised capacitors (small values, up to 1µF)

Unpolarized small value capacitors can be connected in either way.

Except polystrene, heat in the process of soldering does not damage it.

The voltage ratings are high - 50 V to 250 V.

Fig. 1.2.8: Types of capacitors

### Inductors

An inductor consists of a coil or a wire loop. This component is used to store energy in the form of a magnetic field. The more the turns in the coil, the more will be the inductance. The following figure show inductors:



Fig. 1.2.9: Inductors

#### **Thermistors**

A thermistor is a kind of resistor which is sensitive to temperature as compared to other resistors. They are extensively used as in rush current limiters, temperature sensors, self-regulating heating elements and self-resetting overcurrent protectors. The following figure shows a thermistor:



Fig. 1.2.10: A thermistor

### **Splices**

A temporary or permanent join between fibres is called a splice. The following figure shows two cables with splice:



Fig. 1.2.11: Two cables with splice

### **Connectors**

Connectors are junctions which are used to repeatedly connect or disconnect a cable to/from another one or a device such as a detector or a source. The following image shows connectors:

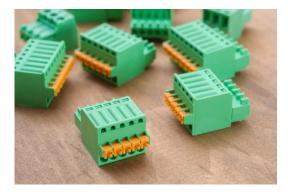


Fig. 1.2.12: Connectors

### **Switches**

Switches are the devices which can redirect optical signals as per electronic/manual control. The following image shows an electronic control switch:



Fig. 1.2.13: An electronic control switch

### **Couplers**

Couplers are used to dispense optical power between multiple fibres or combine optical power to a single fibre from multiple fibres. The following image shows a fibre optic coupler:

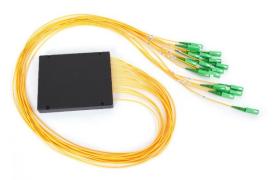


Fig. 1.2.14: A fibre optic coupler

# Activity 🙀

Fill in the missing values

- 1. 1 k Ω = \_\_\_\_ Ω
- 2. \_\_\_\_\_Ω = 1000000 Ω
- 3. \_\_\_\_\_μF = 1F
- 4. 1000nF = \_\_\_\_ μF
- 5. \_\_\_\_\_ pF = 1nF

### **UNIT 1.3: Cables and Connectors**

### Unit Objectives <a>©</a>



#### At the end of this unit, you will be able to:

- 1. Identify the different types of cables and connectors used in a CCTV system
- 2. Define cable, flex, lead and wire

### 1.3.1 Cables ——

When two or more wires run side by side, twisted or bonded together to form one component or assembly, this component/assembly is called a cable. They are used to carry electric current or electric signals from one device to another. They are used in electronic devices for power and signal circuits. Cables are also used for bulk transmission of alternating and direct current power using high voltage power cables. They are used in building wiring for power and control circuits and lighting. Wires are braided or twisted together inside a cable to produce larger and more flexible wires. The following figure shows a typical cable:



Fig. 1.3.1: Cable

#### **Cables used in a CCTV Installation**

Many different types of cables are available nowadays and they have a wide range of application, from transmission to heavy industrial use.

The following table lists some of the cables with their description and uses:

Cable Type	Image	Description
Coaxial/Helix cable	Was a second sec	Has a thin conducting wire inside a tubular conducting shield, which is protected by a tubular insulating jacket.
		Used to connect video equipment and carry television signals.
		Are of two types; RG 58 (50 ohm) and RG 59 (75 ohm). RG 59 is used in CCTV application.
		Can be run up to 750 feet. The highest-grade RG 59 cable can be run up to 1000 feet.
Direct-buried cable (DBC)		Are coaxial or bunched fibre optic cables consisting of a heavy metal centre with multiple layers of banded metal sheathing, shockabsorbing gel, weighty rubber coverings and waterproof wrapped impervious thread-fortified tape.
		Used for transmission or communication requirements because of their high tolerance to temperature changes and moisture.
Multi core/ Multi conductor cable		Consists of more than one conductor and each conductor is insulated separately. As an extra security measure an outer insulation layer is also provided.  Used at homes, as it is easy to use and well-insulated.
Paired cables		Consists of two conductors which are separately insulated.  Used in DC and low-frequency AC applications.

Portable cord		Is made of thermoset or thermoplastic with multiple conductors and is used for making temporary electrical power connections.  Used in operating motors in small and large tools, power extensions, home appliances and machinery.
Ribbon cables	THE PARTY OF THE P	home appliances, and machinery  Contains many conducting wires, fixed on a flat plane and running parallel to each other. They appear like flat ribbons and are flexible.  Used in low voltage applications, such as computers and peripherals.
Twinax/Twinaxial cables		Similar to the coaxial cable except that it has two inner conductors instead of one.  Used in different signalling applications with very short range and high speed.
Twin-lead cables		Are flat multistranded copper cables with two conductors useful for transmitting radio frequency signals  Used in applications such as TV and
Twisted-pair cables		radio.  Have two conductors that are twisted together to cancel out the electromagnetic interference that may come from external sources.  This type of cable is almost the same as a paired cable. The difference is in the two twined inner wires which are insulated unlike the paired cable.  Used for transmission of data over networks such as LAN.

Unshielded twisted-		Comprises of two stranded
pair cables		insulated copper wires. They are twisted together for reduction of inductive interference as twisting restricts it from being parallel at any point of their length.
		Can be run up to 2000 feet Has a broad range of impedance level. For CCTV applications, impedance of 100-150 ohms is used in CCTV application
Optical fibre cable	Corting	Contains one or more optical fibres for carrying light. The optical fibres are coated with plastic layers and secured in a protective tube.  Can be run up to 15 miles without using a repeater.  Used for long distance communication.
Optical fiber cable (Single Mode)	23.500	Has small sized dimetral core and permits a single mode of light to propagate through it. As a result, it reduces the number of light reflections when the light passes through the center. This decreases the attenuation and enables the signal to travel further.  Used for long-distance coverage with a very high bandwidth requirement.
RCA cable		Are pre-terminated cables that are the cheapest. Consists of a relatively thin, coax type wire with a push on RCA connector. Can be run up to 20 feet.

Optical fibre cable (Multi Has big diametral core Mode) and permits several modes of light to propagate through it. The number of light reflections formed when light passes through the centre are more. This enables larger quantity of data to pass through at a given time. The strength of the signal decreases over long distances because of the increased dispersion and attenuation. Used for backbone applications in buildings

Fig. 1.3.2: Cable and their description

### 1.3.2 Connectors

In a transmission line, connectors have an important role to play. The quality and construction influence attenuation, mechanical strength, connection stability and return loss directly.

because of the reliability

and high capacity.

The following figure lists the different types of connectors:



Fig. 1.3.3: Different types of connectors



### 1.3.3 Terminal Blocks and PCB Terminals

Terminal blocks are typically supplied as 12-way lengths, but it may be cut further into small blocks using a wire cutter, knife or junior hacksaw. They are commonly referred to as 'chocolate blocks' mainly because they are easy to cut. To PCB's, semi-permanent connections can be made by mounting PCB terminal blocks. To provide/add more connections, it can be interlocked. The following image shows terminal blocks:

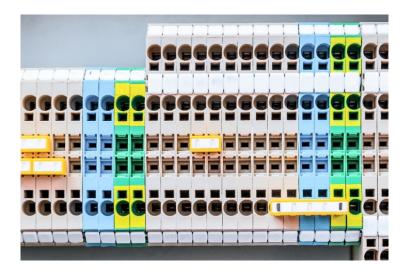


Fig. 1.3.4: Terminal blocks

## Activity 🕍



Match the following type of cables with their respective images:

Type of cables	Image
Ribbon cables	
Twin-lead cables	
Twisted-pair cables	
Paired cables	
Portable cord	
Direct-buried cable (DBC)	
Multi core/ Multi conductor cable	

# **UNIT 1.4: Basics of Networking**

# **Unit Objectives** <a>©</a>



#### At the end of this unit, you will be able to:

- 1. Define network and its topologies
- 2. Identify the types of network
- 3. Use different layout of networks
- 4. Identify various network devices
- 5. Define TCP/IP and IP addressing

#### **1.4.1 Network** \_

A computer network is a group of computers and other devices such as printers, scanners, copiers, fax machines and any other electronic devices, connected with the help of transmission media and various communication devices. All electronic devices such as a computer or a printer attached to a computer network for data transmission or communication are called nodes. The transmission path between two nodes is called a link. The set of rules followed for data transmission over a network is called a protocol. These set of rules define how the data will be transmitted between the connected nodes.

A basic diagram of a network is shown in the following figure:

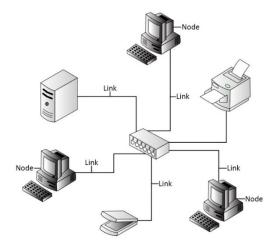


Fig. 1.4.1: Basic diagram of a network

Alternatively, a computer network helps the end-user computers to share common resources, as shown in the following figure:

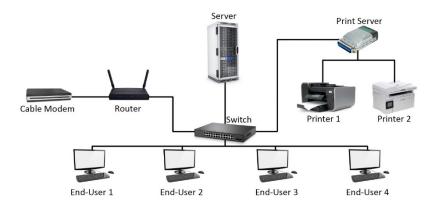
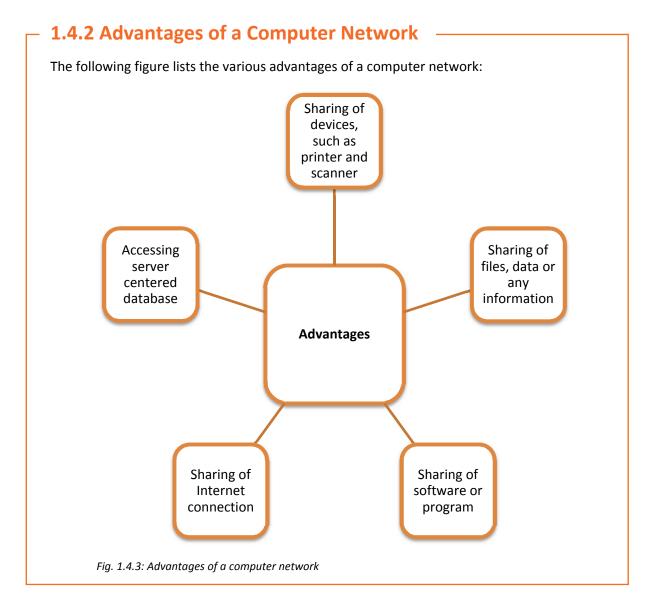
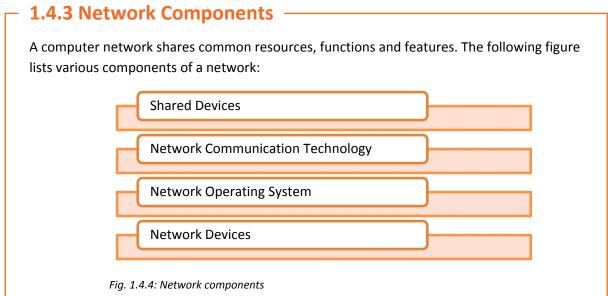


Fig. 1.4.2: Computers accessing shared resources over network

In the preceding figure, the main server is connected to the end-user computers through a switch. The switch is connected to the router, which is connected to the Internet via a modem. The switch is also connected to a print server acting as a medium between the end-user computer and the print server. The print server connects the two printers to the computers in the network.





#### **Shared Devices**

Shared devices are the computers or other peripherals that are shared over the network.

#### Server

A computer which holds programs, network operating systems and the shared files is called a server. Servers are computers dedicated to manage disk drives (file servers), printers (print servers) or network traffic (network servers). They provide access to the network resources to all the devices which are using the network.

#### Clients

Client computers access the network and use various shared resources in the network. They rely on servers for resources, such as files, devices, and even processing power. They receive services from the servers as per their request.

The following figure shows a client server network architecture:

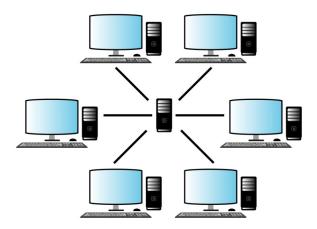


Fig. 1.4.5: Client server network architecture

#### **Network Communication Technology**

Network communication technology deals with the technology aspect of networking communication. Communication is the process of sharing information and ideas through speech, symbols, signals, or signs. Sharing of data and resources among different computers in a network needs a transmission system, communication protocols and technology. Communication network can be wired or wireless. Computers transmit and receive information across the communication links. The elements that are required for network communication are:

• **Network Interface Card:** Each computer requires a special card, called network interface card (NIC) to be connected to a network. The NIC prepares data to be sent, receives data and also controls the data flow between the computer and the network.

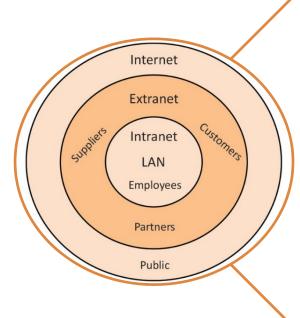
The following image shows a network interface card:



Fig. 1.4.6: Network interface card

- **Data communication software:** It enables the computers to communicate with each other. It tells the computers how to exchange information with other computers.
- **Protocol:** The data transmission protocols perform the following functions:
  - Data Sequencing: breaking up of a long message into smaller packets
  - O Data Routing: finding out the best route for sending the packet to the destination
  - Flow Control: regulates the speed of transmitting data between fast sender and slow receiver
  - o Error Control: detecting error and recovering the data

The following figure shows various types of network communication technologies:



- •Internet is a wide range of computer network with unlimited number of users. It contains a large number of intranets.
- •Intranet is a network of computers that is designed for a group of users. It serves as a private Internet for an organization. The authorized users or the employees of an organization can access intranet from Internet but the number of users is less. For example, intranet is used in an organization to share information with its employees only.
- •Extranet refers to an intranet which can be accessed by authorized users outside the intranet but partially. It enables business to share information in a secure way over the Internet. For example, when an organization wants to exchange some information with another organization such as their customers or vendors, it may provide access to its intranet to the employees of the other organization.

Fig. 1.4.7: Intranet, Extranet and Internet

#### **Mode of Transmission**

Communication technology also deals with the mode of transmission of data. Mode refers to the direction of data flow over the network. There are three types of modes:

• Simplex: Communication is unidirectional. Data can be sent in one direction only, from the sender to the receiver, as shown in the following figure:



Fig. 1.4.8: Simplex mode

• Half Duplex: Data can be sent in both the directions but not at the same time, as shown in the following figure:



Fig. 1.4.9: Half duplex mode

• Duplex: Data can be sent in both the directions simultaneously. A device can send as well as receive data, as shown in the following figure:



Fig. 1.4.10: Duplex mode

#### **Network Operating System (NOS)**

An operating system dedicated to networking which:

- Allows shared file and printer access among the computers connected to the network
- Enables sharing of data, security, applications, and other networking functions

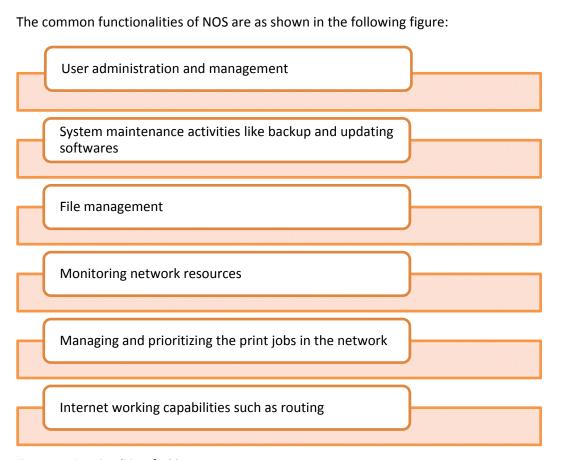


Fig. 1.4.11: Functionalities of NOS

Based on its architecture, there are two approaches to network operating system:

Network operating system based on a peer-to-peer architecture: Users can share
resources and access files from each other. This system does not have a file server or
centralized management resource. For example, AppleShare is used for connecting
Apple products. The following figure lists the advantages and disadvantages of peer-topeer NOS:

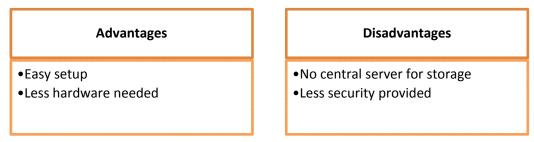


Fig. 1.4.12: Advantages and disadvantages of peer-to-peer NOS

Network operating systems based on client—server architecture: It allows the networks
to centralize the applications and various functions in one or more dedicated servers.
The server allows access to resource and maintains security. This system allows multiple
users to share the same resources simultaneously regardless of their physical location.
For example, Novell NetWare.

The following figure lists the advantages and disadvantages of client-server NOS:

#### **Advantages**

- •It has greater stability
- Security is maintained by the server
- •New hardware and technology can easily be integrated into the system
- Hardware and operating system may be specialized
- Servers can be accessed remotely from different locations

#### **Disadvantages**

- Higher cost
- Dependent on a central server for any operation
- •Regular maintenance required

Fig. 1.4.13: Advantages and disadvantages of client-server NOS

#### **Network Devices**

Network devices are components which are used to connect computers and other electronic devices to share resources such as printers, fax machines, database and so on. The functions of network devices, working together, are as follows:

- Controlling traffic: Network devices filter and isolate the data traffic.
- Connectivity: Using various network protocols, network devices connect different types of networks.
- Hierarchical addressing: These devices segment the network and deliver data to the right destination using destination address.

The following table lists various network devices used in networking:

Device	Image	Description
Modem	0 9 3 10 10 12 B	Modem converts the digital signals into analog ones (modulates) for transmission and converts analog signals to digital signals (demodulates) for transmitted information over a network.
Router		A router reads the destination network address also called the IP address on a data packet and forwards it to the appropriate network.

Gateway	•	Gateway acts as an
		interface between
		dissimilar networks with
	( )	different protocols
		translating one data format
	G-W	to another.
Firewall		Firewalls enable network
	and the same of th	security as it monitors
		incoming and outgoing
	- Infilmition	network traffic facilitating
		controlled data access
		between the networks.
Hub		A hub is used to connect
		the devices on an Ethernet
		network using twisted pair cable to provide signal
		regeneration.
Duide -		
Bridge		A bridge joins two or more similar networks to make a
		bigger network for
		communication or
	100 100 8	transmission of data.
Repeater		A repeater regenerates the
переисі		network signals so that the
		can travel longer distances
		on the network.
Transceiver		Transceiver can function
	3:	both as a transmitter and a
		receiver of signals.
	No.	
Switch		A switch connects the
		devices on a network with
		twisted-pair cable for
		forwarding data to its
	<b>7 77 7 2 2</b>	destination using physical

Wireless access point(WAP)		WAP is used to create a link between wired and wireless segment of the network.
Channel Service Unit/Data Service Unit (CSU/DSU)	NETWORK IN OWN PLOWN OF VAN MOSSES	CSU/DSU helps to translate the digital signals used in a LAN to signals used in WAN
Integrated Services Digital Network (ISDN) terminal adaptor		It connects the devices to the ISDN lines. These adapters are required to reformat the data from a transmitter or a computer node for being transmitted on ISDN links.

Fig. 1.4.14: Networking devices

## **1.4.4 Network Topologies**

Network topology refers to the arrangement of the different elements (links and nodes) of a network. It is the layout of a network and may be depicted as:

- Physical topology: It is the arrangement of the various network components.
- Logical topology: It describes how data flows in a network.

Distances between the nodes, physical connections, rate of transmission, or types of signal may differ between two networks, but still topologies may be identical. The following table lists the eight basic network topologies:

Topology	Image	Description
Point to point		Simplest topology having a dedicated link between two nodes in a network.

Bus	Each node is connected to a single cable, using interface connectors.  The central cable, known as bus, is the backbone of the network.
Line	Multiple nodes are connected in succession to each other. The end node terminates the line.
Mesh	Each node is connected with all the other nodes in the network. Each node relays data or message for other nodes in the mesh topology.
Star	Each node is connected to the central node directly or indirectly through hub, router or switch.
Ring	Data travels in one direction around the ring. Data is passed through the nodes from the sender to the receiver.

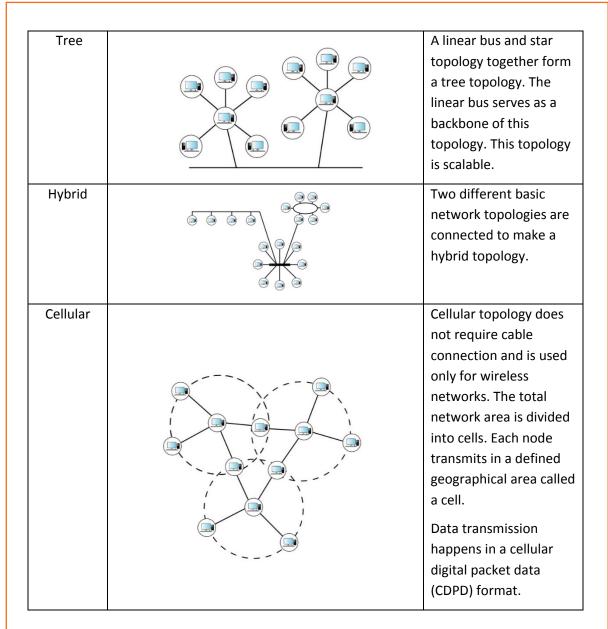


Fig. 1.4.15: Networking topologies

## 1.4.5 Types of Network

There are mainly three types of network classified according to the area covered for transmission, as shown in the following figure:

Local Area Network (LAN)

Metropolitan Area Network (MAN) Wide Area Network (WAN)

Fig. 1.4.16: Types of network

#### LAN

The network that is distributed over a small area, such as within a building, school, or home is called LAN. It allows a number of users to share common resources. Generally, a LAN is limited to 255 users per LAN. The following figure shows a LAN network:

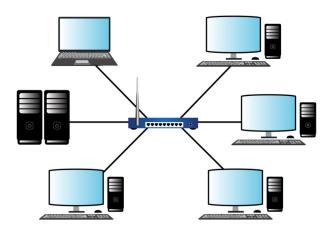


Fig. 1.4.17: LAN network

LANs generally employs Ethernet cables for connecting various devices within the network. It can connect to a mainframe or the minicomputers through network devices such as routers or bridges.

#### **Ethernet**

Ethernet is a network protocol which defines a standard way to connect computers on a network over a wired connection (LAN).

The most common LAN technology used in present time is the Ethernet.

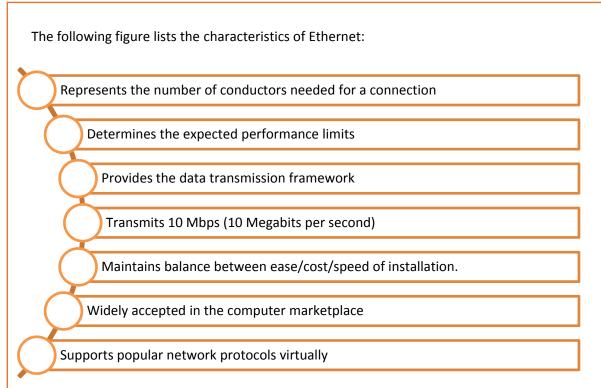
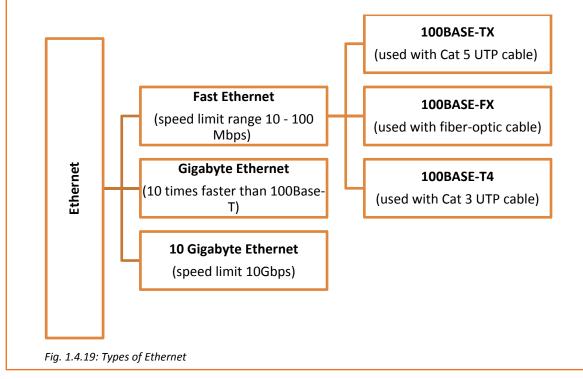


Fig. 1.4.18: Characteristics of Ethernet

The Institute for Electrical and Electronic Engineers (IEEE) developed an Ethernet standard known as IEEE Standard 802.3. The standard outlines configuration rules of an Ethernet network. It mentions interaction between the network and elements of Ethernet. Abiding by standards of IEEE, network protocols and equipment communicate efficiently.

The following figure lists the types of Ethernet:



#### MAN

MAN is a network that interconnects the nodes or computers with resources within a geographic area or region which is larger than the area covered by a LAN but smaller than that of a WAN. The following figure shows a MAN network:

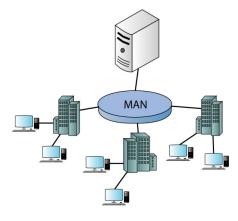


Fig. 1.4.20: MAN network

A MAN typically includes one or more LAN but covers a smaller geographic area than a WAN. It can also be defined as the interconnection of several local area networks by bridging them with backbone lines. This usage of MAN is also sometimes referred to as a campus network.

#### **WAN**

WAN is used to connect devices over much larger distances than LANs. A WAN is established by connecting LANs using routers. WAN is not limited to a single person or organization, for example, Internet, which is a network of networks spread across the globe for exchange of information and services. The following figure shows a WAN network:

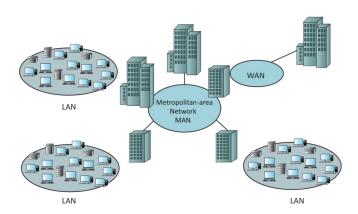


Fig. 1.4.21: WAN network

#### **Wireless Network**

A wireless network uses wireless connections between two network nodes. Wireless networking helps to avoid the costly process of setting up cable connections in a building.

Examples of wireless network are WLAN, Bluetooth, cellular network and so on. Wireless networks are classified based on the coverage area or span (range) in which they can operate.

#### **WLAN**

A WLAN is used to connect two or more devices which are present over a short distance. WLAN is set up using a wireless distribution method. It provides a connection for Internet access through an access point. It is used in cities or towns to connect networks in two or more buildings without installing a wired link. The following figure shows a WLAN:



Fig. 1.4.22: WLAN

Institute of Electrical and Electronics Engineers (IEEE) has created some standards for WLAN. Wi-Fi is known by the number 802.11. Different frequency and speed bands are denominated by the letters mentioned afterwards.

The following figure lists the standards:

#### 802.11

- 1-2 Mbps speed with a band of 2.5 GHz
- Due to older standards, most products in the market are not supported by it
- Speed is slow of the mentioned standards

#### 802.11a

- An amendment to original rules, it came into the market at a second place.
- 802.11a range of operation is 5-6 GHz giving an advantage of lesser interference.
- Uses OFDM (Orthogonal Frequency Division Multiplexing) giving greater resistance to interference with radio frequency. This helps in attaining a greater speed of 54 Mbps.

#### 802.11b

- First networking cards (wireless) in market.
- It operates at a range of 2.4 GHz and at 11Mbps or some operating at 22 Mbps.
- Mbps speed tends to diminish in case of signal quality issues.
- •Complementary Code Keying modulation used in the standard that has lesser chances of interference of multi-path propagation and rates of data are higher or duplicate signals bouncing off walls.

#### 802.11g

- Considered better than the 802.11a and 802.11b.
- It operates in a range of 2.4 GHz range with high data rates of 54 mbps covering limited distance.
- Some forms go up to 100/125 Mbps.

#### 802.11n

•This particular standard promises to put out 100 Mbps, and is predicted to give a better operating distance than current networks.

Fig. 1.4.23: WLAN standards

# Tips



Orthogonal Frequency Division Multiplexing (OFDM) means breaking up information signals to numerous sub-signals that are slower and shifted by different frequencies at the same.



## 1.4.9 TCP/IP and IP Addressing

TCP/IP is the communication protocol for Internet. It is a protocol suite which has two protocols:

- Transmission Control Protocol
  - o Assembles the message to be transmitted over network into smaller data packets
  - Reassembles the received packets into original message
- Internet Protocol
  - Manages the address of each data packet so that the data packet reaches the right destination. This is known as IP addressing.

It is also known as Internet Protocol Suite. TCP/IP is based on client/server model of communication. The client computer requests the server such as opening a web page. The server provides service such as connecting to the web page and letting the access of that web page. Each client request in TCP/IP is an independent request, not related to the previous one. Hence it does not require a dedicated connection.

Application protocols that use TCP/IP include:

- Hypertext Transfer Protocol (HTTP) allows data communication over World Wide Web (WWW).
- File Transfer Protocol (FTP) facilitates transferring of files over network
- Telnet (Telnet) enables logging on to remote computers
- Simple Mail Transfer Protocol (SMTP) enables mail exchange
- Serial Line Internet Protocol (SLIP) and Point-to-Point protocol (PPP) are used for personal computers to connect to Internet using phone lines

#### TCP/IP Model

TCP/IP model or the Transmission Control Protocol/Internet Protocol model is the set of protocols which defines how two or more computers can communicate with each other on Internet. There are many protocols working within TCP/IP model. These protocols provide various functionalities which are important for the data transmission over the networks.

TCP/IP is composed of five layers, as shown in the following figure: Application (Host-to- Host) Transport Internet Network Interface (Hardware) Fig. 1.4.24: Layers of TCP/IP network The following figure describes the TCP/IP layers: Responsible for the placing or receiving of Network Interface Layer/ TCP/IP packets on or off the network medium. Includes Ethernet and Token Ring and WAN **Network Access Layer** technologies. Responsible for IP addressing and routing Internet Layer functions Manages rate of data flow Manages reliability of data Transport Layer Provides the applications with access to services Defines the protocols that the applications will **Application Layer** use for exchanging data Fig. 1.4.25: The TCP/IP layers

# **Tips**



Data in network layer having network headers are called packets.

#### **IP Addressing**

An IP address is a unique identifier for a computer or any other device attached to the network. It is a 32-bit value. IP addresses are written in four decimal numbers which are separated by dots. Each section ranges from 0 to 255. For example, 172.16.254.2 is the IP address of a node. When the address is converted to binary, each section contains 8-bit which is called an octet.

# Tips



- A binary number is a series or combination of 1s and 0s.
- Bit is either a 1 or a 0.
- Byte is generally comprised of 8 bits.

The following figure depicts the dotted decimal notation of the given IP address:

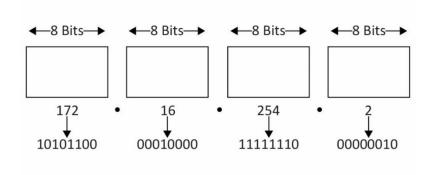


Fig. 1.4.26: Example of an IP address

IP addresses are also known as host addresses.

In a TCP/IP network the routers pass data packets between networks without knowing exact location of the destined host. Routers only know the network of the host. Routers deliver packet to the network and then using the information stored in the router, the packet is delivered to the host. For this, IP address contains two parts:

- First part is network address
- Second part is host address

In order to locate devices in a distributed environment, which is different networks connected to each other, nodes are assigned explicit addresses which identify the network in which the device is on, and also identify the device in that particular network. When these two unique identifiers are combined, it is a globally unique address.

#### **Example**

IP Address: 192.168.13.123 Network Address: 192.168.13.0

Host Address: 0.0.0.123

# Tips



Host numbers 0 and 255 are reserved IP addresses. An IP address with all host bits set to 1(Decimal 255) is a broadcast address. An IP address with all host bits set to 0 (Decimal 0) identifies the network itself.

Using Internet, CCTV systems can be made accessible from remote locations. A fixed public IP address is required rather than a domain name, which is available at an additional cost by the Internet service providers (ISPs).

#### **IPv4 Addressing**

IPv4 is a 32-bit address which is displayed in a dotted decimal notation. In this, TCP/IP defines five classes of IP addresses: class A, B, C, D, and E. Each class has a range of valid IP addresses. The value of the first octet determines the class. IP addresses from the first three classes (A, B and C) can be used for host addresses. The other two classes are used for other purposes (class D for multicast and class E for experimental purposes).

The following table represents different type of classes used in IPv4 addressing:

Class	Number of Networks	Address per Network	Start Address	End Address
Class A	128 (2 <sup>7</sup> )	16,777.216 (2 <sup>24</sup> )	0.0.0.0	127.255.255.255
Class B	16,384 (2 <sup>14</sup> )	65,536 (2 <sup>16</sup> )	128.0.0.0	191.255.255.255
Class C	20,97,152 (2 <sup>21</sup> )	256 (2 <sup>8</sup> )	192.0.0.0	223.255.255.255
Class D (multicast)	Not defined	Not defined	224.0.0.0	239.255.255.255
Class E (reserved)	Not defined	Not defined	240.0.0.0	255.255.255

Fig. 1.4.27: Classes used in IPv4 addressing

# **Tips**



127.0.0.1 is considered as a loop-back address. An IP address for testing communications or medium of transitions on local network for the purpose of network application testing is known as a loopback address. Any data pack sent on this address is re-routed without modification/changes to the source node.

# Activity 🕍



Identify the topology as per the images:

Image	Topology

# **UNIT 1.5: Tools and Equipment**

# Unit Objectives <u>©</u>



#### At the end of this unit, you will be able to:

- 1. Define a multimeter
- 2. Differentiate between analog and digital multimeters
- 3. Use a multimeter
- 4. Maintain a multimeter
- 5. Identify analog scales

#### **1.5.1 Tools**

The tools used for installation and repairing of UPS/inverter are listed in the following table:

Name	Function	Image
Screw driver	Used to turn or remove screws	
Wire cutter	Used for cutting wires	
Pliers	Used to hold objects firmly	
Tester	Used to verify presence of electric voltage in an equipment	A de la

Ladder	Used to climb up to reach high	
	places (6 to 7 feet)	A
Utility Knife	Used to cut various objects such	
	as wires, cords and tapes	
Coaxial Wire	Used to trip insulation of different	
Stripper	coaxial cables with different thickness	
Diagonal Cutter	Suitable for cutting aluminum,	
	iron, brass, copper and steel wire.  Sharp edges of its jaws intersect a joint rivet on the diagonal at a particular angle.	
Crimping Tool	Used to join pieces of metal, because of which one or both metals are deformed in a way such that they can hold each other. The result of the tool's work is called a crimp.	

Fig. 1.5.1: Tools used for installation of UPS inverter

# 1.5.2 Equipment

The equipment's used for installation and repairing of UPS/inverter are listed in the following table:

Test Equipment	Function	Image
Oscilloscope	Used for observing signal voltages that are varying constantly and represented graphically as a function of time	
Voltmeter	Used to measure potential difference between two points in the electric circuit	
Ammeter	Used to measure current flow in a circuit	A 0.000 s.e.
Wattmeter	Used to measure electric power of any given circuit (in watts)	WATT TO STATE OF THE PARTY OF T
Test Light	Used for determining the absence or presence of an electrical voltage	

Multimeter	Used to measure	Galaly Galaly
	resistance, current and voltage	
Clamp meter	Used to measure the vector sum of the currents, which depends on their phase relationship, flowing in all the conductors passing through the probe	
Multimeter LAN tester	Used to connect port, identify polarity, and determine IP addresses and link connectivity.	
	Tests fiber optic cables.  In fiber optic lines, used to identify incorrect connections and cable break points	
	Tests state of LAN network connections to switches and Hubs	
	Can identify the network's traffic and the IP generated.	
Coax Check Remote Tester	Used to identify open shield/braid/open conductor, and short-circuited connections  Tests remote cables	
	installed through 1000 feet walls (600 feet @ 75 ohm)	

Fig. 1.5.2: Equipment used for installation of UPS/inverter

#### 1.5.3 Measurement of Electrical Parameters

There are many types of measuring tools available such as voltmeter, ammeter and multimeter, which can measure voltage, current, power and energy. Among these, one of the most versatile measuring tools is called multimeter.

#### Measurement of Voltage, Current and Resistance

A multimeter can be used for measuring voltage, current and resistance. It can also be used for fault detection in small circuits or to find out the broken wires in a circuit. It can be of two types:

- Analog Multimeter
- Digital Multimeter

The following image shows the different types of multimeters:

**Analog Multimeter** 



**Digital Multimeter** 



It consists of a needle which points at the scale built on it for giving the measured value. It is an electronic meter which displays the measured values in digital form.

Fig. 1.5.3: Types of multimeters

Usually, a standard multimeter can measure the following electrical quantities:

- DC Voltage
- AC Voltage
- DC Current
- AC Current
- Resistance

#### **Measurement of DC Voltage and Current**

Voltage can be measured by directly connecting the voltage meter or the multimeter to the terminals of the voltage source. To measure the voltage using the multimeter, it should be used in voltmeter mode. The range select or knob of the meter should point towards the sign, volts or 'V'. Current can be measured by connecting the current meter or the multimeter to the terminals of voltage source, provided the current is controlled by appropriate value of resistance or load in path.

Multimeter should be in current mode to measure current. The range selector knob of the meter should point towards the sign, amperes or 'A'.

Appropriate precaution should be taken to position the knob or the probe properly for:

- Expected range of voltage or current level
- AC or DC form
- Position of the red probe for AC or DC current measurement
- Position of the red probe for AC or DC voltage measurement

The following figure shows measurement of DC voltage using multimeter:



Fig. 1.5.4: Measurement of DC voltage

#### **Measurement of AC Voltage and Current**

In principle, the procedure for measurement of both DC and AC, current and voltage are similar. For measurement of AC voltage by using a multimeter, it is essential to select the AC form (~) with the range selector knob on the multimeter. It is also essential to check the position of the red probe, as it should be kept in voltage or current mode in the multimeter as per the measuring parameter. The red and black probes are to be connected to phase and neutral points in the circuit, respectively. The following figure shows measurement of AC current using multimeter:



Fig. 1.5.5: Measurement of AC current

#### **Measurement of Resistance**

Resistance measurement is an important part in the field of electricity. The flow of current in a circuit depends on its resistance. Thus, it is very important to know the value of resistance in a circuit.

For measurement of resistance using a multimeter, the range selector knob should be first placed on the 'Resistance' mode or Ohms mode, which is normally shown on a multimeter with  $\Omega$  symbol. The following figure shows measurement of resistance using a multimeter:



Fig. 1.5.6: Measurement of resistance

#### **Measurement of Electrical Power**

Current and voltage can be measured by using an ammeter and a voltmeter respectively. The output power in an electric circuit can be measured using the formula:

Power = Voltage x Current

#### **Measurement of Electrical Energy**

Electrical energy is nothing but the power consumed by a load during a specified time. The product of power and time gives the value of electrical energy consumed by the load in watt-hour.

The meters available for measurement of energy are called energy meter. As the unit of energy is watt-hour, the meters are also called watt-hour meter.



Fig. 1.5.7: Energy meter

A -4	
ACT	IVITV
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,



Fill in the blanks with the correct answer.	
1.	Flow of electrons in an electric circuit is known as
2.	is the basic unit of electric current.
3.	limits the current that flows through a circuit for a particular applied DC
	voltage.
4.	is the basic unit of resistance.
5.	instrument is used to measure resistance.









# 2. Electronic Surveillance

Unit 2.1 – Introduction to Electronic Surveillance

Unit 2.2 - Introducing CCTV

Unit 2.3 – CCTV Technology



# Key Learning Outcomes



#### At the end of this module, you will be able to:

- 1. Define electronic security system
- 2. List the types of electronic surveillance
- 3. Recognize the roles of a CCTV installer
- 4. Explain CCTV surveillance system
- 5. List the applications of CCTV surveillance
- 6. Explain components of CCTV system
- 7. List different types of camera
- 8. Explain different CCTV technology
- 9. Describe remote control surveillance

## **UNIT 2.1: Introduction to Electronic Surveillance**

# 



#### At the end of this unit, you will be able to:

- 1. Define electronic security system
- 2. List the types of electronic surveillance
- 3. Recognize the roles of a CCTV installer

## 2.1.1 Electronic Security System

Electronic security system deals with any electronic equipment that perform the security operations such as:

- Surveillance
- Access control
- **Alarming**
- Intrusion control to an area that uses a power from mains as well as a power backup.

The type of security system is determined based on the area that is to be protected and its potential threats. The following image shows electronic security system of a building:

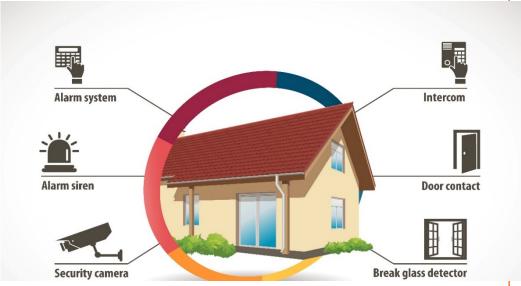


Fig. 2.1.1: Electronic security system of a building

Electronic security systems are widely used in corporate work places, shopping centers, railway stations, commercial places and public places. The systems are popular because they can be operated from a remote zone.

#### **Types of Electronic Security System**

Electronic security system can be classified based on:

Technology usage

- Functioning
- Conditions of necessity

The following figure categorizes the security system based on its functioning:





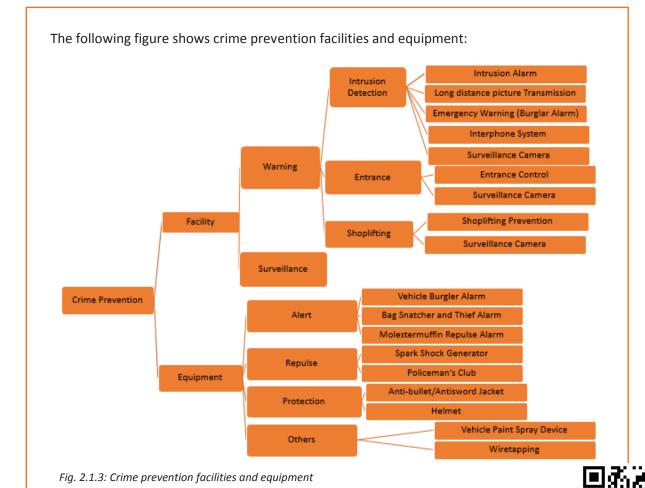


Fig. 2.1.2: Types of electronic security system

#### **Purpose of Security System**

Security systems are made up of various equipment and devices integrated to protect human lives, property and environment. Crime prevention deals with prevention of violating the law or disturbing social order or public interest through acts of violence/crime that are a punishable offense. For prevention of crime, CCTV systems encompasses surveillance camera systems along with long-distance picture transmission systems.

Crime prevention facilities are installed with the aim of letting criminals know the potential risks of crime and the function of keeping a close watch over any potential threat/criminal acts. When a criminal activity is detected, sensors or the warning switches are utilized to raise an alarm. Further, the related departments/personnel receive information to take a suitable course of action for avoiding any loss.



## 2.1.2 Electronic Surveillance

Keeping a house, individual or a business under supervision using various electronic devices like digital video device, legal wiretapping and CCTV or any audio visual or digital means is known as electronic surveillance.

It also refers to any vigilance done by a mobile phone or computer. Remote surveillance by a PC, Internet or tracking through email are examples of computer surveillance.

Electronic surveillance can keep track of what is going on at home even while one is away from home or business providing a combination of video and audio surveillance. It is a way to monitor the information, behavior and activity to protect and manage a certain location.

#### **Types of Electronic Surveillance**

Electronic surveillance can be done through various electronic devices such as computer, telephones, cameras and so on.

The following figure lists the types of electronic surveillance: •It involves keeping an eye on the data and traffic over the Internet. • It identifies suspicious traffic and report to investigators about it. • It provides unauthorized access to data, if specfic software is installed on a computer. •It involves scrutinizing electromagnetic emanations from different Computer computing devices at distances of hundreds of meters for extracting data from them. •It provides databases to store large numbers of emails. •It can provide access to information from technology companies wit the help of data mining. • Tapping telephone lines officially or unofficially is included. •Specific software converts intercepted audio in to machine-readable text, which is then maneged by automated call-analysis programs. Telephones •The phone can be connected to a tracking device without making the user aware of it. •The device operator can extract the information about the location, details of phone calls and text messages. •It offers the facility where the devices are connected to a network or a recording device, and can be watched by the operator. •The footage analysis is made easier by automated software and thus the organise digital video footage into a database which is searchable. Cameras •The amount of video footage can be reduced by using motion sensors that records only when a motion is detected. •CCTV cameras observing public areas that are linked to computer databases of biometric data, can track a person's movements throughout the city. •It involves creation of maps of social networks on the basis of data from various social networking sites. Social network •The maps are then used to extract useful information about a person analysis such as personal interests, thoughts, and activities, friendships & affiliations, and whereabouts with the help of data mining. •It analyzes human physical characteristics such as DNA, fingerprints, and Biometric facial patterns and behavioral characteristics such as manner of walking of a person or voice for the purpose of authentication and identification.

Fig. 2.1.4: Types of electronic surveillance

For installation and maintenance of different electronic surveillance system various persons are involved.

The following images show installation and maintenance of different security system:

Fig. 2.1.5: Installation and maintenance of different security system

#### 2.1.3 Role of a CCTV Installation Technician

A CCTV installation technician, also known as CCTV installer, provides after sale support services to customers, typically, at their premises. The technician at work is responsible for installing the CCTV system in the customer premises. The following figure lists the key roles of a CCTV installer:

Understand the customer and site requirement

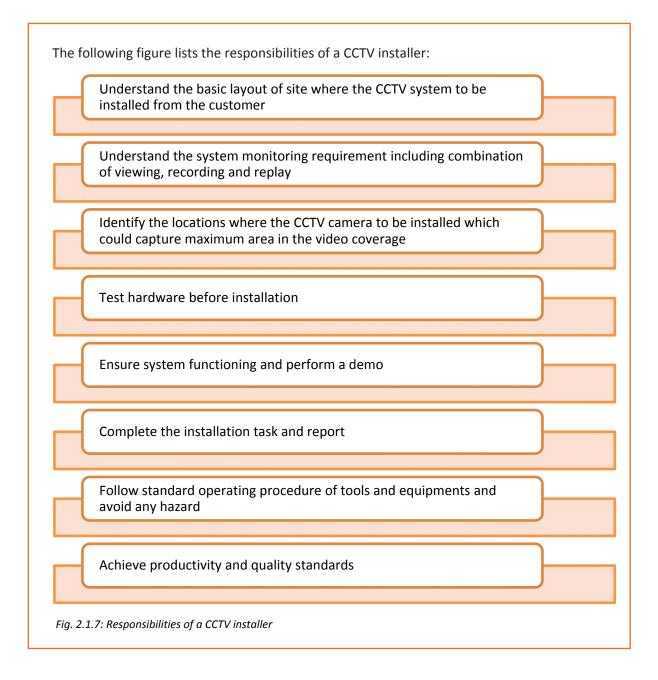
Install the camera

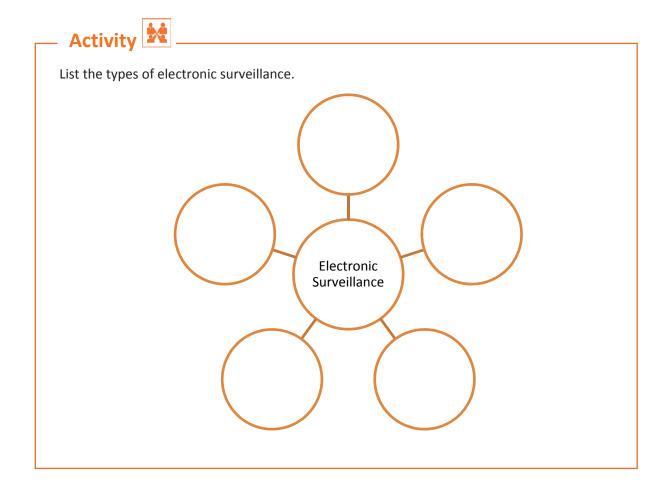
Integrate the hardware for effective CCTV surveillance system functioning.

Fig. 2.1.6: Key roles of a CCTV installer

The job of a CCTV installer requires the individual to have the following attributes:

- Ability to build interpersonal relationships
- Patience, listening skills and critical thinking skills
- Willingness to travel to client premises to install equipment at different location.





## **UNIT 2.2: Introducing CCTV**



# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Explain CCTV surveillance system
- 2. List the applications of CCTV surveillance
- 3. Explain components of CCTV system
- 4. List different types of camera

Now a day, televisions systems are one of the most essential means of information and communications. TV systems are used in wide range of applications that also includes standard television broadcasts. They can be broadly classified as listed in the following figure:

#### Open Circuit TV system

• A system which is targeted at an indefinite number of people. For example: television broadcasts.

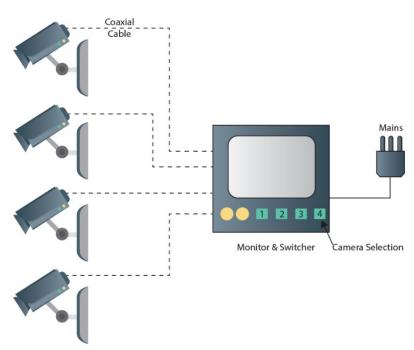
- Closed Circuit TV system
- A system that is designed to provide the video to specified viewers.

Fig. 2.2.1: TV Systems



## 2.2.1 Closed Circuit Television (CCTV)

In CCTV system, the signals are not publicly accessible but are monitored with the purpose of security and surveillance. Cameras are placed strategically, and the footage of the camera are observed on monitors placed somewhere. The CCTV cameras communicate with the video recorders and monitors through communication links (commonly coaxial cables or IP network) and access to the content is limited to those people who can see it.



#### The following figure shows CCTV surveillance system:

Fig. 2.2.2: CCTV surveillance system

Earlier CCTV systems were equipped with small and black and white monitors with low resolution and no interactive capabilities. Modern CCTV systems use high-resolution displays and the systems can allow the operator to zoom in on an image and track something. Talk CCTV enables the operator to speak to the people who are within the range of the speakers associated with the camera.

According to the latest trend CCTV is majorly used in law-enforcement such as, traffic observation and generating automated tickets, towards surveillance of the areas under high crime influence.

## 2.2.2 Purpose of CCTV Surveillance System

The following figure lists the need of a CCTV surveillance system:

- •Maintain security in medium and highly secured areas and installations.
- •Observe behavior of confined and potentially serious patients in medical facilities.
- •Monitor traffic.
- •Oversee locations that may come out as hazardous. For example, radioactive or highly toxic industrial environments.
- Maintain building security.
- •Obtain a visual evidence of the activities where it is necessary to ensure proper security and access controls. For example, in banks, airports or in a diamond cutting operation.

Fig. 2.2.3: Need of a CCTV surveillance system

## 2.2.3 Application of CCTV Surveillance System

CCTV surveillance is used in wide range of applications including:

- Medical care
- Education
- Security
- Military fields
- Disaster prevention
- Industrial measurement
- Energy and manpower saving
- Production management
- Sales promotion and information services

The following figure lists the primary applications of CCTV:

# Security (Crime Prevention)

The CCTV system is used to monitor facilities and places where there is a convergence of money, material and people.

This creates a psychological effect on the criminals and act as a deterrent to crime like theft and molestation.

This help to identify the criminals by reviewing recordings.

## Safety (Disaster Prevention)

The CCTV system is installed in accident and disaster prone facilities and places.

This helps to prevent accidents that are caused by natural or unnatural disasters, minimize any loss of property and personal injury.

This enables to understand the situation quickly after the disaster or incidence occurrence and allows to examine the cause of the incidence.

#### Customer Service

The system is used for improving service to customers. For example, store owners can monitor and improve the attitude of the employees towards the customers.

Fig. 2.2.4: Primary applications of CCTV



## 2.2.4 Components of CCTV Surveillance System

CCTV surveillance systems are comprised of several components that allow the system to view, record, and archive video footage. The following figure shows the components of a CCTV system:

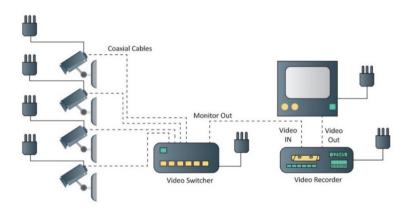


Fig. 2.2.5: Components of a CCTV system

#### Monitor

Monitors are the screen that display the images or recordings captured by the CCTV cameras. Generally, the monitors are placed at a center location, but sometimes they are place at places to be visible by the customers. The monitors are used like a TV, but they have higher resolution for obtaining improved picture quality. Monitors can be configured to view video being captured by a single camera, or multiple cameras can be accessed simultaneously.

#### Camera

There are varieties of CCTV cameras that are designed for different purposes. Cameras can be connected with wires or it can be wireless. The following table lists the advantages and disadvantages of wired and wireless cameras:

	Advantages	Disadvantages
Wired Camera	<ul> <li>No interference issue from nearby devices.</li> <li>Signal can't easily be jammed.</li> <li>Offers good quality video and high reliability.</li> <li>Have longer lifespan.</li> </ul>	<ul> <li>Traditional wired cameras are challenging to install.</li> <li>Drilling of holes are required to run cables throughout home.</li> <li>Once installed at a place, it is not easily portable.</li> </ul>
Wireless Camera	<ul> <li>Installation is easy and quick.</li> <li>No drilling holes.</li> <li>Easily portable.</li> <li>Can be installed anywhere within the range of Wi-Fi.</li> </ul>	<ul> <li>Vulnerable to interference from other devices that can cause failure to the security system.</li> <li>Risks of being jammed or hacked.</li> <li>More expensive than wired ones.</li> </ul>

Fig. 2.2.6: Advantages and disadvantages of camera

## Tips

- <u></u>
- Wireless cameras require at least one cable to be powered. Some cameras are battery operated. The term wireless indicates the wireless transmission of video.
- Wired cameras are powered using cables connected to the back of the recorder.

The following figure lists different types of CCTV cameras:

	ССТУ	Camera	
Based on movement •Fixed •PTZ	Based on connectivity  •Network  •Analog	Based on housing  •Dome  •Box •Bullet	Based on feature •Infrared •High Definition (HD) •Day/Night •Thermal Imaging

Fig. 2.2.7: Types of CCTV camera

Fixed cameras are designed to focus on a single scene constantly. They are mounted in a fixed position may be indoor or outdoor, to have a view on a particular area.

Fixed cameras can be combined with an electronic security system (ESS) and are used to manage the ESS alarms. A fixed camera can monitor a secured gate but triggers an alarm and records the data only when the gate opens.

Analog cameras offer options for high resolution to be applicable for several surveillance needs. They can also provide cyber security advantages since coaxial cables they are connected with would require physical access to breach. Despite digital network camera's popularity, analog camera still holds a place in the market due to the upgradation cost involved and conversion to the transmission process.

The following table describes different types of cameras:

Camera Type	Description	Image
Infrared (IR) security camera	<ul> <li>Provide color video with high resolution during the day.</li> <li>Automatically lights up the area by switching colors from black to white and vice versa.</li> <li>Provide clear recording in both low light and no light situations.</li> <li>Can combat both hot and cold temperatures without requiring any additional camera housing.</li> </ul>	

## Dome Camera Are designed to hide the orientation of the camera that will prevent an individual from knowing in which direction the camera is pointing. Produce a clear color picture with high resolution. Is a default selection since it is the best deterrent, hence, most CCTV cameras are designed in a dome type housing. Controllable domes, outdoor domes, infrared domes and vandal proof domes are categorized under dome cameras. Pro box Camera Are popular for high video quality. Usually seen in super marts, grocery stores and banks. Allow the camera lenses to be changed based on viewing angle and required zooming feature. Are sometimes known as day / night cameras since they can switch from color to black and white as per the light conditions. Lower the light, better the camera can view in complete darkness.

Pan Tilt Zoom	Provide the facility to
Camera	be controlled using remote viewing
	<ul> <li>software, or a joystick.</li> <li>Allow to be panned (left or right) and tilted (up or down).</li> </ul>
	Provide zoom capability and can zoom in on something from a distance.
	Can be programmed to perform preset tours where certain areas can be monitored from a distant location.
	<ul> <li>Are mainly used in department stores, casinos and airports.</li> <li>Are expensive, as compared to other</li> </ul>
	types.
Bullet	<ul> <li>Is a ceiling-mounted or wall-mounted unit designed especially for indoor use, but can also be utilized for some outdoor applications.</li> <li>Is named such for its</li> </ul>
	sleek, thin and cylindrical shape.  Is not designed to have PTZ control but to capture images from a fixed location.

Hidden Cameras	<ul> <li>Offers the best surveillance.</li> <li>Do not allow someone to know about the presence of a camera.</li> <li>The different kinds of smoke detectors include exit signs, clocks, motion and smoke detectors and sprinklers.</li> <li>Do not provide infrared capabilities and hence cannot perform in low light.</li> <li>Hidden cameras are usually places in hotel lobbies, assisted living homes/facilities, pharmacies etc.</li> </ul>	
High-Definition Cameras	<ul> <li>Are often used in places like casinos.</li> <li>Allow the operators zoom in with maximum clarity, especially to monitor poker players who may try to cheat or act fishy.</li> </ul>	
Network Cameras	<ul> <li>Can be connected to IP-based networks</li> <li>Allows viewing and recording of footage remotely.</li> <li>Are also available in HD quality with greater image detail.</li> </ul>	

# Thermal Imaging Cameras

- Provide the facility to detect through fog or smoke.
- Can detect infrared or heat radiation invisible to the human eye.
- Are sensitive to a small difference in temperature (1/10<sup>th</sup> of a degree Fahrenheit).
- Can process the images improving contrast resulting in sharper and clear images
- Are often used for choppers or boats for night surveillance mostly where areas are poorly lit.



Fig. 2.2.8: Type of cameras

## **Tips**



**Varifocal Camera:** A camera having a varifocal lens enables the operator to zoom in and out without removing its focus on an image.

#### **Features of CCTV Camera**

The following figure lists the optional features of CCTV cameras for meeting the specific needs of the users:

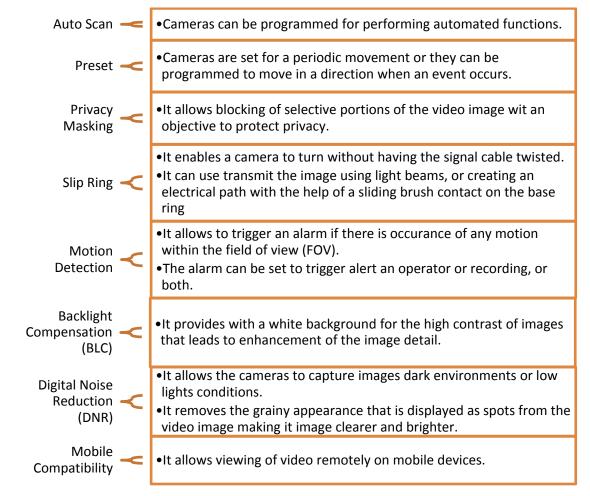


Fig. 2.2.9: Features of CCTV cameras

#### Lens

Lens is an important component for a CCTV camera. It focuses light or infrared (IR) energy onto the sensor that leads to deliver a proper focused, undistorted, accurate picture to imaging sensor. The following figure lists the common types of camera lenses:

#### Fixed Focal Length Lenses

- •Built with one set, unchangeable, focal length.
- •Useful for fixed camera applications.

#### Varifocal Lenses

 Designed to enable the user to change the focal length of within a specific range with an relevant adjustment of iris and focus.

#### **Zoom Lenses**

- Designed to maintain the setting of the focus throughout the range of focal length.
- Focal length can be changed from a remote location.

Fig. 2.2.10: Types of lenses

# Tips 🖳

- Focal length: The distance between the image plane and the optical center of the lens.
- Aperture: The opening in the lens that allows the light to flow into the lens.
- **Iris**: It controls the amount of light through the lens. The iris diameter changes as per aperture setting. If the amount of light on the sensor is too much light, the image will be washed out. If the amount of light is too little it will produce a dark image with brightest objects in the FOV visible.
- The angle is determined by the image sensor's size and focal length enabling the lens to accept light that will focus on image sensor.
- A telephoto lens is the lens whose focal length is greater than the focal length of a standard lens. A wide-angle lens is a lens which has a focal length lesser than the focal length of a standard lens.

#### **Image Sensors**

Two types of sensors are used in CCTV cameras:

- Charge-coupled device (CCD)
- Complementary metal oxide semiconductor (CMOS)

Applications that require high-quality images, rely on CCD sensors. Smartphones, PC peripherals and network camera's applications use CMOS sensors. CMOS sensors use less power than CCDs and they are less expensive. Each pixel is addressed by CMOS sensors individually. On the sensor, charge is processed from each pixel and the digital information bit is transmitted. The procedure helps in reduction of additional processing through transmission pathway. The following images show image sensors:

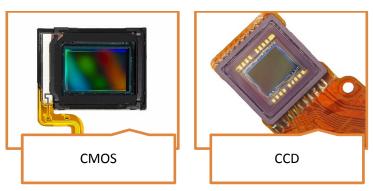


Fig. 2.2.11: Types of image sensors

#### Digital Video Recorders (DVRs)

In any modern CCTV system, DVR is one of the key components that:

- Receives the footage captured by the camera
- Archives the footage as recording to be reviewed later
- Output the recording to a monitor to be view by the user

DVRs allow converting of analog video to sequential digital images, that results in extension of storage capacity. It allows the operators to stream video for viewing remotely over a network from multiple locations.

Certain CCTV systems include an extended storage capacity in the form of external hard drive. CCTV systems range from a basic setup of 4-camera for small surveillance operations, to applications having larger configurations which may require numerous cameras monitoring different locations.

#### **Switchers and Multiplexers**

Switchers and multiplexers enables the system to route the video signal to the output devices in the CCTV systems having number of cameras more than monitors and recorders.

- Switchers can be set to send analog or digital signal to a monitor or a recorder manually or automatically. Some switchers can send frames by recording a frame from each camera in sequence.
- Multiplexers digitizes the received an analog video signal. Multiplexers are designed for recording frames and images. The operator can prioritize the video from different cameras by programming the multiplexers.

The following images show switchers and multiplexers:





Fig. 2.2.12: Switcher and multiplexer

## 2.2.5 Housing and Mounts

Special housings and enclosures are used to ensure that the cameras are protected from extreme weather conditions and other problems. The housing is required to complement the design of the CCTV system and it should not interfere the desired FOV.

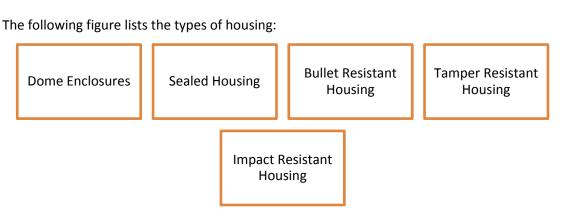
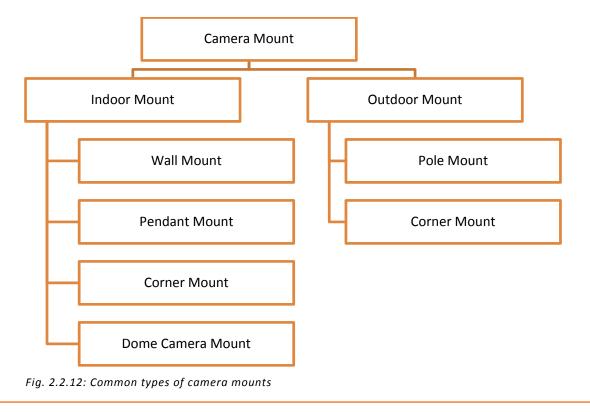


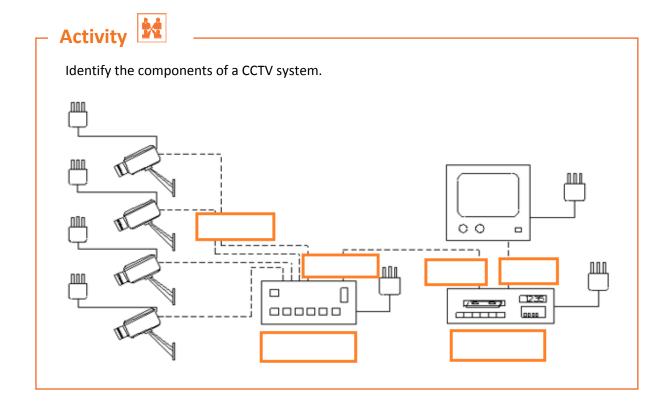
Fig. 2.2.13: Common types of camera housing

Camera housings are intended to increase the life and to ensure the efficiency of a CCTV camera. The housing can have the following features:

- Sun shields can be used to protect the housing from direct sunlight as it may affect the life of the camera adversely. They help to reduce the heat on the camera and lens.
- Wipers may be used to keep the housing's optical window clean.
- Heaters and ventilators can be used to face the problem of fogging, moisture, and icing
  due to temperature differences in between interior and exterior part of the camera
  housing.

The following figure lists different types of camera mount:





## **UNIT 2.3: CCTV Technologies**

## **Unit Objectives**

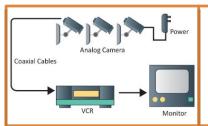


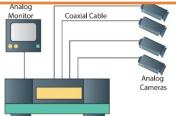
At the end of this unit, you will be able to:

- 1. Explain different CCTV technology
- 2. Describe remote control surveillance

## 2.3.1 Evolution of Video Surveillance Technology -

Video surveillance applications for both residential and commercial use, are becoming more customizable and easier to install and operate over the years because of technological innovations. The following figure shows the evolution of video surveillance recording:







Video surveillance recording started with an analog video camera, a Video Cassette Recorder (VCR) and a multiplexer.

VCR was able to record video streams at 25-30 frames/second up to three hours onto videotape.

The multiplexer allowed a VCR to record the output of several cameras on the same videotape.

The quality of the recordings was limited due to uncompressed analog video with minimal resolution.

Digital Video Recorder (DVR) allows compression of video enabling higher number of pixel images to be captured.

DVR provides quality output at a smaller size without affecting the video quality.

Faster processors improve the speed from capture to record.

Number of cameras is determined by the model of DVR

DVR offers continuous recording, provides scheduled dates and hours, and allows motion detection and switch activation recording

A surveillance system with Network Video Recorder (NVR) is configured on an Ethernet ready interface with the cameras, switches and the recorder interconnected with higher performance cables.

IP cameras enables encoding and processing of the video, then stream the video to the NVR for viewing and archiving.

The video images are of higher resolutions that allows the user to have finer details of the image.

Embedded NVRs can easily be integrated with access control systems and alarm systems.

-Fig. 2.3.1: Evolution of video surveillance recording system

## **2.3.2 CCTV Surveillance Technology**

There are various CCTV surveillance technologies available in the market. The following figure lists some of them:

Analogue CCTV Technology

**IP Based CCTV Technology** 

High Definition Serial Digital Interface (HD-SDI) Technology

High Definition Composite Video Interface (HD-CVI) Technology High Definition Transport Video Interface (HD-TVI) Technology

Fig. 2.3.2: CCTV technologies

The following table lists the advantages and disadvantages of different CCTV technologies:

Туре	Description
Analogue CCTV Technology	<ul> <li>Advantages</li> <li>Stable and well-established robust technology that is widely supported.</li> <li>Easy to install, operate and maintain.</li> <li>Cost effective</li> <li>No compatibility issues among CCTV components</li> <li>No loss of frames</li> <li>Provide better performance in low light situation than other megapixel cameras with CMOS</li> <li>Disadvantages</li> <li>Limited image resolution</li> <li>Less secure than network technologies</li> <li>Quality and reliability of its wireless transmission is not up to mark</li> <li>It is hard to implement upgraded camera firmware and other settings.</li> </ul>

#### **IP Network Technology**

#### **Advantages**

- High resolution of images results in crystal clear picture with clarity.
- Secure, robust and resistant to interference
- Easy modification of components in the system
- Allows variety of data storage such as redundant storage and remote storage.
- Easy maintenance of the software of the cameras and other devices
- Less cables required. Same cable is shared to control data, supply power to cameras and transmit videos.
- Can be connected to compatible access control systems

#### Disadvantages

- Poorer performance in low light conditions than the analogue counterparts
- More fragile than analogue ones. If the network fails, no live video can be monitored or recorded
- Delay in receiving the video signal because of network traffic.
- If not designed properly, the system can suffer missing frames, delays and latency.
- Compatibility limitations among the components and software
- Fast and robust infrastructure required for larger system.
- Storage space required more than analogue ones

#### **HD-SDI Technology**

#### **Advantages**

- High definition video that can have a resolution of 2MP (1920 x 1080) pixels
- Relatively easy installation, operation and maintenance
- There are no issues related to compatibility of SDI DVRs and SDI cameras
- Without any latency, transmits the video signal directly from camera to DVR
- No loss of frames
- Cables used in analogue CCTV system can be used but cables must be in good condition

#### Disadvantages

- Though cheaper than IP CCTV systems, equipment cost is still high
- It has a limitation of maximum 100m cable running between camera and DVR
- Electromagnetic interference and noise is common in transmission of video signal.
- Storage capacity required is more than that of analogue CCTV
- There's not as much in the way of tools, applications and support available on the market as there is for IP or analogue CCTV systems

#### **HD Analogue CCTV Technologies**

#### **Advantages**

- Similar to analogue CCTV technology with exception that all cameras are connected to the associated DVR directly
- Transmits video, audio and serial data simultaneously instead of only video
- Electromagnetic interferences are common while signals are transmitted
- No compression, latency and delay
- HD quality video is delivered
- Low maintenance cost
- Open standard compliance assures compatibility among devices run on same technology by different manufacturers

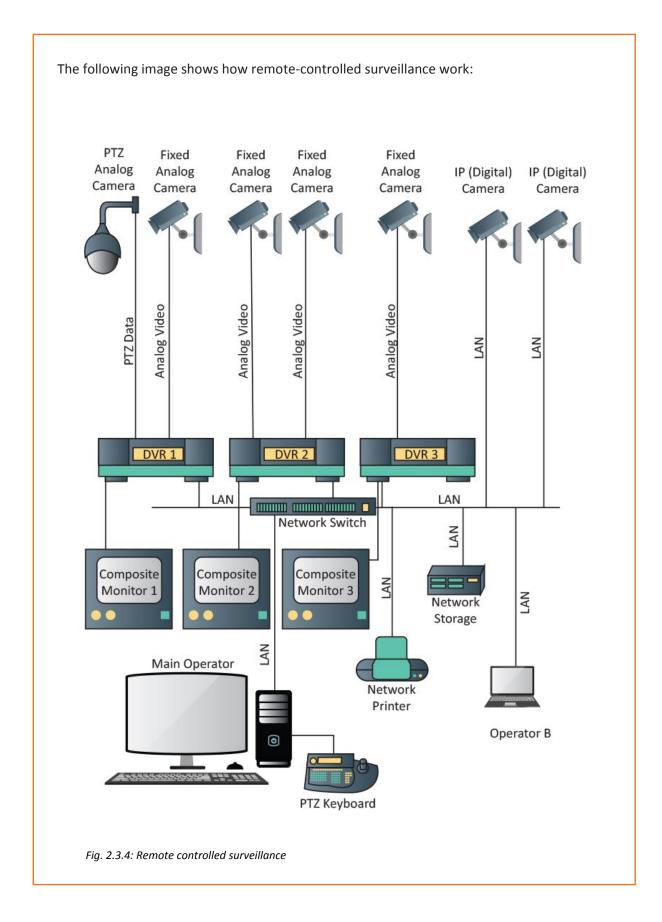
#### **Disadvantages**

- Due to lack of support from major developers and manufacturers the integration is limited with complex integrated access control/intrusion systems.
- Acceptance is low as compared to the new technology.

Fig. 2.3.3: Advantages and disadvantages of CCTV technologies

#### 2.3.3 Remote-Controlled Surveillance

The CCTV surveillance system must be controlled remotely when the distance between the camera and the security room is large (generally over 3 kilometers or 1.9 miles) and if cable installation is not possible. In remote controlled system, video transmission is provided by laser, near infrared rays, mobile telephones and so on. The remote connection can be achieved through a LAN or lines operated by Internet communication providers.



The following figure lists the different video transmission ways:

• A laser beam is used transmission of video signal over a distance.

- •Laser light can transmit signals over distances 1.9 3.1 miles due to its linearity.
- •It is necessary for the transmitter and the receiver to be fixed securedly and no obstacles are there in between.
- •A laser-light producing device should be installed in such a way that the laser light having the potential to damage eye can be prevented from entering eyes.

1)Near-Infrared light

Laser

- •Infrared rays carry the video signals between the transmitter and the receiver.
- •The transmission distance is shorter at 300 800 meters than the laser system, but it is less costly.
- •It is not vulnerable to rain or snow like the laser system, but birds or insects and fog may cause interference to video transmission.

Spread Sprectum

- •Video signals are transmitted over 0.62 1.124 miles by means of radio waves belonging to the 2.4GHz ISM band.
- •Such video transmission is affected if there are obstacles in between.

1)Mobile Telephone

- Video signals are carried through a dedicated equipment that is connected to a mobile telephone.
- •This system requires mobile telephone line with good reception range.
- •The monitor end also needs a telephone line.
- •The images may suffer from loss of frame due to compression depending on conditions of transmission.

1)Telepho ne Line:

- Video signals are carried over a dedicated transmitter device that is connected to the telephone line.
- Image data is compressed over the lines.

Fiber Optic Cable:

- •Video signals can be transmitted over 1.86 miles through fiber optic cables
- •The path of transmission is not affected by any external noise sources.

Fig. 2.3.5: Video transmission methods

The following figure lists some video compression formats:

#### PEG

- Allows compression of still-frame video image
- Provides compression rate from 1/10 to 1/100.

#### **JPEG**

- Allows compression of moving picture data recorded on each frame
- Enables recording of compressed data and reproduction of decompressed data continuously.
- Allows adjustment of degree of compression with a tradeoff between image quality and storage size.

#### (a)MPEG

- Provides highly efficient compression by elimination and encoding of space and time related redundant sections of video data.
- •Includes several specific formats such as MPEG1, MPEG2, and MPEG4.

Fig. 2.3.6: Video compression formats

_	Activity	
	List two advantages of:	
	1. Analogue CCTV Technology  •  •	
	2. HD Analogue CCTV Technologies	
	List two disadvantages of:	
	1. IP Network Technology  •  •	
	2. HD-SDI Technology	











# 3. Designing of the CCTV System

Unit 3.1 – Pre-installation Activities

Unit 3.2 – Customer Requirements and Site Analysis

Unit 3.3 – Selection of Components



# **Key Learning Outcomes**



#### At the end of this module, you will be able to:

- 1. List pre-installation activities
- 2. Identify the factors to be considered for designing process
- 3. Analyse customer needs and requirements
- 4. Assess the site conditions
- 5. Explain the factors of system layout and design considerations
- 6. List the post survey activities
- 7. List the factors for selecting the camera
- 8. Explain the characteristics of camera
- 9. Identify the factors for selecting the camera lens
- 10. Evaluate the selection of switcher, monitor and multiplexer

## **UNIT 3.1: Pre-installation Activities**

## **Unit Objectives**



At the end of this unit, you will be able to:

- 1. List pre-installation activities
- 2. Identify the factors to be considered for designing process

A good design process helps an organization to make acquiring decisions related to purchasing and installation of a CCTV system which meets the requirements.

The system design for a CCTV installation should start with an assessment of customer requirements and analysis of site conditions to ensure security and mitigate plans the identified risks. A CCTV installer should follow the design process to ensure a smooth workflow in the installation process. The following figure lists the pre-installation activities of the design process:

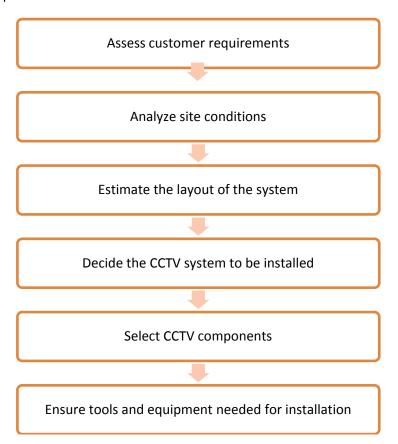
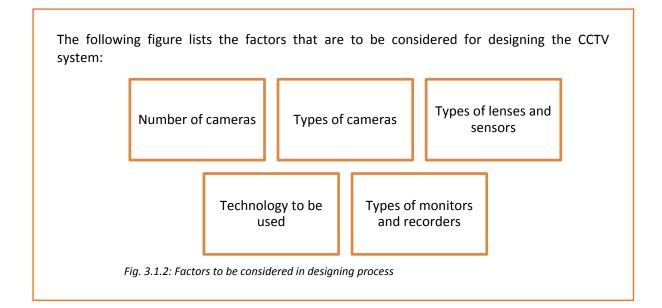


Fig. 3.1.1: Pre-installation activities

While designing a CCTV system, selection of proper equipment, a detailed site survey and clear requirements must be considered.





Create a checklist for designing the CCTV system.

## **UNIT 3.2: Customer Requirements and Site Aalysis**

## **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Analyse customer needs and requirements
- 2. Assess the site conditions
- 3. Explain the factors of system layout and design considerations
- 4. List the post survey activities

## 3.2.1 Assessing Customer Requirements

The design of the CCTV surveillance system depends on various factors such as:

- Risk perception of the customer
- Budget
- Ability to manage a surveillance system
- Purpose for which the system is being installed

To understand these factors, it is necessary for the CCTV installer to interact with the customer. The installer needs to ask relevant questions to gather all the necessary information about the customer's needs. The installer should perform the steps shown in the following figure to analyse the customer's need:

Check the details of visit with customer and then confirm the location to be visited

Understand the basic requirement of the customer

Understand customer's system monitoring need

Understand the type of camera being wanted by the customer - fixed, pan/tilt, zoom options and day/night camera

Fig. 3.2.1: Assessing customer requirements

#### **Needs Assessment**

The CCTV installer should conduct a thorough risk and need assessment for identifying the locations and assets that will enjoy the benefits from the installed CCTV surveillance system. The security of the facilities and infrastructures can be enhanced effectively when the overall goals and objectives for CCTV installation are known.

The following figure lists information about the requirements that can be gathered and analysed while conducting a need assessment:

#### **Functional Requirements**

• Define the need for camera coverage.

#### **Operational Requirements**

- •Describe the capabilities of components of the system which will enable the system to offer the expected information under any condition.
- Conditions to be considered any operational environment may include temperature changes, weather, lighting, day and night operations. It is important that operational requirements are detailed and testable.

#### Infrastructure Requirements

•Describe the required infrastructure installing or accessing cables, wireless networks, and power sources which are necessary to implement a CCTV system successfully.

#### Video Retention Requirements

• Define the requirement of video storage and retention.

Fig. 3.2.2: Information gathered from need assessment

There can be number of reasons for a customer to decide on installing a CCTV surveillance system. Therefore, an installer should be able to ask relevant and probing questions before arriving at any solutions about the system.

The following figure shows customer needs for CCTV installation:



Fig. 3.2.3: Customer concerns that lead to the need of CCTV installation

### 3.2.2 Site Analysis

Successful integration of a CCTV system with other security systems requires a comprehensive site survey that will help to generate detailed equipment specifications and installation design.

A site survey addresses all the aspects of specifying and building a CCTV system. For the installer, it is an integral part for defining the requirements that are essential for the planning and designing of the system.

There is no theoretical limit to the number of cameras and monitors which may be used in a CCTV installation. But the final decision on the number of cameras and the type of cameras to be installed will depend upon customer requirement as well as the site conditions.

The CCTV installer should visit the site of installation and conduct a site analysis, through which suggestions can be given to the customer about the CCTV components that match their requirements.

The following figure lists the activities that should be performed by a CCTV installer while conducting site analysis:

Visit the site and understand the layout

Understand the area and other specifications

Identify installtaion locations for CCTV camera such that maximum area is covered in the video

Understand the building structure for cabling purpose

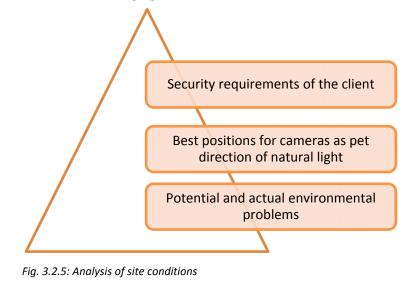
Understand the basic layout of customer's premises for CCTV installation

Check if a mounting structure such as a pole or platform is required for camera installation

Interact with customer to inform about various observations made from surveillance of the site

Fig. 3.2.4: Conducting site analysis

By visiting the site, conducting a survey and analysing the site conditions, the installer can decide the points listed in the following figure:



Operational Environment	Indoor	Outdoor				
Exposure to	Water	Fire	Temperatures		Corrosive	
Camera	Doors/Gates	Building Exterior	Interior Areas		Corridors	
Location	Parking Lot	Perimeter				
Light Level	Day	Night				
Lens	Wide Angle	Normal	Telephoto		Zoom	
Power Supply	12 VDC	24 VDC	120 VAC			
Indoor Camera Type	Fixed	PTZ				
Outdoor Camera Type	Fixed	PTZ	Number of Can	neras		
Camera Housing	Dome	Tamper- Resistant	Weather- Resistant		Other	
Camera Mount	Ceiling	Exterior	Corner		Pole	
Monitor Size	Split-Screen	Multi- Screen	Video Walls			
Recorder	DVR	NVR				
	Wired	Wireless				
Tuan amales ! s :-	Coaxial	Laser				
Transmission Media	Twisted Pair Fibre Optics Telephone	Infrared Radio				
	Cat 5	Frequency Microwave				

The following figure lists the information that should be considered while analysing the site conditions:

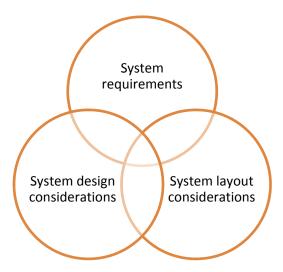


Fig. 3.2.7: Information to be considered while designing a CCTV system

#### **System Layout Considerations**

System layout plays an important role for designing an outdoor CCTV system. Aerial photograph from various sources such as free mapping applications that are web based, aerial photography services that are private contracts, local files of government and satellite photographs helps in the analysis of the layout providing information about blind areas onsite distances and blind areas where outdoor video coverage may be needed.

For interior surveys, blueprints of the facility and its scaled computer aided drawings are used. The following figure lists the factors to be considered for system layout:

Coverage of access points

Critical assets

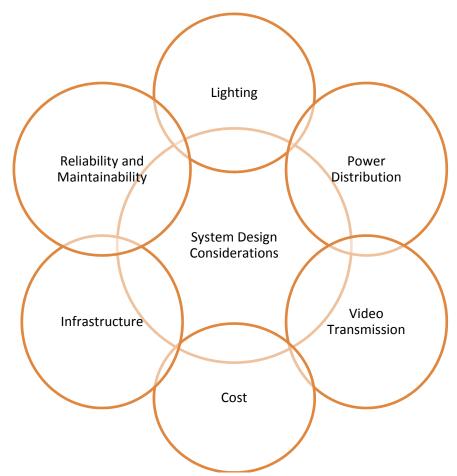
Desired field of view

Location of transmission hub

Fig. 3.2.7: Factors for system layout consideration

#### **System Design Considerations**

The CCTV installer should be aware of specifications of the CCTV system components along with some other important factors.



The following figure lists the factors to be considered for layout and design of CCTV system:

Fig. 3.2.9: Factors related to system design considerations

#### Lighting

CCTV system, especially outdoors, is impacted at different times due to level of light. Lenses with automatic apertures are used to make up for the changes in illumination levels. Backlight compensation may be used with the help of internal software for the interior system. It allows the security personnel to observe a person who moves in front of a window lit brightly.

The following images show backlight compensation:





Fig. 3.2.10: Backlight compensation

**Tips** 



Backlight compensation refers to enhancing the contrast between low light levels and high light levels.

Just like other cameras, the CCTV camera follows rules listed in the following figure:

Rule

The more is the light, the less sensitive the camera is required to be.

Rule

Matching parameters of lighting with the ones of the camera ensures enhancing of image quality.

Rule

Knowledge of how much light the camera requires to produce a good video image.

Fig. 3.2.11: Camera lighting rules

Appearance of the image and the system operation are also influenced by artificial lighting. The following images show artificial lights typically used indoors and outdoors where CCTV surveillance is required:

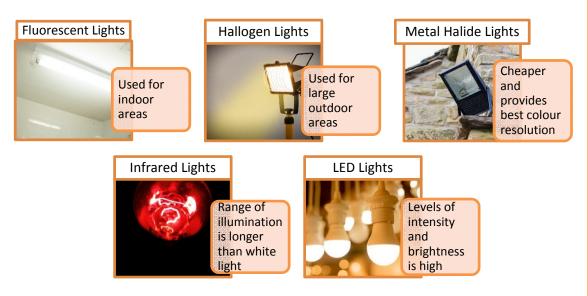


Fig. 3.2.12: Artificial lights

#### **Power Distribution**

Inadequate power can cause inconsistent equipment behaviour and affect the video quality across entire system. Hence, adequate power source is required for efficient system performance. The following figure lists some key points about power distribution:

Placement of proper power components should be considered. It is advisable to place the power sources close to CCTV components.

It is required to specify power conditioning or backups.

All pieces of the electronic equipment must have sufficient lightning to ensure less damage and failures.

Ground loop correctors are used to prevent voltage differentials between two or more pieces of equipment that are powered by different power sources.

It is ideal for CCTV system components to have an internal regulated power supply.

Fig. 3.2.13: Key points for power distribution

#### Video Transmission

Many problems with the quality of the video image may be avoided by:

- Using the right transmission media
- Following the right installation procedures

A CCTV system may be comprised of highest quality components and the overall performance may be hampered if the video signal is not transmitted through right media.

#### Cost

Cost estimates for a CCTV system must cover all aspects of installation, operation, and maintenance. Upgradation of hardware and software should also be considered.

Sometimes, utilizing the existing infrastructure such as mounts and cable runs may reduce cost. But with advancement of technology and system capabilities, replacing of old infrastructure may come out to be a cost-effective option improving the performance of the system.

#### Infrastructure

Each CCTV camera requires power supply and the medium to transmit video signals to the monitor and storage devices. These requirements can generate the necessity of modifications to the infrastructure of the facility. For example, camera may require to be mounted on poles.

Existing infrastructure can be used to some extent. For example, old coaxial cable systems can be converted to IP systems by running Ethernet over coaxial cable with a converter module. Analog video and Ethernet can also be run over telephone lines.

The CCTV installer should have the information about the system requirements.

The following figure lists the questions that will help the installer to be aware of the requirements: What areas require coverage by the system? What are the assets that need to be protected? Infrastructure Intelligence information Intellectual property · High value material Which are the sites that face greater vulnerability? Will the system be integrated with an existing one? Does the budget include maintenance and upgrading od system? Will the system be integrated to any other security system? Does the infrastructure support the number of cameras? Fig. 3.2.14: Questions that will help the installer to be aware of the requirements After conducting the site analysis, the installer should interact with the customer. The installer should be well mannered while talking to the customer and seek customer's approval for visiting the rooms in the premises. The following figure lists the post survey activities that must be performed by the installer: Recommend the CCTV systems that could fulfil customer's need as per the site Recommend the type of camera and recording system Recommend the hardware/software specifications in case the system needs to be in an IP network or for remote monitoring Recommend the hardware that best suits the customer budget and functional requirements Assist customer in case of hesitation in selecting a system Fig. 3.2.15: Post survey activities

_ /	Activity 🙀
	List the factors to be considered for layout and design of CCTV system:
1	1
2	2
3	3
۷	4
5	5

# **UNIT 3.3: Selection of Components**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. List the factors for selecting the camera
- 2. Explain the characteristics of camera
- 3. Identify the factors for selecting the camera lens
- 4. Evaluate the selection of switcher, monitor and multiplexer

Performance of a CCTV system depends on the individual components of the system. The quality of a single component may affect the effectiveness of the system badly. Hence, selection of components should be done with care and importance.

#### 3.3.1 Selection of Camera -

The suitable type of camera for a CCTV system is dependent on the environment in which the system will operate. The following figure lists the factors that impact the selection of a camera:

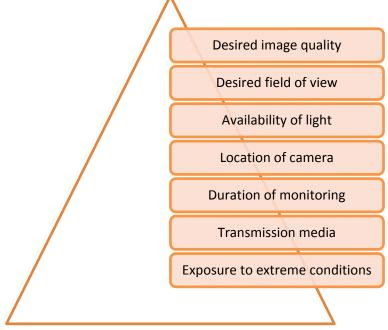


Fig. 3.3.1: Factors for selection of camera

The CCTV installer should be aware of the characteristics of the camera as well that would make it suitable as per the installation requirement.

The following figure lists the characteristics of the camera:

#### Resolution

- Resolution refers to the measurement of the number of pixels that the image sensor of a camera can record in an image.
- High camera resolution makes the image sharper and lifelike.
- Resolution of a digital camera is expressed in mega-pixels.

#### Sensitivity

- •Sensitivity of a camera refers to the minimum amount of light that is required to generate a specified output.
- •The colour, texture and shape of the target affect the intensity of light reflected from the object and also image quality.

#### Field of View

- Field of View (FoV) involves the angle of view and the distance of the target object from the lens
- •Wide angle lenses have the ability to view a large area. Hence, they are suitable for most applications.
- •If the focal length is icreased, the perceived distance of the viewing area decreases.

#### Lens

- •Lenses on an average, range from 2.8mm to 18mm.
- •The larger the size of the lens, the farther it can view.

#### Irish

- •A driving circuit is needed by auto iris lenses to operate and control a motor for adjusting aperature range according to the light conditions.
- •The driving circuit is on the camera lens or inside the camera.
- •The control circuit is in the camera circuit and on the camera lens in a DC driver function and a video driver function respectively.

#### F Stop

- A low F-Stop indicate that more light can be passed through the lens in dark conditions, resulting to provide a better image at night.
- •A maximum F-Stop is necessary for high lux condition, for prevention of "whiting out"thereby helping in maintainance of a video level that is consistent.

Fig. 3.3.2: Characteristics of CCTV cameras

# Tips



**Resolution:** It is the camera's ability to resolve detail.

**TV lines:** It is used to measure horizontal resolution power of a video system. If the number of TV lines is large, resolution will be better and it results a good picture quality.

Lux: It is used to indicate the availability of light.

**F-STOP:** The aperture is maximum when the iris diaphragm of the lens opens completely and F-STOP becomes maximum.

#### **Shape of Camera**

The shape of a CCTV camera is determined by the purpose of the camera and its application. The following figure lists some shapes of camera with their application:

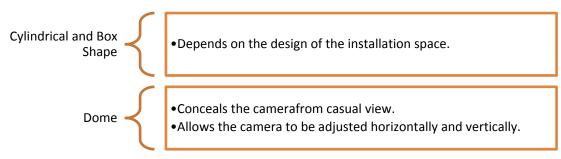


Fig. 3.3.2: Shapes of camera

#### **Selection of Lenses**

Angle of View settings plays a vital role in selection of lenses. A camera covers an angular range known as the angle of view. It is determined by the image sensor's size where a lens' focal length and picture is formed. The following figure shows the angle of view of a lens:

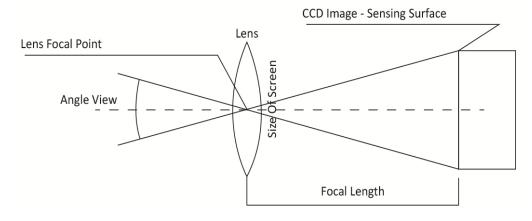


Fig. 3.3.3: Angle of view of a lens

# Tips



For various lenses having identical focal lengths, size of CCD and the angle of view are different.

The angles of view for different lenses are listed in the following table:

Type of lens	Angle of View (Horizontal)	Angle of View (Vertical)
Standard lens	30 – 40°	20 – 30°
Wide angle lens	55 – 60°	45 – 50°
Super wide-angle lens	Over 60°	Over 70°

Fig. 3.3.4: Angle of view for different lenses

The available size of CCD screen is 1/4", 1/3", 1/2" and 2/3", which is measured on the basis of its diagonal dimension. This difference in size impacts the range of the view field.

The view field, as shown in the following figure, is calculated as:

1/3" type	W=4.8/(F×L)	H=3.6/(F×L)
1/4" type	W=3.6/(F×L)	H=2.7/(F×L)

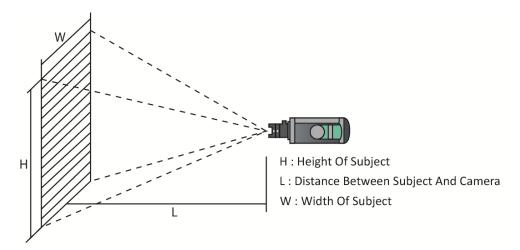


Fig. 3.3.5: View field of a lens

It is important to pick the appropriate lens type that require the positioning and location of the camera to be installed as it stimulates the area of coverage by the camera's image. On the basis of field of view, such simulations may be estimated.

Wide angle lenses camera cover a large area but the images have smaller objects in it.

Instead the standard lenses cameras provide an image with larger subjects in a small coverage of area.

The wider the lens view angle is the more the chances of eliminating the blind spot in a small room.

Use a multiple camera or equip th cameras with pan/tilt heads and zoom lenses to get a detailed image from a wide area.

The following figure lists some points that are considered while selecting the proper lens:

Fig. 3.3.6: Points to be considered while selecting a lens

#### **Lens Mount**

Lens mount is the part that connects a lens to the camera. The following figure lists the categories of mounts:

C mounts CS mounts Bayonet mounts

Fig. 3.3.7: Types of lens mount

In case a category of lens mount does not map with camera's requirement, proper mounting of lens becomes a tedious task. A thread diameter and pitch is common to C and CS mounts. A flange back is the only difference. The distance from mounting face to CCD image sensing surface is 17.526 mm for C mounts and 12.5 mm for CS mounts. C mounts are longer than CS mounts. By using an adapter C mount lenses can be mounted on a CS mount camera. The distance from mounting face to CCD image sensing surface is 17.526 mm for C mounts and 12.5 mm for CS mounts. C mounts are longer than CS mounts. By using an adapter C mount lenses can be mounted on a CS mount camera. For 3-CCD type cameras bayonet mount is used which can be interchanged by C or CS mount.

#### **Selection of Sensors**

Operators do not attend the CCTV surveillance systems all the time. The system is supported by sensors for prevention of missing recorded scenes in the absence of the. These sensors enable efficient operation of systems if outputs are switched between multiple cameras. The following figure lists different types of sensors:

Magnetc Proximity switch sensor

- It consists of a magnetic reed switch and a permanent magnet.
- •The switch closes contact when the there is magnetic field nearby and opens its contact when magnet is removed.
- •It is generally used for detection of the opening or closing of doors and windows.

Shutter sensor

- •It is used for detecting the opening or closing of large doors
- •It is of three types, magnetic, infrared, and mechanical.
- •The infrared includes light transmitter/receiver along with a reflective sheet that reflects the transmitted light back to the receiver.

Infrared sensor

- It consists of transmitter and receiver unit for transmitting and receiving a beam of near-infrared light.
- •It detects an interruption when the light between two units is cut off, and produces output signal.

Glass break sensor

- •It detects if there is any breakage of glass.
- •It involves types of vibration, attached to the window glass and the types of sound, mounted to the wall or ceiling.

Passive sensor

•It detects any change in the far-infrared rays which may be casued by human or animal movements.

Ultrasonic sensor

- •It comprises of ultrasonic sound waves which get reflected by moving objects.
- •The receiver produces an alert signal when variations of frequency are detected as the speed of the objects changes the frequency of the reflected waves.

Motion Detector

- •It reacts to differences of brightness in the set detection zone that is on display on monitor, without any assistance of external sensors.
- •It is typically used in the locations where installation of sensors or cables ais difficult.

Fig. 3.3.8: Types of sensors

#### 3.3.2 Selection of Monitors -

The main use of CCTV monitors are in industries. They cannot receive any TV broadcast as there in no built in TV tuner. The position and size of monitor is considered with respect to the operator while purchasing the monitor. The following figure shows the monitor size and the distance recommended for monitoring:

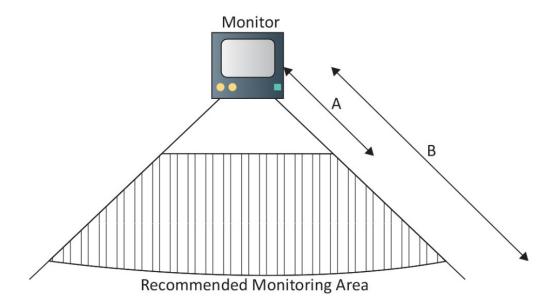


Fig. 3.3.9: Monitor size and the distance recommended for monitoring

The monitor size and respective distance are:

Monitor size	Distance of A in meter (in feet)	Distance of B in meter (in feet)
9- Inch Type	0.9 (3.0)	2.1 (6.9)
14-Inch Type	1.0(3.3)	3.3(10.8)
21-Inch Type	1.2(3.9)	5.0(16.4)
29-Inch Type	1.7(5.6)	6.0(19.7)

Fig. 3.3.10: Monitor size and respective distance

If a display with a 4-segment split-screen is required, distance B should be lessened a little as the images on the screen will be smaller.

Smaller monitors are easier to install as their placement can be done in racks. They are not appropriate for finer image observation.

Liquid crystal display (LCD) monitors are popular for commercial applications as they are cost effective.

The following figure lists some features of LCD monitors:



Fig. 3.3.11: Some features of LCD monitors

The different constant for calculating sizes of monitor according to the size of sensor are:

CCD Imager Size	Width	Height
1/4" Type	3.6	2.7
1/3" Type	4.8	3.6
1/2" Type	6.4	4.8
2/3" Type	8.8	6.6

Fig. 3.3.12: Calculating size of motor

#### 3.3.3 Selection of Switcher

Number of screen increases with the number of camera. A switcher enables the operator to view the screens on the same monitor. Switchers enables switching of output of camera in sequence or by split screen on a single monitor. Sensors connected to the recorders are required to record the unviewed images for later playback. The CCTV installer must choose the switchers on the basis of the number of cameras. The following figure lists different types of switcher:



Fig. 3.3.13: Types of switcher

#### **Sequential Switcher**

In sequential switching, at a time the screen can display one camera output. Hence other camera outputs cannot be observed simultaneously. So, there is a requirement of prioritizing of camera output.

A manual switcher allows switching manually among the camera outputs.

• An automatic switcher allows switching of the images automatically at specified intervals.

The following figure shows working of a sequential switcher:

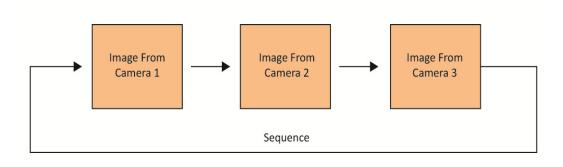


Fig. 3.3.14: Sequential switching

#### **Multiviewer Switcher**

A multiviewer switcher enables users to view multiple camera images on a single monitor simultaneously using a split-screen display. The screen comes with either 4, 9 or 16 segment display. The following figure shows split-screen display with 4 and 9 segment:

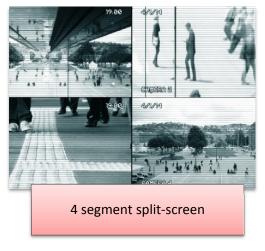
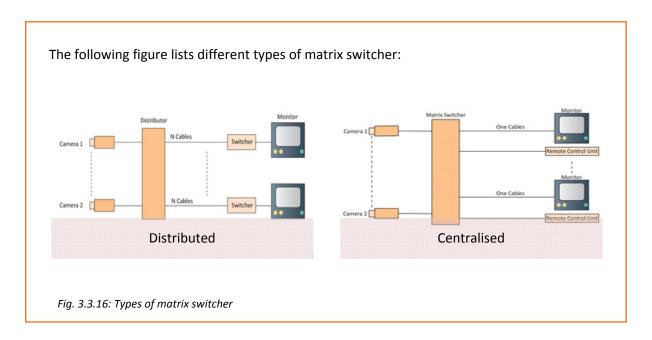




Fig. 3.3.15: Split-screen display with 4 and 9 segments

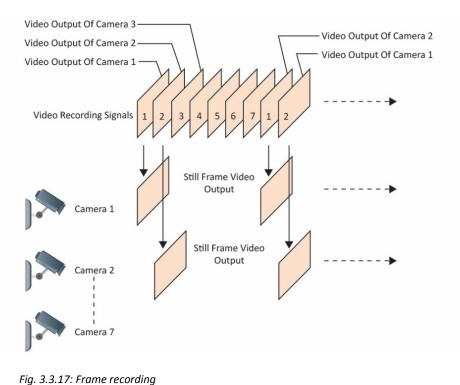
#### **Matrix Switcher**

Matrix Switcher enables routing and switching of the signal manually or automatically. Zoom lenses and tilt/pan heads can be controlled using installed units of a remote control at various locations. There is an economic advantage as compared to a distributed system as it employs a large number of cameras.



# 3.3.4 Selection of Multiplexer

Multiplexers involve a frame recording function, for which they are used in conjunction with a time lapse VCR or DVR. 9 /16 camera outputs can be recorded on a single recorder. A multiplexer enables recording of multiple images by switching them frame by frame. The CCTV installer should check the compatibility of the multiplexer with the recorders. The following figure shows frame recording:



## 3.3.5 Selection of Power Supply

The selection of power supply is very important for a security system. The selection must be made carefully, otherwise the whole setup may get affected. When the installer has to specify the power supply requirements he/she should consider the voltage, power capacity, voltage drop and fluctuations should be considered.

While considering circuit breaker for monitors the capacity of circuit breaker should be three times the rated power consumption. The following figure lists the types of power supplies that are generally used:

AC Mains Supply 24 VAC supply 12 VDC Supply Single Cable System

Fig. 3.3.18: Power supply for CCTV system

#### **AC Mains System**

AC mains is the source of power to the camera making it a low-cost option as it is used as a source of power for other equipment too. The following figure shows AC Mains system:

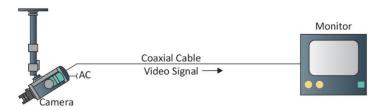


Fig. 3.3.19: AC Mains system

#### 24 VAC System

Power supply is through a 24V relay box or adapter. The total cost is reduced if a combination of tilt/pan and housing head is used. The following figure shows 24 VAC systems:

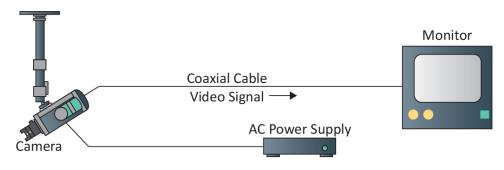


Fig. 3.3.20: 24 VAC system

#### 12 VDC System

Power supply to the camera is through a 12V DC supply that is typically used for sensor systems. The camera combinations can be with sensor systems for a low cost approach. The only drawback is that video signal synchronization cannot use their DC power source due to voltage drop in a long cable. The following figure shows 12 VDC system:

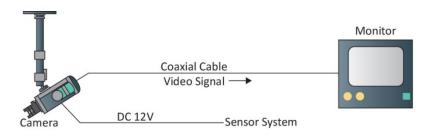


Fig. 3.3.21: 12 VDC system

#### Single-Cable (Superimposing) System

To reduce the wiring between camera and camera drive unit to a single cable system, the video signal and the power supply are overlaid on the coaxial cable. As the video signal is superimposed on the power supply which is different from the usual signal makes the format unsuitable for transmitting the signal over coaxial cables. The superimposing method used different trend for different single-cable system manufactured by different manufacturers. The following figure shows single cable system:

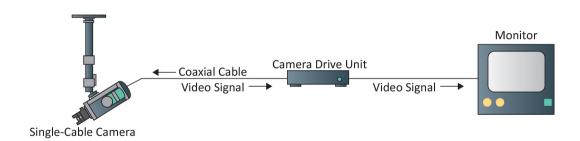


Fig. 3.3.22: Single cable system

#### 3.3.6 Selection of Cables

For video signal transmission, coaxial cables are generally used with an impedance of 75  $\Omega$ . The characteristics of different high frequency cables are:

	RG-59/U	RG-6/U	RG-11/U	RG-15/U
Cable outer diameter (mm)	5.9	6.8	10.3	13.3
Conductor diameter (AWG)	22	18	14	14
Characteristic impedance $(\Omega)$ ,	75	75	75	75
Attenuation (dB/km), 10MHz	29.5	23.6	11	13

Fig: 3.3.23: Characteristic of high frequency cable

#### **Coaxial Cable Length**

If the data exceeds the designated limit, a signal transmission is still likely. The resolution is likely to deteriorate as coaxial cable length increases. Video signal can get affected despite the cable not exceeding its indicated limits subject to AC power supply interference or by any other sources of electromagnetic field.

The maximum video signal transmission distances are:

Coaxial Cable Type	Maximum cable distance in meter (yard)	Maximum cable distance in meter (yard) <when cable="" compensator="" is="" used.=""></when>
RG-59/U	250 (273)	2,000 (2,187)
RG-6/U	500 (547)	2,400 (2,625)
RG-11/U	600 (656)	2,400 (2,625)
RG-15/U	750 (820)	3,000 (3,281)

Fig: 3.3.24: Video signal transmission

#### **Cable Compensator**

When video signals are transmitted over long distance, the video quality is degraded due to loss of signal. This results on screen image to appear out of the focus and the final picture is with deteriorated resolution.

To make the video signals travel through longer distances without this degradation, a cable compensator enhances the contour of subjects.

The following figure shows a cable compensator:

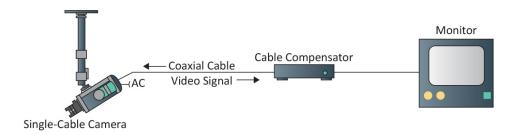


Fig. 3.3.25: Cable compensator

#### **Twisted-pair Cable Transmission**

Installation of a coaxial cable is a tedious task in elevators which is why using a transformer, impedance is changed or video signals are transmitted over the twisted pair cable. An external equipment reduces the induced noise due to this cable. But, this method is not suitable for single-cable cameras. The following figure shows twisted pair transmission:

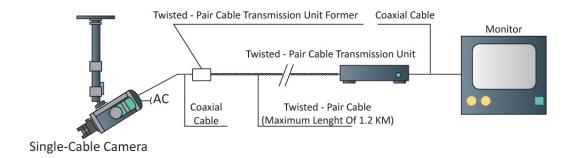


Fig. 3.3.26: Twisted pair transmission

#### **Control Signal Circuits**

Control signals are signals used for controlling pan/tilt heads or lenses. Use of multi core cables are the best for each control target because various signals require transmission that depends on control target.

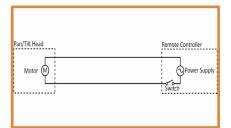
The characteristics of two types of cables used for such control signal transmission are:

Performance Characteristic	Pair-type polyethylene insulated vinyl sheathed local cable (CPEV)	Pair-type polyethylene insulated polyethylene sheathed local cable (CPEE)
Chemical resistance	Excellent	Excellent
Heat resistance	Good	Excellent
Flame resistance	Good	Poor
Weather resistance	Good	Excellent
Water resistance	Good	Excellent
Flexibility	Good	Good
Connection ease	Good	Normal

Fig. 3.3.27: Performance characteristics

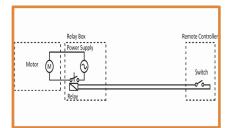
The following figure lists two types of signal control transmission system:

#### **Short Distance Control**



The power is taken directly using a relay control to control the remote unit remotely using a control unit. Over longer distances the voltage drops gradually and the control becomes difficult.

#### **Long Distance Control**



A relay control system controls the system using a remote control unit through a relay box.

Fig. 3.3.28: Signal control transmission system

## 3.3.6 Selection of Equipment

While selecting camera for the intended application, the performance of the camera suitable for that application must be taken care. In case of camera housings, it is important to select the best suitable type as per the place where the camera is to be installed. Depending on the conditions such as monitoring range or the mounting method, lenses and pan/tilt heads can be required. Sometimes other accessories such as remote controller can be required to operate the camera from remote locations.

The following table lists the conditions of selecting equipment:

Conditions to be Determined	Contents to be examined	Equipment to be selected
Target and observation range	Size of target and room	Lens (wide-angle, standard and zoom), number of cameras and motorized pan/tilt head
Camera's external View	Shape of camera and installation method	Dome camera, pinhole lens and so on
Installation place	Temperature, humidity, dust and rain	Camera housing and outdoor box
Mounting method	Wall, ceiling, and pole	Mounting hardware
Synchronization method	System configuration unit power frequency (50 or 60Hz) and wiring method	Vertical gen-lock and drive unit
Distance to camera	Maximum cable length and frequency bandwidth	Cable compensator, relay box, media converter, transmitting device and LAN equipment
Monitor screen size	Size of monitor room and aim of surveillance	Monitor: CRT or LCD typically
Monitor display method	Number of cameras, sequential display and multi-segment split- screen display	Switcher, Multi-viewer and multiplexer
Number of monitors	Number of cameras, size of monitor room, number of places monitored and aim of surveillance	Video signal splitter, switcher, Multi-viewer, multiplexer and Matrix switcher
Video recording System	Aim of recording, media and time interval	Time-lapse VCR, digital video recorder and video printer
Instant response Capability	Aim of surveillance	Sensor and preset memory system
Equipment storage	Storage form	Monitor rack, cabinet rack and mounting hardware

Fig. 3.3.29: Conditions of selecting equipment

Following the determination of the location of camera installation, the CCTV installer needs to understand the environment of the installation location, for selecting the necessary equipment. The conditions that the installer must be aware of are:

Condition for Selection	Examination Item	Condition for Selection
Brightness	Cameras minimum subject illumination	Brightness
Backlight phenomenon	Cameras backlight compensation	Backlight phenomenon
Temperature, rain, dust and explosive atmosphere	Camera housing function	Temperature, rain, dust and explosive atmosphere
Lightning and electromagnetic wave	Cameras video output	Lightning and electromagnetic wave
Privacy	Camera shape, installation method and image blocking capability	Privacy

Fig. 3.3.30: Condition for selection

## 3.3.7 Some Examples of CCTV System Selection

Examine the number of cameras, monitor, and their installation location based on the purpose of the system. First the clarification of the system is based on the input and output devices such as cameras, microphones and monitors and speakers respectively. Then the connections to be made to connect these equipment is considered.

The range of operation and the type of building and facility is then considered for selecting the system. The following figure gives a few concrete examples:

#### Convenience Stores

Convenience stores often suffer damages and loss that are a result of shoplifting or employee theft. Such situations demand surveillance camera systems. The following image shows CCTV in a convenience store:



Fig. 3.3.31: CCTV in a convenience store

#### • Financial Institutions

The CCTV surveillance system acts as assistance in police investigation. The number of cameras to be installed in a financial institution is proportional to the size of the institute. The following image shows CCTV in front of ATMs:



Fig. 3.3.32: CCTV in front of ATM

#### Office Buildings

Numerous surveillance camera systems are installed in public areas like large buildings for maintenance of safety as it quickly detects any crime or inappropriate actions taking place. The following image shows CCTV in office:



Fig. 3.3.33: CCTV in office building

#### Senior Citizen Centers and Related Facilities

There are many old age homes that need 24x7 care of elderly people due to shortage of manpower. To compensate, some old age homes employ surveillance camera systems for the safety of senior citizens living in these facilities.

#### • Hospitals and Other Medical Facilities

Hospitals need constant monitoring at places like waiting rooms, or lobbies and entrances. The following figure shows CCTV in hospital:



Fig. 3.3.34: CCTV in hospital

#### • Hotels

To help prevent the premises from unauthorized people, install the system at the entrance, all lobby and elevators. Also, system can be installed in the hall or dining area to check the lunch timing for meal courses served. The following image shows CCTV in a hotel:



Fig. 3.3.35: CCTV in hotel

#### Factories

CCTV cameras should be installed in such locations that they are not easily accessible by the workers and they can monitor the working conditions and instruments.





Fig. 3.3.36: CCTV in factory

#### • Transportation

At train stations, surveillance systems are installed to monitor arriving and departing trains in order to prevent accidents on the platform. The following figure shows CCTV in station:



Fig. 3.3.37: CCTV in station

# Activity 🙀



Match the following conditions that an installer must be aware of with the appropriate tools to be used in that situation.

Conditions to be Determined	Equipment/Tool to be selected
Target and observation range	Camera housing and outdoor box
Synchronization Method	Sensor and preset memory system
Installation place	Vertical gen-lock and drive unit
Number of monitors	Lens (wide-angle, standard and zoom), number of cameras and motorized pan/tilt head
Monitor screen size	Video signal splitter, switcher, Multi-viewer, multiplexer and Matrix switcher
Instant response Capability	Monitor: CRT or LCD typically









# 4. CCTV Camera Installation

Unit 4.1 – Planning for CCTV Camera Installation

Unit 4.2 - Installing the Camera

Unit 4.3 – Checking the Camera Functions



# Key Learning Outcomes



#### At the end of this module, you will be able to:

- 1. Explain the positioning of camera
- 2. Identify the protection grades
- 3. Perform the steps for installing a dome camera
- 4. Identify the steps of installing a box and a PTZ camera
- 5. Perform activities for achieving standards
- 6. Identify various camera functions
- 7. Explain synchronization of camera

# **UNIT 4.1: Planning a CCTV Camera Installation**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Explain the positioning of camera
- 2. List the environmental conditions to be considered for camera installation
- 3. Identify the protection grades
- 4. Draw the layout for installation

A CCTV installer must be aware of the workflow of CCTV installation process. The following figure lists the workflow of the installer:

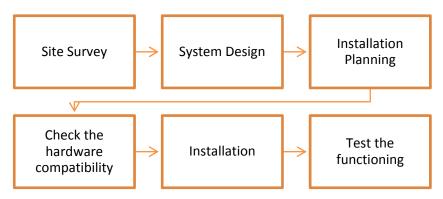


Fig. 4.1.1: Workflow of a CCTV installer

After analyzing the site conditions and customer requirements and selecting the components, the installer needs to plan for the installation. The planning includes determining the layout of components, making drawings of the layout, positioning the camera and so on.

# **4.1.1** Positioning and Protecting the Camera

The installer needs to make sure that the camera covers maximum possible area. The camera should be kept it at a height where it cannot be vandalized. Positioning the camera outside the building or property can provide advance information about anyone who is trying to break in or about an intruder at the time of exit.

The CCTV installer also needs to the environmental conditions to take any precautions for protecting the camera.

The following figure lists some environmental conditions:

#### Brightness

- Monochrome cameras needs brightness of at least 100 lux and brightness over 300 lux is required for color cameras.
- •Infrared cameras should be used for monitoring objects in low lux, and thermal cameras may be used for smoky conditions.

#### Temperatur e and Humidity

- •The operating temperature remains within the range of 14°F to 122°F.
- Formation of dew on the camera as a result of increase in humidity, affects camera operation.
- Dew condensation in the lens of the camera may corrode the metallic parts and result in disfuntioning of the camera.
- Defrosters and wipers operated by remote controllers can be used to protect against humidity.

#### Lightning

- Outdoor cameras and wiring are subject to lightning strikes.
- •CCTV system needs different protectors for video and control signal and power supply.

#### 6)Electroma gnetic Waves

- For cameras installed under high-voltage power lines, noise may be caused due to induction.
- •Camera can be equipped with a grounding wire.

#### Radiation

- •Cameras installed near nuclear power plants should be eqquiped with special radiation resistant CCD.
- •In x-ray photography rooms the lens surface typically gets discolored over time, and this leads to blurring of the image, and white spots on the screen. Hence, such cameras must be placed within a protective housing.

#### Corrosion

- •For surveillance in corrosive environments, camera should be placed in such a location so as to minimize corrosion.
- •Salt carrying breezes near sea shore, chlorine vapour near swiming pool are likely to corrode camera's metallic parts.
- •Even gases such as ammonia may cause corrosion.

# Explosion proof

- •It is necessary to select the right camera model and explosion proof housing while installing surveillance systems in explosion prone places.
- •It requires to meet the local legal and regulatory requirements.

#### Rain and Dust

- Proper rainproof coverings need to be used if cameras are in moist conditions.
- Dustproof indoor housings are required for the camera and its peripheral equipment installed in dusty indoor locations.

Fig. 4.1.2: Some environmental conditions to be considered for installation

Camera housings should be manufactured as per International Electro Technical Commission (IEC) standards. The following figure lists some IEC529 protection grades:

Charged internal components cannot be touched with fingers.

The unit is not reachable to the solid objects with thickness or diameter exceeding 2.5mm.

Entry of of dust particles may be prevented to the extent that operation is not affected.

Water drops falling straight vertically or at angle of 15° or less cannot affect the unit adversly.

Rain drops falling to the perpendicular at angles less than 60° cannot impact the unit.

Fig. 4.1.3: Some IEC529 Protection Grades

# 4.1.2 Drawing of the Layout

Depending on the requirements and components of the CCTV system, next step is to create a layout for the components in a block diagram. The following figure shows a block diagram of the layout of the system:

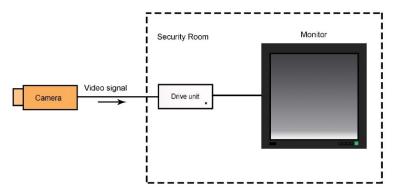
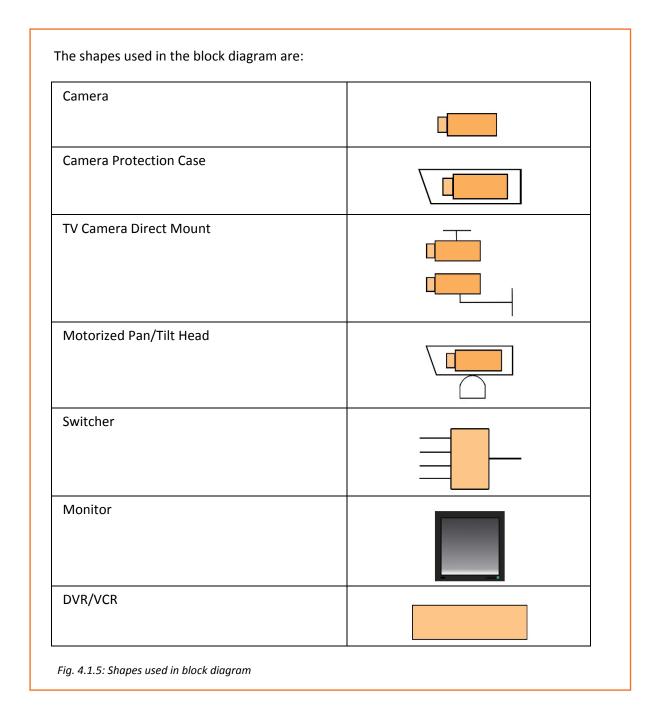


Fig. 4.1.4: Layout of CCTV system

The CCTV installer should consider the following rules while creating the layout:

- Organize equipment by installation location. Enclose the closer components with dashed line.
- Create the drawing in such a way that the signal flows from left to right and top to bottom.
- Make the diagram as detailed as possible.



# Activity 🕍



Match the followings components with their respective shapes:

1.	Switcher	a.	
2.	Monitor	b.	
3.	DVR/VCR	c.	
4.	Camera Protection Case	d.	
5.	Camera	e.	

# - Activity



Fill in the blanks for the following statements:

- 1. Monochrome camera needs brightness of at least \_\_\_\_\_\_.
  - a. 50 lux
- b. 100 lux
- c. 70 lux
- \_\_\_\_\_ cameras should be used for monitoring objects in low lux.
  - a. Monochrome camera
- b. Infrared camera c. CCD camera
- 3. CCTV cameras are susceptible to \_\_\_\_\_\_ such as Sulphur dioxide, ammonia and hydrochloric acid.
  - a. Corrosive liquids b. Corrosive gases c. Corrosive solids

- 4. The operating temperature range should be in between \_\_\_\_\_.
  - a. 9°F to 120°F
- b. 11°F to 122°F
- c. 14°F to 122°F

# **UNIT 4.2: Installing Camera**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Identify the steps of installing a dome camera
- 2. List the steps of installing a box camera
- 3. List the steps of installing a PTZ camera
- 4. Identify the activities for achieving standards

## 4.2.1 Steps of Installing a Dome Camera

The steps for installing a dome camera are as follow:

#### Step 1

Open the dome camera cover by turning it anti-clockwise, as shown in the following figure.



Fig. 4.2.1: Opening of camera

#### Step 2

Look at dome camera cover and the camera base unit. Place the camera base as reference and mark the holes, as shown in the following figure.

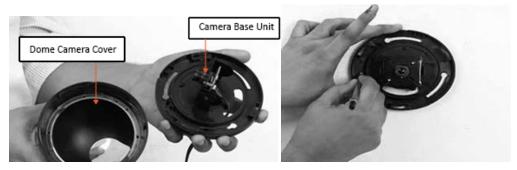


Fig. 4.2.2: Placing of camera base

Drill the mounting holes for the screws with a drill machine, as shown in the following figure.

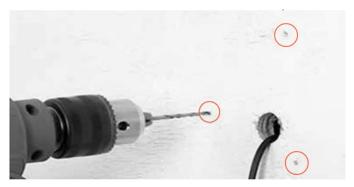


Fig. 4.2.3: Drilling mounting holes

#### Step 4

Connect the cable and the 2 core Dc pin, as shown in the following figure.

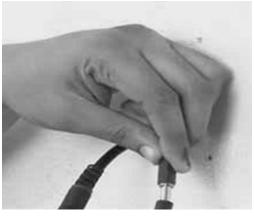


Fig. 4.2.4: Connecting cables

#### Step 5

Insert the cable through the cable guide holes all the way, as shown in the following figure.



Fig. 4.2.5: Inserting cables through holes

Place the camera base and align with the holes on the wall. Fix the camera base with screws onto the mounting holes, as shown in the following figure.





Fig. 4.2.6: Placing of camera base and fixing it

#### Step 7

Mount camera in such a way that, video and power cable should not be visible. Adjust Pan and Tilt position as per the client's requirement, as shown in the following figure.



Fig. 4.2.7: Dome camera

# 4.2.2 Steps of Installing a Box Camera

The steps for installing a box camera are as follow:

#### Step 1

Collect proper toolkit and camera unit, as shown in the following figure.





Fig. 4.2.8: Toolkit and camera unit

#### Step 2

Remove the screws provided at the end of the casing, as shown in the following figure.



Fig. 4.2.9: Removing screw at the end of casing

#### Step 3

First fix the lens provided on the front side of the box camera unit by rotating it in a clock wise direction, as shown in the following figure.



Fig. 4.2.8: Fixing the lens

Adjust the position by sliding in to the front and back so that the lens is near the front opening, as shown in the following figure.





Fig. 4.2.9: Adjusting position of lens

#### Step 5

Pass the cable through the cable guide. Insert the cable with BNC connector and a 2 core cable with dc power pin into the casing through the cable guard, as shown in the following figure.

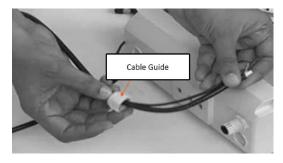




Fig. 4.2.10: Passing cable

#### Step 6

Close the top cover of the casing and fix the two screws and tighten them with screwdriver, as shown in the following figure.

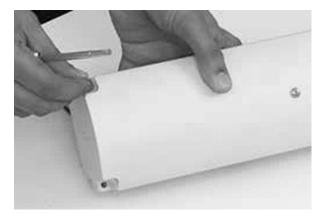


Fig. 4.2.11: Closing cover of the box

Adjust the position and match the hole at the bottom of the camera, as shown in the following figure.

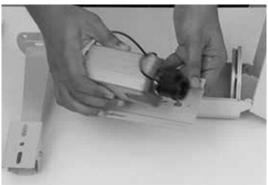


Fig. 4.2.12: Adjusting position of camera

#### Step 8

With the help of a center punch mark a guiding hole over the pencil mark for the drill machine. Drill a hole with small bit. Then with a help of a trishul bit drill a bigger hole for the cable guide, as shown in the following figure.







Fig. 4.2.13: Drilling hole

Fix all the screws one by one to hand tight position first, then tighten fully, as shown in the following figure.

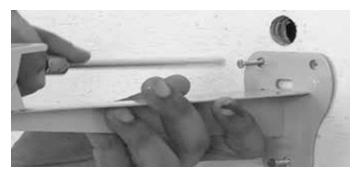


Fig. 4.2.14: Fixing screws

#### Step 10

First you need to insert all the cable from the camera end through the cable guide hole for the DVR end connection, as shown in the following figure.

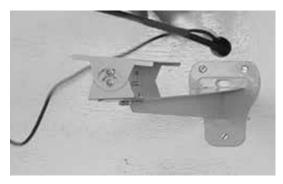


Fig. 4.2.15: Passing cables to DVR

#### Step 11

Mount the box camera with the casing to the stand. Mount Camera Stand with screws onto the wall or ceiling. Fix the Box Camera onto the camera stand or fix camera housing on to the mounting stand. Mount camera in such a way that, video and power cable should be visible minimum, as shown in the following figure.



Fig. 4.2.16: Mounting and fixing the camera

Set the required viewing angle of the camera as per your need and tighten the screws. Adjust Pan and Tilt position as per the client's requirement, as shown in the following figure.



Fig. 4.2.17: Adjust the camera

## 4.2.3 Steps of Installing a PTZ Camera

The box contains user manual and warranty card. The installer should gently remove the upper packing. The following steps describes the installation of a PTZ camera:

#### Step 1

Lift the PTZ camera carefully. It has three BNC connectors for Video and DC pin for power supply and 2 core RS485 connector for data. Keep the Speed dome on the upper packing safely. At the bottom you will find power supply unit and wall mount stand, as shown in the following figure.

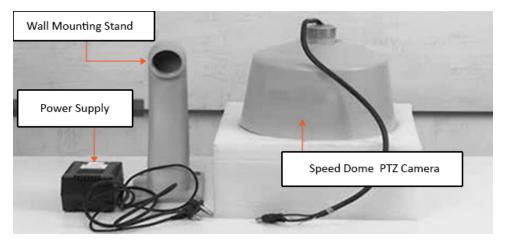


Fig. 4.2.18: Camera units

Place the wall mount stand at the location where we want to install the PTZ camera and mark all the mounting holes with the help of a pencil. Please ensure that the stand does not move from its place while marking the holes, as shown in the following figure.

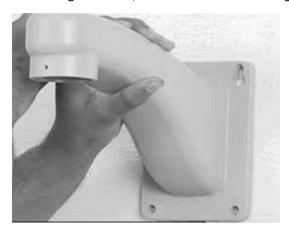


Fig. 4.2.19: Marking drilling holes

#### Step 3

With the help of the center punch mark holes for drilling. Using the smaller drill bit, drill four mounting holes. Change the drill bit to the size of the screw and drill all the mounting holes. Drill a bigger hole at the center to pass the cables Mount the stand with nut bolts to check if the mounting is correct. Remove the stand from the mounting, as shown in the following figure.







Fig. 4.2.20: Drilling holes

Once done, go on to assemble the PTZ camera to its stand before you mount it to the wall. Insert the cable through the wall mount stand and fix the stand on PTZ dome camera by turning the screw in a clockwise direction, as shown in the following figure.



Fig. 4.2.21: Inserting cables through wall mount

#### Step 5

Lift the camera with the stand and insert cables through the center hole drilled for cable to pass, as shown in the following figure.



Fig. 4.2.22: Lifting the camera

#### Step 6

Mount the junction box on the back side of speed dome. Insert cable from the back side of the junction box. Place the junction box on the wall and mark holes for fixing the junction box, as shown in the following figure.



Fig. 4.2.23: Inserting cables from back

Connect the BNC cable from the camera to the BNC connector coming from the DVR end. Insert power cable fitted with DC pin in the junction box and connect to the DC pin of speed dome. Insert RG -6 cables terminated with BNC male connector in junction box and connect it to female BNC connector of Speed dome.

#### Step 8

Join the 2 core RS 485 cables together rand secure it with insulation tape. Connect two way connector to the RS 485 wires. Note down polarity of RS 485 wires as per colour code. Normally yellow is data 1 or 'RS485A' or positive and Orange is data 0 or 'RS485B' or negative. Insert two core Multistrand cables for RS 485 connectivity. Connect RS485A and RS485B as per polarity, as shown in the following figure.





Fig. 4.2.24: Connecting cables

#### Step 9

Push the extra cables through the cable guide hole onto the other side of the wall and place the stand cover it, as shown in the following figure.

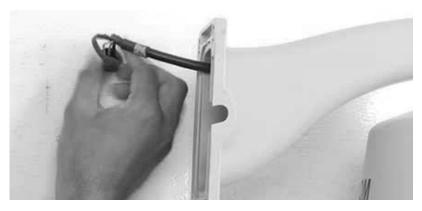


Fig. 4.2.25: Cables through cable guide

#### Step 10

Fix the junction box on the wall by fixing wall mount screws. When it is aligned, fix all the four screws one by one and fit the four nuts and bolts by holding the camera with one hand. Tighten all mounting nuts and bolts with the spanner.

With the help of the Allen key provided in the box, tighten the fixing screw to lock speed dome camera with the stand, as shown in the following figure.



Fig. 4.2.26: Fixing junction box and camera

## 4.2.4 Achieving Standards -

While installing the CCTV system the following activities must be performed:

Follow standard operating procedure for using tools and equipment

Use the installation manual for specific hardware component

Use specified tools for specific equipment to avoid damage

Follow standard safety procedures for installing

Ensure using only quality hardware products complying to industry and quality standards

Ensure product installation and user manual is given to the user or customer

Ensure that there are no cable joins, sharp bends during installation

Ensure weather proof (UV proof) cable are used for outdoor installation

Ensure that cabling is robust, protected and not hanging

Ensure zero-material damage to equipment during installation process

Install target number of CCTVs as per company's policy

Fig. 4.2.27: Activities at the time of installation

### **UNIT 4.3: Camera Functions**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Identify various camera functions
- 2. Explain synchronization of camera

#### 4.3.1 Functions of a Camera

The CCTV installer needs to check the functioning of the CCTV camera and therefore should be aware of various functions of the camera.

#### **Backlight Compensation (BLC)**

When bright light falls on the screen, the brightness is modified to accommodate the bright area of the image such that the front object becomes dark. For example, at an entrance to a building, bright light entering from the door may cause the faces of the entering persons in the images to be darkened. This function is used to display the image at an appropriate brightness. The following image shows backlight compensation:



Fig. 4.3.1: Backlight compensation

#### **Automatic Sensitivity Adjustment (AES)**

This function enables the camera to adjust the screen brightness and maintain it at a certain level by modifying the speed of the shutter.

#### Wide Dynamic Range (WDR)

WDR functions enable the cameras to release automatic electric shutters (AES) two times per frame, and then process the resulting images in such a way that both bright and dark objects are easily visible. BLC functions enable dark objects to be viewed with clarity, while WDR cameras make sure that clearer regeneration occurs for both bright and dark objects. The following image shows wide dynamic range function:



Fig. 4.3.2: Wide dynamic range function

#### **Image Enhancer**

This function adjusts and sharpens the contours of objects for reproducing better images with full clarity.

#### White Balance

This function helps in appearing the white objects correctly amidst the process of color reproductions. This automatic adjustment of color is known as "automatic white balance" (AWB). A user can select automatic tracking system (ATW) between the given AWB system for adjusting and correcting the white balance when there is availability of power. As surveillance cameras is less adaptive to color temperature, so it reproduces different color based on the source of light. That is why, white balance is necessary for adjusting color tone.

#### **Day and Night Function**

This function is similar to the high sensitivity accumulation function. To use this function at dark places, infrared cut filter is removed and now infrared emitter is working as light source to monitor color images of subjects. Changing the filter enables the IR light to reach the imaging element of camera at night. The following figure shows the day and night function of a camera:

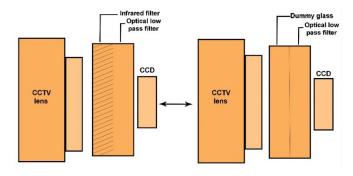


Fig. 4.3.3: Day and night function of a camera

#### **Automatic Gain Control (AGC)**

This function helps in maintaining consistency of screen brightness by electronically adjusting the video signals. If the input signals received by the camera exceeds its predetermined level, it adjusts the gain which keeps the signal below that level. This signal is boosted to its preset level, if it is too weak. Thus, AGC is used to maintain the intensity of the signal at a definite level by automatically adjusting the gain.

#### **Flicker Reduction**

This function changes the speed of the shutter to maintain the screen brightness rather than changing the lens aperture. AES does not work in areas with power frequency of 50Hz, because the shutter mechanism is used by flicker reduction function.

#### **High-Sensitivity Accumulation**

This function slows down the shutter speed so that the camera is able to gather images for a longer time period. This ensures that the images of objects can be captured even at dark places. At excessively dark place (darkness greater than 1 lux), this function along with the day and night function can be used.

#### **Privacy Masking**

Considering privacy issue, this function allows masking of four subject images position at a time, so that the images which should not be photographed like apartment windows cannot be surveillance.

It can conceal the parts of image to protect personal privacy by masking the privacy area.

Other useful functions include as shown in the following figure:

Zoomimg	Provides electronic zooming upto 2X
Camera title dispaly	Displays location name which is in surveillance on the screen
Screen Reversing	Corrects reversed or inverted images

Fig. 4.3.4: Some other functions of a camera

#### 4.3.2 Synchronization

Synchronization involves the timing of scanning of video images. The following figure lists the two types of synchronization:



Fig. 4.3.5: Types of synchronization

While switching between multiple video outputs, if they are not synchronized, it may cause disturbances on the screen. The camera can be set to use any type of synchronization.

#### **Internal Synchronization**

The video signal is scanned with help of the timing of the synchronous signal that is generated by synchronous signal generating circuit which is available in the cameras. This method cannot let the camera coordinate with other ones. The following figure shows internal synchronization:

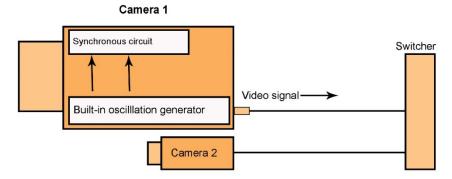


Fig. 4.3.6: Internal synchronization

#### **External Synchronization**

A synchronous signal that is generated by an external synchronous signal generating device, as a reference, is sent to the camera. This method supplies the same synchronous signal having identical timing to the cameras and thus adjusts the scanning timing of each camera.

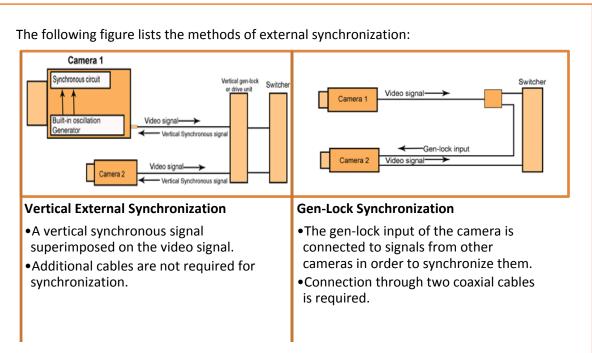


Fig. 4.3.7: External synchronization

#### **Line Lock Synchronization**

This method adjusts the vertical synchronization in which the frequency of the synchronization is almost identical with the 60 Hz frequency of AC power supply of the camera. This method enables easy synchronization with the help of a power supply with the same phase, but it cannot be used in areas with power frequency 50 Hz. The following figure shows line lock synchronization:

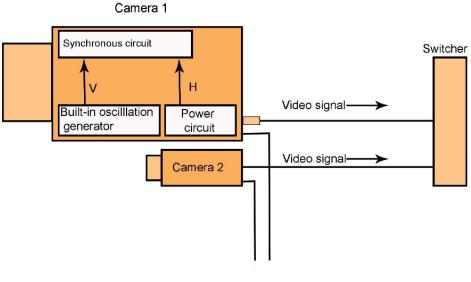


Fig. 4.3.8: Line lock synchronization

# Tips



Digital Video Signal Processor (DVSP) is used in a system where non-synchronous cameras are used. The DVSP adjusts input signals performing time base correction to them and ensures that all the input signals get synchronized.









# 5. Set Up CCTVSurveillance System

Unit 5.1 – Connecting Camera and DVR with System

Unit 5.2 – Configuring Network Settings

Unit 5.3 – Checking the Functioning of the System



# Key Learning Outcomes



#### At the end of this module, you will be able to:

- 1. List the steps of DVR installation
- 2. Explain the operation of DVR
- 3. Identify the controls of DVR
- 4. Configure network settings
- 5. Explain on-screen display settings
- 6. Manage hard disk drives
- 7. List various PTZ controls
- 8. Check camera functioning
- 9. Achieve quality standards and productivity

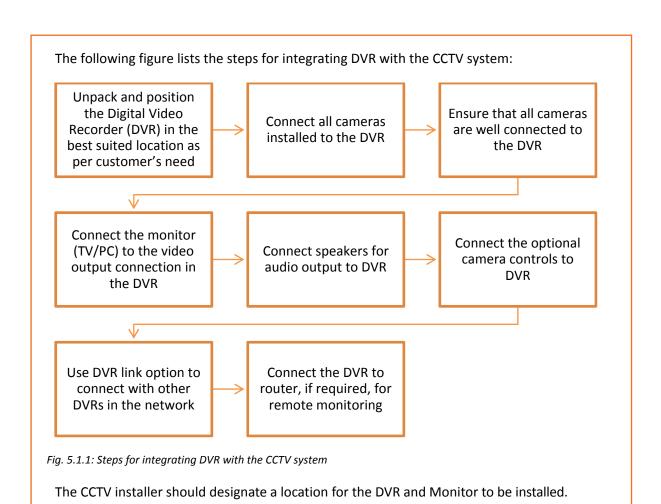
## **UNIT 5.1: Connecting Camera and DVR with System**

# Unit Objectives



#### At the end of this unit, you will be able to:

- 1. List the steps of DVR installation
- 2. Explain the operation of DVR
- 3. Identify the controls of DVR



#### 5.1.1 Installation of DVR

The following figure lists the activities that a CCTV installer should perform after receiving the DVR:

> Open the box and Check for any visible extract the damage on the DVR. protective materials

Fig. 5.1.2: Activities after receiving DVR

The steps for installation of DVR are as follow:

**Step 1:** Remove the DVR set from the package, which includes DVR unit, mouse, power supply adapter and cords. The following image shows a DVR set:

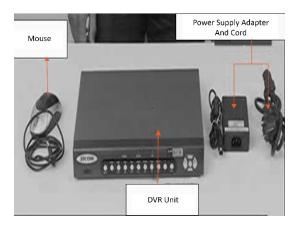


Fig. 5.1.3: A DVR set

**Step 2:** Open the screws using a screwdriver and remove the cover of DVR unit as shown in the following images:



Fig. 5.1.4: Removing the cover of DVR unit

**Step 3:** Connect data cable to the specified data port on the panel board as shown in the following image:

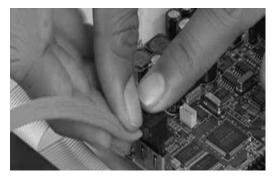


Fig. 5.1.5: Connecting data cable

**Step 4**: Place the hard disk within the DVR unit, at the space provided and fix it in the unit with screws as shown in the following image:



Fig. 5.1.6: Placing HDD

**Step 5:** Close the cabinet placing the cover back on it and fixing it the screws as shown in the following image:



Fig. 5.1.7: Closing the DVR cabinet

**Step 6:** Attach the power adapter connector to the DVR unit as shown in the following image:



Fig. 5.1.8: Connecting power adapter

**Step 7:** Connect the compatible USB mouse to the DVR as shown in the following image:



Fig. 5.1.9: Connecting USB mouse

**Step 8:** Attach the cables coming from the camera to the connector specified on the DVR as shown in the following image:



Fig. 5.1.10: Connecting cables

There are different ports for different cables. The CCTV installer should be aware of the ports to connect the cables. The ports for of a DVR panel are:

Port	Feature	
VIDEO OUT	Attaches BNC connector:	
	<ul> <li>If video graphics array (VGA) is attached, the interface will not work.</li> </ul>	
	<ul> <li>If VGA is not attached, the interface can be used as the primary video output enabled with local video display and menu functions.</li> </ul>	
VIDEO SPOT OUT	POT OUT Connects BNC connector for monitor having a single window view.	
VIDEO IN	Connects BNC connectors for analog video image input.	
AUDIO IN	Connects RCA connectors for analog input audio.	
AUDIO OUT	Connects RCA connector for output audio.	

Fig. 5.1.11: Ports for DVR panel

# **5.1.2** Operating the DVR

A CCTV installer needs to check the functioning of the CCTV system in order to understand how to operate the components of CCTV.

After installing the CCTV system, the activities listed in the following figure should be performed:

Give a demo of CCTV system operations to the customer

Make sure that the controls of the system work properly

Make sure that optional camera properties such as pan, tilt, zoom work properly

Monitor and try to switch to other cameras connected in the system

View, record and replay the video captured in the system

Correct/fix issues such as no video, lack of clarity in the system, if found

Fig. 5.1.12: After installing the CCTV system

There are several ways for navigating and operating the DVR. DVR can be controlled using the front panel controls, Infrared (IR) remote or a mouse/soft keyboard.

The following figure lists some common controls of DVR:

#### USB Ports

•Used to connect additional devices such as USB HDD and mouse.

#### Indicator

- Alarm: turns red at detection of a sensor alarm.
- Ready: becomes green to indicate DVR is working properly.
- •Status: becomes green while the DVR unit is operated using an IR remote.
- HDD: starts blinking red while reading/writing data from/to HDD.
- NETWORK: starts blinking blue to indicate proper functioning of network connection.
- •MENU: Enables the user to return to the main menu after a successful login. It is also used for Sensitivity Interface settings.
- •ESC: Used to go back to the previous menu.
- •EDIT: Used to edit text fields or as a Backspace button. Pressing this button on the checkbox fields allows the user to select the checkbox. It can also be used to produce video clips for back up, in Playback mode.
- PLAY: It is used to enter the Playback menu or turn the audio on/off in the Playback menu.
- •REC: Used to go to the manual record interface.

#### **Buttons**

- •PTZ: Used for PTZ Control mode.
- PREVIEW: Used for switching between single screen mode and multi-screen one.
- •SHIFT: Used for switching between numeric and control buttons.
- DIRECTION: Used to navigate between the menu fields and items.
- •Up and Down button, in playback mode, are used for increase/decrease the speeding of the recorded video.
- •Left and Right buttons are used to move backward and forward in a video. Can also be used for cycling through channels in the preview mode.
- •ENTER: Used to confirm the selection in any of the modes. It is also used for selecting checkbox fields. It is used to play or pause video in playback mode.

Fig. 5.1.13: Some common controls of DVR

the next item.

#### **Using a USB Mouse** Typically a 3-button USB mouse (Left, Right and a Scroll-wheel) can be used to work with DVR unit. The following figure lists the functions of the mouse buttons: Left Button Right Button Scroll-Wheel Single-Click Scroll Up Shows a pop-up •Select a field of a •In Preview menu. menu. mode, enables going to the previous screen. •In Menu mode, Double-Click helps in moving Switch between selected parts to screen modes in the previous Preview mode. item. Click and Drag Scroll Down Control pan/tilt •In Preview functions of a mode, allows PTZ camera and switching to the to vary the next screen. digital zoom •In Menu mode, area position moves the and camera on selected item to screen display

Fig. 5.1.14: Functions of the mouse buttons

#### **Using Setup Wizard**

(OSD).

The Setup wizard starts by default when the loading of DVR is finished. The Setup wizard enables the user to modify some important settings of DVR. The cancel button needs to be clicked if the user does not want to modify the settings.

The following screenshot shows the Setup wizard:

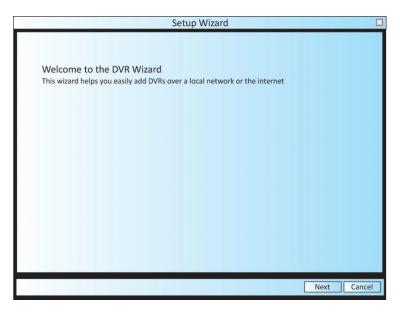
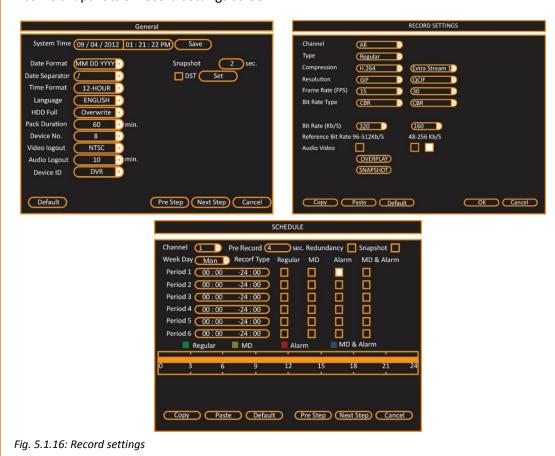


Fig. 5.1.15: The Setup wizard

Using the Setup wizard, record settings, recording schedules and network settings can be set. To enter the Record Settings window, click the Enter button. The following images show some snapshots of record settings screen:



To access the DVR remotely, it needs to be connected to a modem or a router. A router allows the user to connect to DVR to LAN and to web. A remote viewing software should also be installed on the user's device. For configuring network settings, the IP address, subnet mask and default gateway address should be mentioned. The following image shows configuring DVR to be operated remotely:



Fig. 5.1.17: Configuring DVR to be operated remotely

# Practical 2



Perform the task of installation of CCTV with DVR at a customer site.

#### Tools:

- 1. Video cables
- 2. CCTV camera
- 3. Monitor
- 4. DVR

# Practical 2



Install an IP Camera at a customer site.

#### Tools:

- 1. Network camera
- 2. CAT 5 cable
- 3. Internet connection
- 4. Router
- 5. Computer system

# **UNIT 5.2: Setting Up the System**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Configure network settings
- 2. Use on screen display settings
- 3. Manage hard disk drives

## **5.2.1 Configuring Network Settings**

To operate the CCTV surveillance system remotely, the system should be connected to a network and have a valid IP configuration. To configure the system for remote monitoring, the installer needs to:

- Connect the DVR to the router.
- Install the required software needed for connecting to an IP network or remote monitoring.
- Feed in the appropriate IP address to get video signals through IP network/Internet.
- Connect the equipment and switch the system on to start the video capturing.

#### **Basic Network Settings**

To configure basic network settings, the following steps should be followed:

1. Select Menu → Settings → Network for going to network settings. The following snapshot shows the Network Settings menu:



Fig. 5.2.1: The Network Settings menu

2. If the user wants the DVR to receive the IP address and network settings automatically from a DHCP server, the DHCP checkbox should be selected.

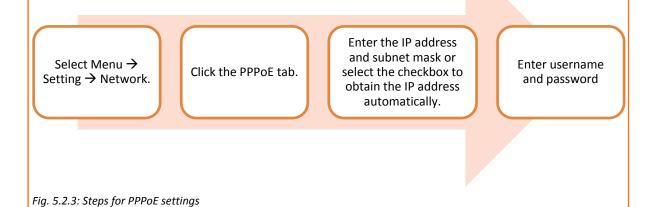
3. The network status can also be checked from Network Status tab, as shown in the following snapshot:



Fig. 5.2.2: Checking network status

#### **PPPoE Settings**

The DVR may also allow access to Point-to-Point Protocol over Ethernet (PPPoE). PPPoE access settings can be done as shown in the following figure:



The following snapshot shows the PPPoE Settings:

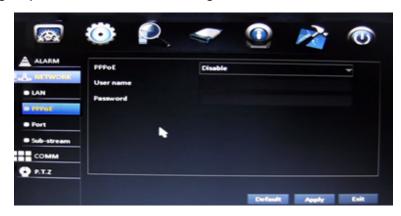


Fig. 5.2.4: PPPoE Settings

#### Configuring Network Time Protocol (NTP) Server

NTP Server enables the DVR to maintain accurate date and time. The following figure shows the steps for configuring the NTP Server:

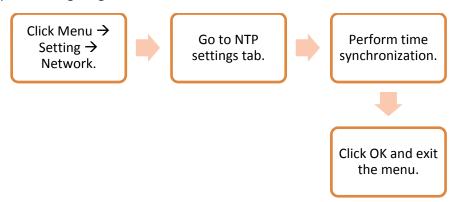


Fig. 5.2.5: Steps for configuring NTP Server

# **5.2.2** Setting Up a Remote Alarm Host

The following figure lists the steps for setting up a remote alarm host:

Select Menu → Setting → Network → Advanced tab.

Select the Set button located next to Host/Others.

Enter the IP address and port of the Alarm Host.

Fig. 5.2.6: Steps for setting up a remote alarm host

## **5.2.3 Configuring on Screen Display (OSD) Settings**

To configure OSD settings, use the Camera Management menu. The OSD settings is shown in every display during the Live Preview mode and it contains the time and date and name of the camera. OSD settings allows the operator to adjust brightness, contrast and privacy masking. OSD settings can be done in the following way:

- 1. Click Menu  $\rightarrow$  Setting  $\rightarrow$  Camera to go to Camera Management/Settings.
- 2. Select the channel to configure the OSD settings.
- 3. Under selected channel, click the Set button.
- 4. Configure desired OSD settings.

## 5.2.4 Managing Hard Disk Drives (HDDs)

A newly installed HDD can be used with the DVR after it is initialized. Initializing HDD will remove all data on it. The following figure lists some options of managing HDD:

**Initializing HDD** 

•Go to HDD Management menu, by clicking Menu → HDD.

#### **Grouping HDD**

- Videos from designated channels can be set in a way such that it can be recorded on a particular HDD group.
- •Go to the HDD Management menu and select the HDDs that are to be added to group.
- Go to Group Settings by selecting Group button.
- Set HDD Group Number

#### **Setting HDD Status**

•Behaviour of HDD can be changed by modifying its status. The status of a HDD can be set to redundancy, read-only or read/write (R/W).

Fig. 5.2.7: Managing HDD

# Practical 2



Perform the task of setting up the DVR for remote surveillance.

#### Tools:

- 1. Computer with Internet connection
- 2. DVR
- 3. Ethernet Cable
- 4. Router
- 5. DVR remote viewer software

# Practical 2



Perform the task of assignment of an IP Address to DVR.

#### Tools:

- 1. Computer with internet connection
- 2. DVR
- 3. Ethernet Cable
- 4. Router

## **UNIT 5.3: Checking the Functioning of the System**

# **Unit Objectives**



At the end of this unit, you will be able to:

- 1. Identify various PTZ controls
- 2. Check camera functioning
- 3. Achieve quality standards and productivity

After installing the CCTV surveillance system, the CCTV installer should ensure that the CCTV system is functioning properly and the output is per customer's expectation. The installer must check the functioning of various modules to ensure the working of the system.

## 5.3.1 Checking Up the Functioning of Camera

The functions and controls of the camera should be checked after installation. The customer should be made aware of the various controls of the camera. The following figure lists various controls visible on PTZ panel:

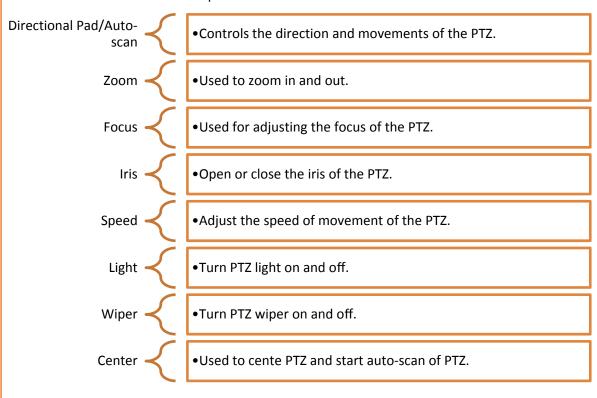


Fig. 5.3.1: PTZ controls

Additionally, the installer should check the performance of the camera.

The following figure lists the steps for checking camera performance:

Check the performance of the camera in all the available light levels. For outdoor cameras, check the performance during both day and night time.

Check the coverage area of the lens for each location and ensure the lens fulfills the specified condition.

Check the number of cameras and ensure that all of them provide the required coverage

•For zoom lenses, ensure that they have been properly back focused that enables the lens to focus on the object of interest during the zooming in and out.

Check that all cameras are synchronized properly. The lack of synchronization can result a lot of problems.

- Watching jumping images continuously, makes the operator irritated.
- •It may lead to poor quality recording such as color disorientation, skipping of picture frames.

Fig. 5.3.2: Checking camera performance

## 5.3.2 Checking Up the Functioning of Other Components

The installer should also check the performance of other components such as DVR, switcher and so on. The basic checks that the installer should perform:

- Ensure that the DVRs and multiplexers are programmed properly.
- Check that proper camera numbers and addresses are provided to all cameras.
- Check the functioning of keyboard.
- Simulate and ensure that all the alarms are working as per requirement.
- Check that the picture quality during the day and night matches the client requirement.
- Check the quality of the cable runs and the BNC connectors.
- Ensure that no exposed cables are there at the camera points.
- Check the equipment rack and stability of the mount.

## 5.3.3 Handing over the Documents -

The installer should hand over the necessary documents to the customer. The following figure lists some of the documents:

Warranty

Operating Manual Installation Manual Product Catalogue

Maintenace Schedule

Feedback Form

Fig. 5.3.3: List of documents

## **5.3.4 Achieving Productivity and Quality Standards**

The installer must achieve the quality standards of the company ensuring customer satisfaction. The following figure lists the activities for achieving quality standards:

Ensure that CCTV system is working properly and the output is as expected

Confirm customer's acceptance for installing additional hardware/software

Inform customer about warranty/terms and conditions on the equipment

Give a demo for use of the system or hardware

Escalate problems to superior if cannot be resolved at field level

Submit the feedback form with customer satisfaction level

Report work status using proper documentation

Fig. 5.3.4: Achieving quality standards

		_	
Δ	cti	vi	tv
•	-	•	~ 7



Create a checklist for performing the post installation activities.

Activity	Status (Done/Not Done)











# 6. Soft Skills and Work Ethics

Unit 6.1 – Effective Communication and Coordination at Work

Unit 6.2 – Working Effectively and Maintaining Discipline at Work

Unit 6.3 – Maintaining Social Diversity at Work



# 

#### By the end of this unit, participants will be able to:

- 1. State the importance of work ethics and workplace etiquette
- 2. State the importance of effective communication and interpersonal skills
- 3. Explain ways to maintain discipline in the workplace
- 4. Discuss the common reasons for interpersonal conflict and ways of managing them effectively.

## **UNIT 6.1: Efffecte Communicacation a Coordinainati** t Work

## Unit Objectives | ©



#### By the end of this unit, participants will be able to:

- 1. Work efffectely at the workplace.
- 2. Demonstrate practices related to gender and PwD sensitazation.

## 6.1.1 Importance of Work Ethics and Workplace Etiquette

Workplace ethics are a set of moral and legal guidelines that organizations follow. These guidelines influence the way customers and employees interact with an organization. Workplace ethics essentially guide how an organization serves its clients and treats its employees.

For example, if a company seeks to fulfil the promises it makes, it may develop processes and set up a robust support system to address this policy and build customer/client loyalty. To achieve this goal, the company may implement specific incentive programs for employees to encourage them to produce high-quality work and ensure the organization fulfils the promises it makes to its clients/ customers.

Many organizations, often the large ones, set detailed ethical codes to guide their operations and control how the organizational processes impact the stakeholders. These ethics usually help organizations maintain certain standards of responsibility, accountability, professionalism and among others, as they navigate through different challenges and day-to-day circumstances. By following these guidelines, organizations often experience several benefits that improve the lives of stakeholders, such as customers, employees, leaders, etc.

#### **Examples of Common Workplace Ethics**



Fig. 6.1.1 Examples of Common Workplace Ethics

Workplace ethics are essential for a successful organization with a satisfied and loyal team. High ethical standards help in ensuring all stakeholders, such as customers, investors, employees, and other individuals involved in the workplace operations, feel the organization is safeguarding their interests. By creating and implementing ethical guidelines, organizations can keep the best interests of their employees in mind while maintaining a positive influence on those they impact through their processes. As a result, employees maintain the organization's best interests by being ethical in their daily work duties. For example, fairly-treated employees of an organization who understand the organization's commitments to environmental sustainability are usually less likely to behave in a manner that causes harm to the environment. Thus, they help maintain a positive public image of the organization. It means that workplace ethics help in maintaining reciprocal relationships that benefit organizations at large and the individuals associated with and influenced by the organizational policies.

#### **Benefits of Workplace Ethics**

There are various benefits of implementing workplace ethics. When organizations hold themselves to high ethical standards, leaders, stakeholders, and the general public can experience significant improvements. Following are some of the key benefits of employing ethics in the workplace:



Fig. 6.1.2 Benefits of Workplace Ethics

## **6.1.2 Interpersonal Communication**

Interpersonal communication is a process that involves sharing ideas and emotions with another person, both - verbally and non-verbally. It is essential to interact effectively with others in both personal and professional lives. In professional life or the workplace, strong interpersonal skills play a crucial role in achieving effective collaboration with colleagues.

#### **Interpersonal Skills**

Interpersonal skills, in other terms, are known as people skills, which are used to communicate and interact with others effectively. These are soft skills one uses to communicate with others and understand them. One uses these skills in daily life while interacting with people

#### **Examples of Interpersonal Skills**



Fig 6.1.3 Examples of Interpersonal Skills

Numerous interpersonal skills involve communication. Communication can be verbal, such as persuasion or tone of voice — or non-verbal, such as listening and body language.

#### **Importance of Interpersonal Skills**

Interpersonal skills are essential for communicating and collaborating with groups and individuals in both personal and professional life. People with strong interpersonal skills often are able to build good relationships and also tend to work well with others. Most people often enjoy working with co-workers who have good interpersonal skills.

Among other benefits of good interpersonal skills is the ability to solve problems and make the best decisions. One can use the ability to understand others and good interpersonal communication skills to find the best solution or make the best decisions in the interest of everyone involved. Strong interpersonal skills help individuals work well in teams and collaborate effectively. Usually, people who possess good interpersonal skills also tend to be good leaders, owing to their ability to communicate well with others and motivate the people around them.

Interpersonal communication is the key to working in a team environment and working coollectely to achieve shared goals. Following are the interperso

#### **Verbal Communication**

The ability to speak clearly, appropriately and confidently can help one communicate effectively with others. It is vital to select the appropriate vocabulary and tone for the target audience.

For example – one should speak formally and professionally in the work environment, while informal language is acceptable in an intimate environment with close friends and family. Also, one should avoid using complex or technical language while communicating with an audience that may not be familiar with it. Using simple language in a courteous tone helps achieve better communication, irrespective of the audience.

#### **Active Listening**

Active listening is defined as the ability to pay complete or undivided attention to someone when they speak and understand what they are saying. It is important for effective communication because without understanding what the speaker is saying, it becomes difficult to carry forward a conversation. One should ensure to use appropriate verbal and non-verbal responses, e.g. eye contact, nodding, or smiling, to show interest in what the speaker says. Active listening is also about paying attention to the speaker's body language and visual cues. Asking and answering questions is one of the best ways to demonstrate an interest in conversing with the other person.

Active listening is critical for communicating effectively without ambiguity. It helps one understand the information or instructions being shared. It may also encourage co-workers to share their ideas, which ultimately helps achieve collaboration.

#### **Body Language**

One's expression, posture, and gestures are as important as verbal communication. One should practice open body language to encourage positivity and trust while communicating. Open body language includes - maintaining eye contact, nodding, smiling and being comfortable. On the other hand, one should avoid closed body language, e.g. crossed arms, shifting eyes and restless behaviour.

#### **Empathy**

Empathy is the ability to understand the emotions, ideas and needs of others from their point of view. Empathy is also known as emotional intelligence. Empathetic people are good at being aware of others' emotions and compassionate when communicating with them. Being empathetic in the workplace can be good to boost the morale of employees and improve productivity. By showing empathy, one can gain the trust and respect of others.

#### **Conflict Resolution**

One can use interpersonal communication skills to help resolve disagreements and conflicts in the workplace. This involves the application of negotiation and persuasion skills to resolve arguments between conflicting parties. It is also important to evaluate and understand both sides of the argument by listening closely to everyone involved and finding an amicable solution acceptable to all.

Good conflict resolution skills can help one contribute to creating a collaborative and positive work environment. With the ability to resolve conflicts, one can earn the trust and respect of co-workers.nal communicationskills that vital for success at work:

#### Teamwork

Employees who communicate and work well in a team often have better chances of achieving success and common goals. Being a team player can help one avoid conflicts and improve productivity. One can do this by offering to help co-workers when required and asking for their feedback and ideas. When team members give their opinions or advice, one should positively receive and react to the opinions/advice. One should be optimistic and encouraging when working in groups.

#### **Improving Interpersonal Skills**

One can develop interpersonal skills by practising good communication and setting goals for improvement. One should consider the following tips to improve their interpersonal skills:

- One should ask for feedback from co-workers, managers, family or friends to figure out what needs improvement concerning their interpersonal skills.
- One can identify the areas of interpersonal communication to strengthen by watching others.
- One can learn and improve interpersonal skills by observing co-workers, company leaders and
  professionals who possess good interpersonal skills. This includes watching and listening to them to
  note how they communicate and the body language used by them. It is vital to note their speed of
  speaking, tone of voice, and the way they engage with others. One should practice and apply such
  traits in their own interactions and relationships.
- One should learn to control their emotions. If stressed or upset, one should wait until being calm to have a conversation. One is more likely to communicate effectively and confidently when not under stress.
- One can reflect on their personal and professional conversations to identify the scope of improvement and learn how to handle conversations better or communicate more clearly. It helps to consider whether one could have reacted differently in a particular situation or used specific words or positive body language more effectively. It is also vital to note the successful and positive interactions to understand why they are successful.
- One should practice interpersonal skills by putting oneself in positions where one can build relationships and use interpersonal skills. For example, one can join groups that have organized meetings or social events. These could be industry-specific groups or groups with members who share an interest or hobby.
- Paying attention to family, friends and co-workers and making efforts to interact with them helps a
  lot. One should complement their family, friends and co-workers on their good ideas, hard work and
  achievements. Trying to understand someone's interests and showing interest in knowing them can
  help one build strong interpersonal skills. Offering to help someone, especially in difficult situations,
  helps build stronger and positive workplace relationships.
- One should avoid distractions, such as a mobile phone, while interacting with someone. Giving
  someone full attention while avoiding distractions helps achieve a clear exchange of ideas. By
  listening with focus, one can understand and respond effectively.

- One can attend appropriate courses on interpersonal skills or sign up for workshops at work to improve interpersonal skills. One can find many resources online also, such as online videos.
- For personal mentoring, one can approach a trusted family member, friend, co-worker, or current/ former employer. A person one looks up to with respect and admires is often a good choice to be selected as a mentor. One can even hire a professional career or communication coach.

Interpersonal communication skills often help one boost their morale, be more productive in the workplace, complete team projects smoothly and build positive and strong relationships with coworkers.

_ Notes   🚞	
- Notes -	
	_

## **UNIT 6.2: Working Efffectely and Maintaining Discipline at Work**

## Unit Objectives | ©



#### By the end of this unit, participants will be able to:

- · Discuss the importance of following organizational guidelines for dress code, time schedules, language usage and other behavioural aspects
- Explain the importance of working as per the workflow of the organization to receive instructions and report problems
- · Explain the importance of conveying information/instructions as per defined protocols to the authorised persons/team members
- Explain the common workplace guidelines and legal requirements on non-disclosure and confidentiality of business-sensitive information
- · Describe the process of reporting grievances and unethical conduct such as data breaches, sexual harassment at the workplace, etc.
- Discuss ways of dealing with heightened emotions of self and others.

## **6.2.1** Discipline at Work

Discipline is essential for organizational success. It helps improve productivity, reduce conflict and prevent misconduct in the workplace. It is important to have rules concerning workplace discipline and ensure that all employees comply with them. In the absence of discipline, a workplace may experience conflicts, bullying, unethical behaviour and poor employee performance. An efficient workplace disciplinary process helps create transparency in the organization. Benefits of disciplinary standards:

All employees follow the same rules which helps establish uniformity and equality in the workplace

Managers and supervisors have defined guidelines on what accon to take while initi atg disciplinary y aon

With well-defined and enforced disciplinary rules, an organiizaon can avoid various safety, security, rupati nal risks

Fig 6.2.1 Benefits of Disciplinary Standards

Maintaining an organized and cohesive workforce requires maintaining discipline in both personal and professional behaviour. It is important to follow the appropriate measures to keep employees in line without affecting their morale.

#### **Defining Discipline**

The first and crucial step in maintaining workplace discipline is to define what is meant by discipline. It helps to evaluate common discipline problems and devise guidelines for handling them effectively.

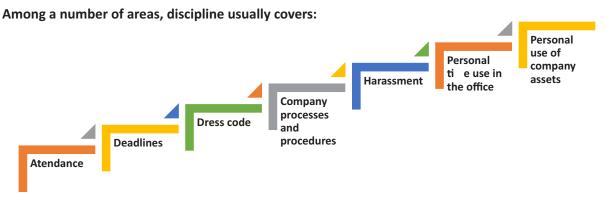


Fig 6.2.2 Examples of Workplace Discipline

According to demography and local issues, it may also include substance use and related issues.

It is vital for a workplace to have an employee handbook or company policy guide, to serve as a rulebook for employees to follow. The employee handbook/ company policy guide should be reviewed and updated periodically according to any issues or areas, or concerns identified concerning workplace discipline. Such manuals should also cover all the laws and regulations governing workplace behaviour.

Defining and documenting workplace rules aids in their implementation, ensuring little or no ambiguity. All employees in a workplace should also have easy access to the workplace guidelines so that they can refer to them to get clarity whenever required. To maintain discipline at work, it is also critical to ensure uniform application of workplace guidelines to all employees without exception.

## **6.2.2** Employee Code of Conduct

The employee code of conduct manual serves as a guide for employees to inform them regarding the behaviour expected from them at work. It helps create a good work environment with consistent behaviour from employees. The manual should list examples of acceptable and not acceptable behaviours at work. The code of conduct should be discussed with employees so that they have the clarifications required.

For example, an organization may create guidelines concerning the conduct with clients to ensure no contact is made with them except for business purposes, also prescribing the use of appropriate means of communication.

Employees should have a clear understanding concerning their job responsibilities and the behaviour expected from them with all stakeholders, e.g. company personnel, clients and associated third parties. It is critical to have documented guidelines for employees to follow concerning all aspects of work. It should also document the disciplinary action to be followed in case of non-compliance, e.g. verbal and

then written warning, temporary suspension or eventual termination of service in case of repeated non-compliance with the employee code of conduct. Employees should know what the company rules are and what will happen if they break the rules. However, disciplinary action should be initiated only when reasonably required to avoid its misuse for employee harassment.

There should also be an effective mechanism for employees to raise their concerns/ grievances and have them addressed while maintaining privacy, as required, e.g. raising concerns regarding the behaviour of a co-worker.

The employee code of conduct manual must be duly reviewed and approved by the concerned stakeholders, such as the Human Resources (HR) department and company executives.

## **6.2.3 Interpersonal Conflicts**

Interpersonal conflict is any type of conflict between two or more people. These are found in both - personal and professional relationships - among friends, family, and co-workers. In the workplace, interpersonal conflict is often observed when a person or group of people interfere with another person's attempts at completing assignments and achieving goals. It is critical to resolve conflicts in the workplace to boost the morale of employees, repair working relationships among them, and improve customer satisfaction.

#### **Reasons for Workplace Conflicts**

Workplace conflicts are often observed when two or more people have different points of view. This can happen between managers, co-workers, or clients and customers. In general, interpersonal conflicts are caused by a lack of communication or unclear communication.

Some of the leading reasons for workplace conflicts are:

- · Difference in values
- Personality clashes
- Poor communication

Example of poor communication – if a manager reassigns a task to another employee without communicating with the employee to whom it was originally assigned, interpersonal conflict can arise among them. This may potentially make the first employee, i.e. who was originally assigned the task, feel slighted and mistrusted by the manager. It may even cause animosity in the first employee toward the employee who has now been assigned the task.

#### **Types of Interpersonal Conflict**

Following are the four types of interpersonal conflicts:

#### a. Policy-related interpersonal conflict

When a conflict relates to a decision or situation that involves both parties, it can be called a policy-related interpersonal conflict. Example – two people or groups working on the same project, trying to adopt different approaches. To resolve policy-related interpersonal conflicts, the parties involved should try to look for a win-win situation or make a compromise. This is especially critical to resolve trivial issues so that work is not affected and common goals are achieved.

#### b. Pseudo-conflicts

Pseudo-conflict arises when two people or groups want different things and cannot reach an agreement. Pseudo-conflicts usually involve trivial disagreements that tend to hide the root of the issue.

#### c. Ego-related interpersonal conflicts

In ego conflicts, losing the argument may hurt or damage a person's pride. Sometimes ego conflicts arise when a number of small conflicts pile up on being left unresolved. To resolve ego-related conflicts, it's best to find the root of the issue and work towards a resolution.

#### d. Value-related interpersonal conflicts

Sometimes conflicts may occur between people when they have different value systems. Such conflicts can be difficult to identify initially, making the people involved think the other party is being disagreeable or stubborn, wherein they just have different values. Some co-workers may highly value their personal/ family time after office that they may be unreachable to clients during non-office hours, while others may place a high value on client satisfaction and may still be available for clients during non-office hours. Conflict may arise among such people when they may be required to coordinate to help a client during after-office hours. Value-related interpersonal conflicts are often difficult to settle since neither party likes to compromise.

#### **Resolving Interpersonal Conflicts**

Conflicts are usually likely in the workplace; they can, however, be prevented. Often resolving interpersonal conflicts through open communication helps build a stronger relationship, paving the way for effective coordination and success. Some ways to resolve interpersonal conflict:

• Communication - A great way to resolve interpersonal conflicts is for the opposing parties to listen to one another's opinions and understand their viewpoints. Meeting in person and keeping the conversation goal-oriented is important. One can have effective communication by following some measures, e.g. staying on the topic, listening actively, being mindful of the body language, maintaining eye contact, etc.

- Active Listening One should patiently listen to what the other person is saying without interrupting
  or talking over them. It helps one display empathy and get to the root of the issue. Asking questions
  to seek clarification when required helps in clear communication and conveys to the other person
  that one is listening to them. Practising active listening is a great way to improve one's
  communication skills.
- Displaying Empathy Listening attentively and identifying the anxieties/ issues of co-workers is a
  great way to show empathy and concern. It is essential to understand their feelings and actions to
  encourage honesty and avoid future conflict.
- Not Holding Grudges With different types of people and personalities in a workplace, it is common
  for co-workers to have conflicts. It is best to accept the difference in opinions and move on. Being
  forgiving and letting go of grudges allows one to focus on the positive side of things and perform
  better at work.

Work-related interpersonal conflicts can be complicated because different people have different leadership styles, personality characteristics, job responsibilities and ways in which they interact. One should learn to look above interpersonal conflicts, resolving them to ensure work goals and environment are not affected.

## **6.2.4 Importance of Following Organizational Guidelines**

Policies and procedures or organizational guidelines are essential for any organization. These provide a road map for the operations of the organization. These are also critical in ensuring compliance with the applicable laws and regulations by guiding the decision-making process and business operations.

Organizational guidelines help bring uniformity to the operations of an organization, which helps reduce the risk of unwanted and unexpected events. These determine how employees are supposed to behave at work, which ultimately helps the business achieve its objectives efficiently.

However, organizational guidelines are ineffective and fail to serve their purpose if they are not followed. Many people don't like the idea of following and abiding by specific guidelines. Such people should be made to understand the benefits of following the organizational guidelines. Some of the key benefits are given below:

With well-defined organizational guidelines in place, no individual can act arbitrarily, irrespective of their position in the organization. All individuals will know the pros and cons of taking certain actions and what to expect in case of unacceptable behaviour. Benefits of following organizational guidelines:

Consistent processes and structures - Organization guidelines help maintain consistency in
operations, avoiding any disorder. When all employees follow the organizational guidelines, an
organization can run smoothly. These ensure that people in different job roles operate as they are
supposed to, knowing what they are responsible for, what is expected of them, and what they can
expect from their supervisors and co-workers. With clarity in mind, they can do their jobs with
confidence and excellence. With every person working the way intended, it's easy to minimise
errors.

With all the staff following organizational guidelines, the organization has a better scope of using time and resources more effectively and efficiently. This allows the organization to grow and achieve its objectives.

- Better quality service By following organizational guidelines, employees perform their duties
  correctly as per the defined job responsibilities. It helps enhance the quality of the organization's
  products and services, helping improve the organization's reputation. Working with a reputable
  organization, employees can take pride in their work and know they are contributing to the
  reputation.
- A safer workplace When all employees follow organizational guidelines, it becomes easy to
  minimise workplace incidents and accidents. It reduces the liabilities associated with risks for the
  organization and limits the interruptions in operations. Employees also feel comfortable and safe in
  the workplace, knowing their co-workers are ensuring safety at work by following the applicable
  guidelines.

Different organizations may have different guidelines on dress code, time schedules, language usage, etc. For example – certain organizations in a client-dealing business requiring employees to meet clients personally follow a strict dress code asking their employees to wear formal business attire. Similarly, organizations operating in specific regions may require their employees to use the dominant regional language of the particular region to build rapport with customers and serve them better. Certain organizations, such as banks, often give preference to candidates with knowledge of the regional language during hiring.

Working hours may also differ from one organization to another, with some requiring employees to work extra compared to others. One should follow the organizational guidelines concerning all the aspects of the employment to ensure a cohesive work environment.

#### 6.2.5 Workflow -

Workflow is the order of steps from the beginning to the end of a task or work process. In other words, it is the way a particular type of work is organised or the order of stages in a particular work process.

Workflows can help simplify and automate repeatable business tasks, helping improve efficiency and minimise the room for errors. With workflows in place, managers can make quick and smart decisions while employees can collaborate more productively.

Other than the order that workflows create in a business, these have several other benefits, such as:

• Identifying Redundancies - Mapping out work processes in a workflow allows one to get a clear, top-level view of a business. It allows one to identify and remove redundant or unproductive processes.

Workflow gives greater insights into business processes. Utilizing such useful insights, one can improve work processes and the bottom line of the business. In many businesses, there are many unnecessary and redundant tasks that take place daily. Once an organization has insight into its processes while preparing workflow, it can determine which activities are really necessary.

Identifying and eliminating redundant tasks creates value for a business. With redundant tasks and processes eliminated, an organization can focus on what's important to the business.

• Increase in Accountability and Reduction in Micromanagement - Micromanagement often causes problems in a business setting as most employees don't like being micromanaged, and even many managers don't like the practice. Micromanagement is often identified as one of the reasons why people quit their job.

However, the need for micromanagement can be minimized by clearly mapping out the workflow. This way, every individual in a team knows what tasks need to be completed and by when and who is responsible for completing them. This makes employees more accountable also.

With clearly defined workflow processes, managers don't have to spend much time micromanaging their employees, who don't have to approach the manager to know what the further steps are. Following a workflow, employees know what is going on and what needs to be done. This, in turn, may help increase the job satisfaction of everyone involved while improving the relationships between management and employees.

- Improved Communication Communication at work is critical because it affects all aspects of an
  organization. There are instances when the main conflict in an organization originates from
  miscommunication, e.g. the management and employees disagreeing on an aspect, despite
  pursuing the same objectives. Poor communication is a common workplace issue that is often not
  dealt with.
- This highlights why workflow is important. Workplace communication dramatically can increase
  with the visibility of processes and accountability. It helps make the daily operations smoother
  overall.

Better Customer Service - Customers or clients are central to a business. Therefore, it is imperative
to find and improve ways to improve customer experience. Relying on outdated manual systems
may cause customer requests or complaints to be overlooked, with dissatisfied customers taking
their business elsewhere. However, following a well-researched and defined workflow can help
improve the quality of customer service.

By automating workflows and processes, an organization can also reduce the likelihood of human error. This also helps improve the quality of products or services over time, resulting in a better customer experience.

## **6.2.6 Following Instructions and Reporting Problems**

All organizations follow a hierarchy, with most employees reporting to a manager or supervisor. For organizational success, it is vital for employees to follow the instructions of their manager or supervisor. They should ensure they perform their duties as per the given instructions to help achieve the common objectives of the organization and deliver quality service or products. This consequently helps maintain the reputation of the organization.

It is also important to be vigilant and identify problems at work or with the organizational work processes. One should deal with the identified within their limits of authority and report out of authority problems to the manager/ supervisor or the concerned person for a prompt resolution to minimise the impact on customers/clients and business.

## **6.2.7 Information or D** ta Sharing

Information or data is critical to all organizations. Depending on the nature of its business, an organization may hold different types of data, e.g. personal data of customers or client data concerning their business operations and contacts. It is vital to effective measures for the appropriate handling of different types of data, ensuring its protection from unauthorized access and consequent misuse.

One should access certain data only if authorised to do so. The same is applicable when sharing data which must be shared only with the people authorised to receive it to use it for a specific purpose as per their job role and organizational guidelines. For example — one should be extra cautious while sharing business data with any third parties to ensure they get access only to the limited data they need as per any agreements with them. It is also critical to monitor how the recipient of the data uses it, which should strictly be as per the organizational guidelines. It is a best practice to share appropriate instructions with the recipient of data to ensure they are aware of the purpose with which data is being shared with them and how they are supposed to use and handle it. Any misuse of data must be identified and reported promptly to the appropriate person to minimise any damage arising out of data misuse.

These days most organizations require their employees and business partners or associated third parties to sign and accept the relevant agreement on the non-disclosure of business-sensitive information. In simple terms, business-sensitive information is confidential information. It is proprietary business information collected or created during the course of conducting business, including information about the business, e.g. proposed investments, intellectual property, trade secrets, or plans for a merger and information related to its clients. Business-sensitive information may sometimes also include information regarding a business's competitors in an industry.

The release of business-sensitive information to competitors or the general public poses a risk to a business. For example, information regarding plans for a merger could be harmful to a business if a competitor gets access to it.

## **6.2.8 Reporting Issues at Work**

Most organizations have defined guidelines on appropriate reporting processes to be followed for reporting different types of issues. For example – one can report any grievances or dissatisfaction concerning co-workers to their manager/supervisor, e.g. data breaches or unethical conduct. If the concern is not addressed, then the employee should follow the organizational guidelines and hierarchy for the escalation of such issues that are not addressed appropriately.

For example – any concern related to sexual harassment at the workplace should be escalated to the concerned spokesperson, such as Human Resources (HR) representative, and if not satisfied with the action taken, it should be reported to the senior management for their consideration and prompt action.

## **6.2.9 Dealing with Heightened Emotions**

Humans are emotional beings. There may be occasions when one is overwhelmed by emotions and is unable to suppress them. However, there may be situations when one must manage emotions well, particularly at work.

Stress in one's personal and professional life may often cause emotional outbursts at work. Managing one's emotions well, particularly the negative ones, is often seen as a measure of one's professionalism. Anger, dislike, frustration, worry, and unhappiness are the most common negative emotions experienced at work.

#### Ways to manage negative emotions at work:

• Compartmentalisation – It's about not confining emotions to different aspects of one's life. For example, not letting negative emotions from personal life affect work-life and vice versa. One should try to leave personal matters and issues at home. One should train their mind to let go of personal matters before reaching work. Similarly, one can compartmentalise work-related stresses so that negative emotions from work don't affect one's personal life.

- Deep breathing and relaxation Deep breathing helps with anxiety, worry, frustration and anger. One should take deep breaths, slowly count to ten inhaling and exhaling until one calms down. One can also take a walk to calm down or listen to relaxing music. Talking to someone and sharing concerns also helps one calm down.
- The 10-second rule This is particularly helpful in controlling anger and frustration. When one feels their temper rising, they should count to 10 to calm down and recompose. If possible, one should move away to allow temper to come down.
- **Clarify** It is always good to clarify before reacting, as it may be a simple case of misunderstanding or miscommunication.
- **Physical activity** Instead of losing temper, one should plan to exercise, such as running or going to the gym, to let the anger out. Exercise is also a great way to enhance mood and release any physical tension in the body.
- **Practising restraint** One should avoid replying or making a decision when angry, not allowing anger or unhappiness to cloud one's judgement. It may be best to pause any communication while one is angry, e.g. not communicating over email when angry or upset.
- **Knowing one's triggers** It helps when one is able to recognise what upsets or angers them. This way, one can prepare to remain calm and plan their reaction should a situation occur. One may even be able to anticipate the other party's reaction.
- **Be respectful** One should treat their colleagues the same way one would like to be treated. If the other person is rude, one need not reciprocate. It is possible to stay gracious, firm and assertive without being aggressive. Sometimes, rude people back away when they don't get a reaction from the person they are arguing with.
- Apologise for any emotional outburst Sometimes, one can get overwhelmed by emotions, reacting with an emotional outburst. In such a case, one should accept responsibility and apologise immediately to the affected persons without being defensive.
- Doing away with negative emotions It is recommended to let go of anger, frustration and unhappiness at the end of every workday. Harbouring negative emotions affects one emotionally, affecting their job performance also. Engaging in enjoyable activities after work is a good stress reliever.

Notes —			
Notes 🔳			
<u> </u>	 <u> </u>	<u> </u>	

## **UNIT 6.3: Maintaining Social Diversity at Work**

## **Unit Objectives ©**



#### By the end of this unit, participants will be able to:

- 1. Explain the concept and importance of gender sensitivity and equality.
- 2. Discuss ways to create sensitivityfor different genders and Persons with h Disabiliti(PwD).

## **6.3.1 Gender Sensitivity** -

Gender sensitivity is the act of being sensitive towards people and their thoughts regarding gender. It ensures that people know the accurate meaning of gender equality, and one's gender should not be given priority over their capabilities.



Fig 6.3.1 Gender Equality

Women are an important source of labour in many sectors, yet they have limited access to resources and benefits. Women should receive the same benefits and access to resources as men. A business can improve its productivity and quality of work by providing better support and opportunities to women.

#### **Important Terms**

- Gender Sensitivity- Gender sensitivity is the act of being sensitive to the ways people think about
- · Gender Equality It means persons of any gender enjoy equal opportunities, responsibilities, and rights in all areas of life.
- Gender Discrimination It means treating an individual unequally or disadvantageously based on their gender, e.g. paying different wages to men and women for similar or equal job positions.

#### **Strategies for Enhancing Gender Equity**

To enhance gender equity, one should:

- Follow gender-neutral practices at all levels at work.
- Participate together in decision-making.
- Help in promoting women's participation in different forums.
- Assist women in getting exposure to relevant skills and practices.
- · Assist women in capacity building by mentoring, coaching or motivating them, as appropriate.
- Assist in the formation and operation of women support groups.
- Assist in the implementation of women-centric programmes.
- Combine technical training with reproductive health and nutrition for coffee farming households.
- · Assist in making a work environment that is healthy, safe, and free from discrimination.

#### **Bridging Gender Differences**

Men and women react and communicate very differently. Thus, there are some work differences as both genders have their style and method of handling a situation.

Although, understanding and maturity vary from person to person, even between these genders, based on their knowledge, education, experience, culture, age, and upbringing, as well as how one's brain functions over a thought or problem.

#### In order to bridge the gap, one should:

- Not categorize all men and women in one way.
- Be aware of the verbal and non-verbal styles of communication of every gender to avoid any miscommunication and work better.
- Be aware of partial behaviour and avoid it.
- Encourage co-workers of different genders to make room by providing space to others.

#### **Ways to reduce Gender Discrimination**

- · Effective steps against sexual harassment by the concerned authorities and general public.
- Gender stereotypes are how society expects people to act based on their gender. This can only be reduced by adopting appropriate behaviour and the right attitude.
- Objectification of females must be abolished.

#### Ways to Promote Gender Sensitivity in the Workplace

Practices that promote gender diversity should be adopted and promoted.

- All genders should receive equal responsibilities, rights, and privileges.
- All genders should have equal pay for similar or the same job roles/ positions.
- · Strict and effective workplace harassment policies should be developed and implemented.
- An open-minded and stress-free work environment should be available to all the employees, irrespective of their gender.
- Women should be encouraged to go ahead in every field of work and assume leadership roles.
- Follow appropriate measures for women's empowerment.
- Men should be taught to be sensitive to women and mindful of their rights.

## 6.3.2 PwD Sensitivity -

Some individuals are born with a disability, while others may become disabled due to an accident, illness or as they get old. People with Disabilities (PwD) may have one or more areas in which their functioning is affected. A disability can affect hearing, sight, communication, breathing, understanding, mobility, balance, and concentration or may include the loss of a limb. A disability may contribute to how a person feels and affect their mental health

#### **Important Terms**

•Persons with Disabilities (PwD) – Persons with Disabilities means a person suffering from not less than 40% of any disability as certified by a medical authority.

#### ·Types of Disability:

- a. Blindness Visually impaired
- b. Low Vision
- c. Leprosy Cured
- d. Hearing impairment
- e. Locomotor disability
- f. Mental retardation
- g. Mental illness

#### **PwD Sensitivity**

PwD sensitivity promotes empathy, etiquette and equal participation of individuals and organizations while working with individuals with a disability, e.g. sensory, physical or intellectual.

#### Ways to be PwD Sensitive

#### To be sensitive to PwD, one should:

- Be respectful to all Persons with Disabilities (PwD) and communicate in a way that reflects PwD sensitivity.
- Always be supportive and kind towards a PwD with their daily chores.
- Be ready to assist a PwD to help them avail of any benefit/ livelihood opportunity/ training or any kind that helps them grow.
- Encourage and try to make things easier and accessible to PwD so that they can work without or with minimum help.
- Protest where feasible and report any wrong act/behaviour against any PwD to the appropriate authority.
- Learn and follow the laws, acts, and policies relevant to PwD.

#### **Appropriate Verbal Communication**

As part of appropriate verbal communication with all genders and PwD, one should:

- Talk to all genders and PwD respectfully, maintaining a normal tone of voice with appropriate
  politeness. It is important to ensure one's tone of voice does not have hints of sarcasm, anger, or
  unwelcome affection.
- Avoid being too self-conscious concerning the words to use while also ensuring not to use words that imply one's superiority over the other.
- Make no difference between a PwD and their caretaker. Treat PwD like adults and talk to them directly.
- Ask a PwD if they need any assistance instead of assuming they need it and offering assistance spontaneously.

#### **Appropriate Non-verbal Communication**

Non-verbal communication is essentially the way someone communicates through their body language. These include:

- Facial expressions The human face is quite expressive, capable of conveying many emotions without using words. Facial expressions must usually be maintained neutral and should change according to the situation, e.g. smile as a gesture of greeting.
- Body posture and movement One should be mindful of how to sit, stand, walk, or hold their head. For example one should sit and walk straight in a composed manner. The way one moves and carries self, communicates a lot to others. This type of non-verbal communication includes one's posture, bearing, stance, and subtle movements.

- Gestures One should be very careful with their gestures, e.g. waving, pointing, beckoning, or using
  one's hands while speaking. One should use appropriate and positive gestures to maintain respect
  for the other person while being aware that a gesture may have different meanings in different
  cultures.
- Eye contact Eye contact is particularly significant in non-verbal communication. The way someone looks at someone else may communicate many things, such as interest, hostility, affection or attraction. Eye contact is vital for maintaining the flow of conversation and for understanding the other person's interest and response. One should maintain appropriate eye contact, ensuring not to stare or look over the shoulders. To maintain respect, one should sit or stand at the other person's eye level to make eye contact.
- **Touch** Touch is a very sensitive type of non-verbal communication. Examples are handshakes, hugs, pat on the back or head, gripping the arm, etc. A firm handshake indicates interest, while a weak handshake indicates the opposite. One should be extra cautious not to touch others inappropriately and avoid touching them inadvertently by maintaining a safe distance.

#### Rights of PwD

PwD have the right to respect and human dignity. Irrespective of the nature and seriousness of their disabilities, PwD have the same fundamental rights as others, such as:

- Disabled persons have the same civil and political rights as other people
- Disabled persons are entitled to the measures designed to enable them to become as selfdependent as possible
- Disabled persons have the right to economic and social security
- Disabled persons have the right to live with their families or foster parents and participate in all social and creative activities.
- Disabled persons are protected against all exploitation and treatment of discriminatory and abusive nature.

#### **Making Workplace PwD Friendly**

- One should not make PwD feel uncomfortable by giving too little or too much attention
- One should use a normal tone while communicating with a PwD and treat them as all others keeping in mind their limitations and type of disability
- Any help should be provided only when asked for by a PwD
- One should help in ensuring the health and well-being of PwD.

#### **Expected Employer Behaviour**

Some of the common behavioural traits that employees expect from their employers are:

- Cooperation: No work is successful without cooperation from the employer's side. Cooperation helps to understand the job role better and complete it within the given timeline.
- Polite language: Polite language is always welcomed at work. This is a basic aspect that everybody
  expects.
- Positive Attitude: Employers with a positive attitude can supervise the work of the employees and act as a helping hand to accomplish the given task. A person with a positive attitude looks at the best qualities in others and helps them gain success.
- Unbiased behaviour: Employers should always remain fair towards all their employees. One should not adopt practices to favour one employee while neglecting or ignoring the other. This might create animosity among co-workers.
- Decent behaviour: The employer should never improperly present oneself before the employee. One should always respect each other's presence and behave accordingly. The employer should not speak or act in a manner that may make the employee feel uneasy, insulted, and insecure.

# Exercise

- 1. List down three examples of workplace ethics.
- 2. List down three examples of interpersonal skills.
- 3. Identify two reasons for workplace conflicts.
- 4. Identify two ways of resolving interpersonal conflicts
- 5. List down two ways of dealing with heightened emotions at work.
- 6. List down two types of non-verbal communication.

Notes —			
Notes 🔳			
<u> </u>	 <u> </u>	<u> </u>	









# 7. Basic Health and Safety Practices

Unit 7.1 - Workplace Hazards

Unit 7.2 - Fire Safety

Unit 7.3 - First Aid

Unit 7.4 - Waste Management



# **Key Learning Outcomes**



#### By the end of this module, participa ts will be able to:

- 1. Discuss job-site hazards, risks and accidents
- 2. Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials
- 3. Describe how to interpret warning signs while accessing sensitive work areas
- 4. Explain the importance of good housekeeping
- 5. Describe the importance of maintaining appropriate postures while lifting heavy objects
- 6. List the types of fire and fire extinguishers
- 7. Describe the concept of waste management and methods of disposing of hazardous waste
- 8. List the common sources of pollution and ways to minimize them
- 9. Elaborate on electronic waste disposal procedures
- 10. Explain how the administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning and also administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock

# **UNIT 7.1: Workplace Hazards**

# **Unit Objectives ©**



#### By the end of this unit, participants will be able to:

- Discuss job-site hazards, risks and accidents
- Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials
- Describe how to interpret warning signs while accessing sensitive work areas
- Explain the importance of good housekeeping
- Describe the importance of maintaining appropriate postures while lifting heavy objects
- Explain safe handling of tools and Personal Protective Equipment to be used.

# 7.1.1 Workplace Safety ————

Workplace safety is important to be established for creating a safe and secure working for the workers. The workplace has to be administered as per the rules of the Occupational Safety and Health Administration (OSHA). It refers to monitoring the working environment and all hazardous factors that impact employees' safety, health, and well-being. It is important to provide a safe working environment to the employees to increase their productivity, wellness, skills, etc.

#### The benefits of workplace safety are:

- Employee retention increases if they are provided with a safe working environment.
- · Failure to follow OSHA's laws and guidelines can result in significant legal and financial consequences.
- A safe environment enables employees to stay invested in their work and increases productivity.
- Employer branding and company reputation can both benefit from a safe working environment.

# 7.1.2 Workplace Hazards —

A workplace is a situation that has the potential to cause harm or injury to the workers and damage the tools or property of the workplace. Hazards exist in every workplace and can come from a variety of sources. Finding and removing them is an important component of making a safe workplace.

#### **Common Workplace Hazards**

The common workplace hazards are:

·Biological: The threats caused by biological agents like viruses, bacteria, animals, plants, insects and also humans, are known as biological hazards.

- **Chemical:** Chemical hazard is the hazard of inhaling various chemicals, liquids and solvents. Skin irritation, respiratory system irritation, blindness, corrosion, and explosions are all possible health and physical consequences of these dangers.
- **Mechanical:** Mechanical Hazards comprise the injuries that can be caused by the moving parts of machinery, plant or equipment.
- **Psychological:** Psychological hazards are occupational hazards caused by stress, harassment, and violence.
- **Physical:** The threats that can cause physical damage to people is called physical hazard. These include unsafe conditions that can cause injury, illness and death.
- **Ergonomic:** Ergonomic Hazards are the hazards of the workplace caused due to awkward posture, forceful motion, stationary position, direct pressure, vibration, extreme temperature, noise, work stress, etc.

#### **Workplace Hazards Analysis**

A workplace hazard analysis is a method of identifying risks before they occur by focusing on occupational tasks. It focuses on the worker's relationship with the task, the tools, and the work environment. After identifying the hazards of the workplace, organisations shall try to eliminate or minimize them to an acceptable level of risk.

#### **Control Measures of Workplace Hazards**

Control measures are actions that can be taken to reduce the risk of being exposed to the hazard. Elimination, Substitution, Engineering Controls, Administrative Controls, and Personal Protective Equipment are the five general categories of control measures.

- **Elimination:** The most successful control technique is to eliminate a specific hazard or hazardous work procedure or prevent it from entering the workplace.
- **Substitution:** Substitution is the process of replacing something harmful with something less hazardous. While substituting the hazard may not eliminate all of the risks associated with the process or activity, it will reduce the overall harm or health impacts.
- **Engineering Controls:** Engineered controls protect workers by eliminating hazardous situations or creating a barrier between the worker and the hazard, or removing the hazard from the person.
- Administrative Controls: To reduce exposure to hazards, administrative controls limit the length of time spent working on a hazardous task that might be used in combination with other measures of control.
- **Personal Protective Equipment:** Personal protective equipment protects users from health and safety hazards at work. It includes items like safety helmets, gloves, eye protection, etc.

### 7.1.3 Risk for a Drone Technician

A drone technician may require to repair the propeller, motor and its mount, battery, mainboards, processor, booms, avionics, camera, sensors, chassis, wiring and landing gear. A technician may face some risks while repairing the drones' equipment.

- The technician is susceptible to being physically harmed by propellers.
- Direct contact with exposed electrical circuits can injure the person.
- If the skin gets in touch with the heat generated from electric arcs, it burns the internal tissues.
- Major electrical injuries can occur due to poorly installed electrical equipment, faulty wiring, overloaded or overheated outlets, use of extension cables, incorrect use of replacement fuses, use of equipment with wet hands, etc.

# 7.1.4 Workplace Warning Signs

A Hazard sign is defined as 'information or instruction about health and safety at work on a signboard, an illuminated sign or sound signal, a verbal communication or hand signal.'

There are four different types of safety signs:

- Prohibition / Danger Alarm Signs
- Mandatory Signs
- Warning Signs
- And Emergency
- **1. Prohibition Signs:** A "prohibition sign" is a safety sign that prohibits behaviour that is likely to endanger one's health or safety. The colour red is necessary for these health and safety signs. Only what or who is forbidden should be displayed on a restriction sign.



Fig. 7.1.1. Prohibition arning Signs

#### 2. Mandatory Signs:

Mandatory signs give clear directions that must be followed. The icons are white circles that have been reversed out of a blue circle. On a white background, the text is black.



Fig. 7.1.2. Mandatory Signs

#### 3. Warning Signs

Warning signs are the safety information communicatiosigns. They are shown as a 'yellow colour triangle'.



Fig. 7.1.3. Warning Signs

#### 4. Emergency Signs

The locationor routes to emergency ffacilitieare indicated by emergency signs. These signs have a green backdrop with a white emblem or writing. These signs convey basic informatioand frequently refer to housekeeping, company procedures, or logistics.

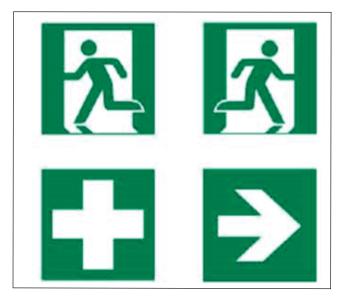


Fig. 7.1.4. Emergency Signs

# 7.1.5 Cleanliness in the Workplace

Workplace cleanliness maintenance creates a healthy, efficient and productive environment for the employees. Cleanliness at the workplace is hindered by some elements like cluttered desks, leftover food, waste paper, etc. A tidy workplace is said to improve employee professionalism and enthusiasm while also encouraging a healthy working environment.

#### Benefits of cleanliness in the workplace:

- 1. Productivity: Cleanliness in the workplace can bring a sense of belonging to the employees, also motivating and boosting the morale of the employees. This results in increasing their productivity.
- Employee Well-being: Employee well-being can be improved by providing a clean work environment. Employees use fewer sick days in a workplace where litter and waste are properly disposed of, and surfaces are cleaned regularly, resulting in increased overall productivity.
- 3. Positive Impression: Cleanliness and orderliness in the workplace provide a positive impression on both employees and visitors.
- 4. Cost saving: By maintaining acceptable levels of cleanliness in the workplace, businesses can save money on cleaning bills and renovations, which may become necessary if the premises are not properly kept.

#### **Reasons for Cleaning the Workplace**

- Cleaning of dry floors, mostly to prevent workplace slips and falls.
- Disinfectants stop bacteria in their tracks, preventing the spread of infections and illness.
- Proper air filtration decreases hazardous substance exposures such as dust and fumes.
- Light fixture cleaning improves lighting efficiency.
- Using environmentally friendly cleaning chemicals that are safer for both personnel and the environment.
- Work environments are kept clean by properly disposing of garbage and recyclable items.

# 7.1.6 Lifting and Handling of Heavy Loads

Musculoskeletal Injuries (MSIs), such as sprains and strains, can occur while lifting, handling, or carrying objects at work. When bending, twisting, uncomfortable postures and lifting heavy objects are involved, the risk of injury increases. Ergonomic controls can help to lower the risk of injury and potentially prevent it.

Types of injuries caused while lifting heavy objects:

- Cuts and abrasions are caused by rough surfaces.
- Crushing of feet or hands.
- Strain to muscles and joints

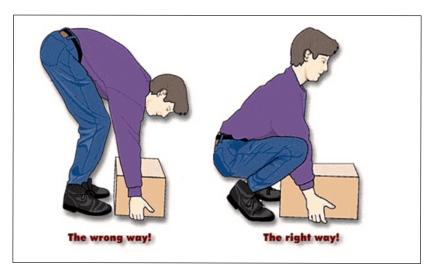


Fig. 7.1.5. Lifting loads echnique

#### **Preparing to lift**

A load that appears light enough to bear at first will grow increasingly heavier as one carries it further. The person carrying the weight should be able to see over or around it at all times.

The amount of weight a person can lift, depends on their age, physique, and health

It also depends on whether or not the person is used to lifting and moving hefty objects.

#### **Common Causes of Back Injuries**

The Most Common Causes of Back Injuries are:

- 1) Inadequate Training: The individual raising the load receives no sufficient training or guidance.
- **2)** Lack of awareness of technique: The most common cause of back pain is incorrect twisting and posture, which causes back strain.
- **3)** Load size: The load size to consider before lifting. If the burden is too much for one's capacity or handling, their back may be strained and damaged.
- **4) Physical Strength:** Depending on their muscle power, various persons have varied physical strengths. One must be aware of their limitations.
- **5) Teamwork:** The operation of a workplace is all about working together. When opposed to a single person lifting a load, two people can lift it more easily and without difficulty. If one of two people isn't lifting it properly, the other or both of them will suffer back injuries as a result of the extra strain.

#### **Techniques for Lifting Heavy Objects**

Tec	hnique	Demonstraton
1.	Ensure one has a wide base of support before lifting the heavy object. Ensure one's feet are shoulder-width apart, and one foot is slightly ahead of the other at all times. This will help one maintain a good balance during the lifting of heavy objects. This is known as the Karate Stance.	
2.	Squat down as near to the object as possible when one is ready to lift it, bending at the hips and knees with the buttocks out. If the object is really heavy, one may wish to place one leg on the floor and the other bent at a straight angle in front of them.	

 Maintain proper posture as one begin to lift upward. To do so, one should keep their back straight, chest out, and shoulders back while gazing straight ahead.



4. By straightening one's hips and knees, slowly elevate the thing (not the back). As one rises, they should extend their legs and exhale. Lift the heavy object without twisting the body or bending forward.



5. Do not lift bending forward.



6. Hold the load close to the body.



7. Never lift heavy objects above the shoulder



8. Use the feet (not the body) to change direction, taking slow, small steps.



9. Set down the heavy object carefully, squatting with the knees and hips only.



Table 7.1.1 Techniques for lifting he vy objects

# **7.1.7** Safe Handling of Tools

Workers should be trained on how to use tools safely. When tools are misplaced or handled incorrectly by workers, they can be dangerous. The following are some suggestions from the National Safety Council for safe tool handling when they are not in use:

- Never carry tools up or down a ladder in a way that makes it difficult to grip them. Instead of being carried by the worker, tools should be lifted up and down using a bucket or strong bag.
- Tools should never be tossed but should be properly passed from one employee to the next. Pointed tools should be passed with the handles facing the receiver or in their carrier.
- When turning and moving around the workplace, workers carrying large tools or equipment on their shoulders should pay particular attention to clearances.
- Pointed tools such as chisels and screwdrivers should never be kept in a worker's pocket. They can be
  carried in a toolbox, pointing down in a tool belt or pocket tool bag, or in hand with the tip always
  held away from the body.
- Tools should always be stored while not in use. People below are put in danger when tools are left sitting around on an elevated structure, such as a scaffold. In situations when there is a lot of vibration, this risk increases.

<sup>&</sup>lt;sup>3</sup>Source:https://ww .braceability.ccom/blogs/articles/7-prop-heavavy-liftinechniques

# 7.1.8 Personal Protective Equipment

Personal protective equipment, or "PPE," is equipment worn to reduce exposure to risks that might result in significant occupational injuries or illnesses. Chemical, radiological, physical, electrical, mechanical, and other job dangers may cause these injuries and diseases.

#### PPE used for protection fom the following injuries are:

Injury Protecton	Protecton	PPE
Head Injury Protecton	Falling or flying objects, stationary objects, or contact with electrical wires can cause impact, penetration, and electrical injuries. Hard hats can protect one's head from these injuries. A common electrician's hard hat is shown in the figure below. This hard hat is made of nonconductive plastic and comes with a set of safety goggles.	
Foot and Leg Injury Protecton	In addition to foot protection and safety shoes, leggings (e.g., leather) can guard against risks such as falling or rolling objects, sharp objects, wet and slippery surfaces, molten metals, hot surfaces, and electrical hazards.	
Eye and Face Injury Protecton	Spectacles, goggles, special helmets or shields, and spectacles with side shields and face shields can protect against the hazards of flying fragments, large chips, hot sparks, radiation, and splashes from molten metals. They also offer protection from particles, sand, dirt, mists, dust, and glare.	

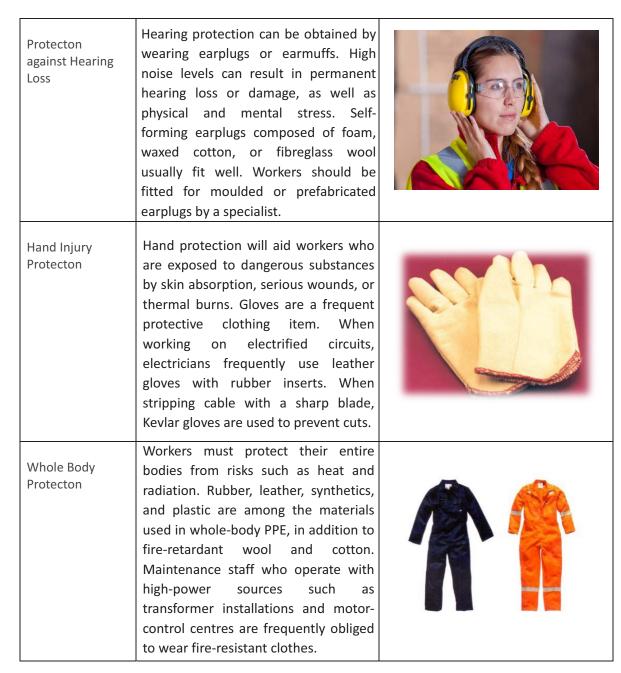


Table 7.1.2. Personal protective equipment

Notes 📋 —		
Notes 🔳		

# **UNIT 7.2: Fire Safety**

# **Unit Objectives ©**



#### By the end of this unit, participants will be able to:

1. List the types of fire and fire e extinguiss.

# 7.2.1 Fire Safety —

Fire safety is a set of actions aimed at reducing the amount of damage caused by fire. Fire safety procedures include both those that are used to prevent an uncontrolled fire from starting and those that are used to minimise the spread and impact of a fire after it has started. Developing and implementing fire safety measures in the workplace is not only mandated by law but is also essential for the protection of everyone who may be present in the building during a fire emergency.

The basic Fire Safety Responsibilities are:

- To identify risks on the premises, a fire risk assessment must be carried out.
- Ascertain that fire safety measures are properly installed.
- Prepare for unexpected events.
- Fire safety instructions and training should be provided to the employees.

# 7.2.2 Respond to a Workplace Fire

- Workplace fire drills should be conducted on a regular basis.
- If one has a manual alarm, they should raise it.
- Close the doors and leave the fire-stricken area as soon as possible. Ensure that the evacuation is quick and painless.
- Turn off dangerous machines and don't stop to get personal items.
- · Assemble at a central location. Ascertain that the assembly point is easily accessible to the employees.
- If one's clothing catches fire, one shouldn't rush about it. They should stop and descend on the ground and roll to smother the flames if their clothes catch fire.

# 7.2.3 Fire Extinguisher -

Fire extinguishers are portable devices used to put out small flames or minimise their damage until fire-fighters arrive. These are maintained on hand in locations such as fire stations, buildings, workplaces, public transit, and so on. The types and quantity of extinguishers that are legally necessary for a given region are determined by the applicable safety standards.

Types of fire extinguishers are:

#### There are five main types of fire extinguishers:

- 1. Water.
- 2. Powder.
- 3. Foam.
- 4. Carbon Dioxide (CO2).
- 5. Wet chemical.
- **1. Water:** Water fire extinguishers are one of the most common commercial and residential fire extinguishers on the market. They're meant to be used on class-A flames.



**2. Powder:** The L2 powder fire extinguisher is the most commonly recommended fire extinguisher in the Class D Specialist Powder category, and is designed to put out burning lithium metal fires.



**3. Foam:** Foam extinguishers are identified by a cream rectangle with the word "foam" printed on it. They're mostly water-based, but they also contain a foaming component that provides a quick knock-down and blanketing effect on flames. It suffocates the flames and seals the vapours, preventing re-ignition.



**4. Carbon Dioxide (CO2):** Class B and electrical fires are extinguished with carbon dioxide extinguishers, which suffocate the flames by removing oxygen from the air. They are particularly beneficial for workplaces and workshops where electrical fires may occur since, unlike conventional extinguishers, they do not leave any toxins behind and hence minimise equipment damage.



**5. Wet Chemical:** Wet chemical extinguishers are designed to put out fires that are classified as class F. They are successful because they can put out extremely high-temperature fires, such as those caused by cooking oils and fats.



Notes 📋 —		
Notes 🔳		

# **UNIT 7.3: First Aid**

# Unit Objectives 6



#### By the end of this unit, participants will be able to:

- 1. Explain how the administer appropriate first aid to victims in case of bleeding, burns, choking, electric shock, poisoning
- 2. Explain how to administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock.

#### 7.3.1 First Aid ———

First aid is the treatment or care given to someone who has sustained an injury or disease until more advanced care can be obtained or the person recovers.

The aim of first aid is to:

- · Preserve life
- · Prevent the worsening of a sickness or injury
- · If at all possible, relieve pain
- Encourage recovery
- · Keep the unconscious safe.

First aid can help to lessen the severity of an injury or disease, and in some situations, it can even save a person's life.

# 7.3.2 Need for First Aid at the Workplace —

- In the workplace, first aid refers to providing immediate care and life support to persons who have been injured or become unwell at work.
- Many times, first aid can help to lessen the severity of an accident or disease.
- It can also help an injured or sick person relax. In life-or-death situations, prompt and appropriate first aid can make all the difference.

# 7.3.2 Need for First Aid at the Workplace

In the workplace, first aid refers to providing immediate care and life support to persons who have been injured or become unwell at work.

Many times, first aid can help to lessen the severity of an accident or disease.

It can also help an injured or sick person relax. In life-or-death situations, prompt and appropriate first aid can make all the difference.

# 7.3.3 Treating Minor Cuts and Scapes

#### Steps to keep cuts clean and prevent infectionsand scars:

- Wash Hands: Wash hands first with soap and water to avoid introducing bacteria into the cut and causing an infection. One should use the hand sanitiser if one is on the go.
- **Stop the bleeding:** Using a gauze pad or a clean towel, apply pressure to the wound. For a few minutes, keep the pressure on.
- Clean Wounds: Once the bleeding has stopped, clean the wound by rinsing it under cool running water or using a saline wound wash. Use soap and a moist washcloth to clean the area around the wound. Soap should not be used on the cut since it may irritate the skin. Also, avoid using hydrogen peroxide or iodine, as these may aggravate the wound.
- **Remove Dirt:** Remove any dirt or debris from the area. Pick out any dirt, gravel, glass, or other material in the cut with a pair of tweezers cleaned with alcohol.

## 7.3.4 Heart Atack

When the blood flow carrying oxygen to the heart is blocked, a heart attack occurs. The heart muscle runs out of oxygen and starts to die.

Symptoms of a heart attack can vary from person to person. They may be mild or severe. Women, older adults, and people with diabetes are more likely to have subtle or unusual symptoms.

#### Symptoms in adults may include:

- Changes in mental status, especially in older adults.
- Chest pain that feels like pressure, squeezing, or fullness. The pain is most often in the centre of the chest. It may also be felt in the jaw, shoulder, arms, back, and stomach. It can last for more than a few minutes or come and go.
- · Cold sweat.
- Light-headedness.
- · Nausea (more common in women).
- · Indigestion.

- Vomiting.
- Numbness, aching or tingling in the arm (usually the left arm, but the right arm may be affected alone, or along with the left).
- Shortness of breath
- Weakness or fatigue, especially in older adults and in women.

#### First Aid for Heart Attack

If one thinks someone is experiencing a heart attack, they should:

- Have the person sit down, rest, and try to keep calm.
- Loosen any tight clothing.
- Ask if the person takes any chest pain medicine, such as nitro-glycerine for a known heart condition, and help them take it.
- If the pain does not go away promptly with rest or within 3 minutes of taking nitro-glycerine, call for emergency medical help.
- If the person is unconscious and unresponsive, call 911 or the local emergency number, then begin CPR.
- If an infant or child is unconscious and unresponsive, perform 1 minute of CPR, then call 911 or the local emergency number.

	Notes	_				
	Notes					
•						
•						
•						
•						

# **UNIT 7.4: Waste Management**

# Unit Objectives S



#### By the end of this unit, participants will be able to:

- 1. Describe the concept of waste management and methods of disposing of hazardous waste.
- 2. List the common sources of pollutionand ways to minimize them.
- 3. Elaborate on electronic waste disposal procedures.

# 7.4.1. Waste Management and Methods of Waste Disposal –

The collection, disposal, monitoring, and processing of waste materials is known as waste management. These wastes affect living beings' health and the environment. For reducing their effects, they have to be managed properly. The waste is usually in solid, liquid or gaseous form.

The importance of waste management is:

Waste management is important because it decreases waste's impact on the environment, health, and other factors. It can also assist in the reuse or recycling of resources like paper, cans, and glass. The disposal of solid, liquid, gaseous, or dangerous substances is the example of waste management.

When it comes to trash management, there are numerous factors to consider, including waste disposal, recycling, waste avoidance and reduction, and garbage transportation. Treatment of solid and liquid wastes is part of the waste management process. It also provides a number of recycling options for goods that aren't classified as garbage during the process.

# 7.4.2 Methods of Waste Management

Non-biodegradable and toxic wastes, such as radioactive remains, can cause irreversible damage to the environment and human health if they are not properly disposed of. Waste disposal has long been a source of worry, with population increase and industrialisation being the primary causes. Here are a few garbage disposal options.

- 1. Landfills: The most common way of trash disposal today is to throw daily waste/garbage into landfills. This garbage disposal method relies on burying the material in the ground.
- 2. Recycling: Recycling is the process of transforming waste items into new products in order to reduce energy consumption and the use of fresh raw materials. Recycling reduces energy consumption, landfill volume, air and water pollution, greenhouse gas emissions, and the preservation of natural resources for future use.

- **3. Composting:** Composting is a simple and natural bio-degradation process that converts organic wastes, such as plant remnants, garden garbage, and kitchen waste, into nutrient-rich food for plants.
- **4. Incineration:** Incineration is the process of combusting garbage. The waste material is cooked to extremely high temperatures and turned into materials such as heat, gas, steam, and ash using this technology.

# 7.4.3 Recyclable, Non-Recyclable and Hazardous Waste

- 1. Recyclable Waste: The waste which can be reused or recycled further is known as recyclable waste.
- **2. Non-recyclable Waste:** The waste which cannot be reused or recycled is known as non-recyclable waste. Polythene bags are a great example of non-recyclable waste.
- **3. Hazardous Waste:** The waste which can create serious harm to the people and the environment is known as hazardous waste.

## 7.4.4 Sources of Pollution -

Pollution is defined as the harm caused by the presence of a material or substances in places where they would not normally be found or at levels greater than normal. Polluting substances might be in the form of a solid, a liquid, or a gas.

- **Point source of pollution:** Pollution from a point source enters a water body at a precise location and can usually be identified. Effluent discharges from sewage treatment plants and industrial sites, power plants, landfill sites, fish farms, and oil leakage via a pipeline from industrial sites are all potential point sources of contamination.
  - Point source pollution is often easy to prevent since it is feasible to identify where it originates, and once identified, individuals responsible for the pollution can take rapid corrective action or invest in longer-term treatment and control facilities.
- **Diffuse source of pollution:** As a result of land-use activities such as urban development, amenity, farming, and forestry, diffuse pollution occurs when pollutants are widely used and diffused over a large region. These activities could have occurred recently or in the past. It might be difficult to pinpoint specific sources of pollution and, as a result, take rapid action to prevent it because prevention often necessitates significant changes in land use and management methods.

#### **Pollution Prevention**

Pollution prevention entails acting at the source of pollutants to prevent or minimise their production. It saves natural resources, like water, by using materials and energy more efficiently.

#### Pollution prevention includes any practice that:

- Reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal;
- Reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants (these practices are known as "source reduction");
- Improved efficiency in the use of raw materials, energy, water, or other resources, or Conservation is a method of safeguarding natural resources.
- Improvements in housekeeping, maintenance, training, or inventory management; equipment or technology adjustments; process or method modifications; product reformulation or redesign; raw material substitution; or improvements in housekeeping, maintenance, training, or inventory control.

## 7.4.5 Electronic Waste

Lead, cadmium, beryllium, mercury, and brominated flame retardants are found in every piece of electronic waste. When gadgets and devices are disposed of illegally, these hazardous compounds are more likely to contaminate the earth, pollute the air, and leak into water bodies.

When e-waste is dumped in a landfill, it tends to leach trace metals as water runs through it. The contaminated landfill water then reaches natural groundwater with elevated toxic levels, which can be dangerous if it reaches any drinking water bodies. Despite having an environmentally benign approach, recycling generally results in international shipment and dumping of the gadgets in pits.

#### Some eco-friendly ways of disposing of e-waste are:

- · Giving back the e-waste to the electronic companies and drop-off points
- · Following guidelines issued by the government
- · Selling or donating the outdated technology-based equipment
- · Giving e-waste to a certified e-waste recycler

Exercise	0
----------	---

humans, are known as \_\_\_\_\_\_.

1. Name all five types of fire extinguishers.
2. Explain PPE in brief.
3. List the common workplace hazards.
1. Fill in the blacks:
i. A " sign" is a safety sign that prohibits behaviour that is likely to endanger one's health
or safety.
ii entails acting at the source of pollutants to prevent or minimise their production.
iii is the treatment or care given to someone who has sustained an injury or disease
until more advanced care can be obtained or the person recovers.
iv. The threats caused by biological agents like viruses, bacteria, animals, plants, insects and also

v. The workplace has to be administered as per the rules of the \_\_\_\_\_\_.

— Notes 🚞		
Notes 📃		











# 8. Employability & Entrepreneurship Skills

Unit 8.1 – Personal Strengths & Value Systems

Unit 8.2 – Digital Literacy: A Recap

Unit 8.3 – Money Matters

Unit 8.4 – Preparing for Employment & Self-Employment

Unit 8.5 – Understanding Entrepreneurship

Unit 8.6 – Preparing to be an Entrepreneur



# Key Learning Outcomes

#### At the end of this module, you will be able to:

- 1. Explain the meaning of health
- 2. List common health issues
- 3. Discuss tips to prevent common health issues
- 4. Explain the meaning of hygiene
- 5. Discuss the purpose of Swacch Bharat Abhiyan
- 6. Explain the meaning of habit
- 7. Discuss ways to set up a safe work environment
- 8. Discuss critical safety habits to be followed by employees
- 9. Explain the importance of self-analysis
- 10. Discuss motivation with the help of Maslow's Hierarchy of Needs
- 11. Discuss the meaning of achievement motivation
- 12. List the characteristics of entrepreneurs with achievement motivation
- 13. List the different factors that motivate you
- 14. Discuss the role of attitude in self-analysis
- 15. Discuss how to maintain a positive attitude
- 16. List your strengths and weaknesses
- 17. Discuss the qualities of honest people
- 18. Describe the importance of honesty in entrepreneurs
- 19. Discuss the elements of a strong work ethic
- 20. Discuss how to foster a good work ethic
- 21. List the characteristics of highly creative people
- 22. List the characteristics of highly innovative people
- 23. Discuss the benefits of time management
- 24. List the traits of effective time managers
- 25. Describe effective time management technique
- 26. Discuss the importance of anger management
- 27. Describe anger management strategies
- 28. Discuss tips for anger management
- 29. Discuss the causes of stress
- 30. Discuss the symptoms of stress
- 31. Discuss tips for stress management
- 32. Identify the basic parts of a computer
- 33. Identify the basic parts of a keyboard
- 34. Recall basic computer terminology
- 35. Recall the functions of basic computer keys
- 36. Discuss the main applications of MS Office
- 37. Discuss the benefits of Microsoft Outlook
- 38. Discuss the different types of e-commerce
- 39. List the benefits of e-commerce for retailers and customers
- 40. Discuss how the Digital India campaign will help boost e-commerce in India

- 41. Describe how you will sell a product or service on an e-commerce platform
- 42. Discuss the importance of saving money
- 43. Discuss the benefits of saving money
- 44. Discuss the main types of bank accounts
- 45. Describe the process of opening a bank account
- 46. Differentiate between fixed and variable costs
- 47. Describe the main types of investment options
- 48. Describe the different types of insurance products
- 49. Describe the different types of taxes
- 50. Discuss the uses of online banking
- 51. Discuss the main types of electronic funds transfers
- 52. Discuss the steps to prepare for an interview
- 53. Discuss the steps to create an effective Resume
- 54. Discuss the most frequently asked interview questions
- 55. Discuss how to answer the most frequently asked interview questions
- 56. Discuss basic workplace terminology
- 57. Discuss the concept of entrepreneurship
- 58. Discuss the importance of entrepreneurship
- 59. Describe the characteristics of an entrepreneur
- 60. Describe the different types of enterprises
- 61. List the qualities of an effective leader
- 62. Discuss the benefits of effective leadership
- 63. List the traits of an effective team
- 64. Discuss the importance of listening effectively
- 65. Discuss how to listen effectively
- 66. Discuss the importance of speaking effectively
- 67. Discuss how to speak effectively
- 68. Discuss how to solve problems
- 69. List important problem-solving traits
- 70. Discuss ways to assess problem solving skills
- 71. Discuss the importance of negotiation
- 72. Discuss how to negotiate
- 73. Discuss how to identify new business opportunities
- 74. Discuss how to identify business opportunities within your business
- 75. Explain the meaning of entrepreneur
- 76. Describe the different types of entrepreneurs
- 77. List the characteristics of entrepreneurs
- 78. Recall entrepreneur success stories
- 79. Discuss the entrepreneurial process
- 80. Describe the entrepreneurship ecosystem
- 81. Discuss the purpose of the Make in India campaign
- 82. Discuss key schemes to promote entrepreneurs

- 83. Discuss the relationship between entrepreneurship and risk appetite
- 84. Discuss the relationship between entrepreneurship and resilience
- 85. Describe the characteristics of a resilient entrepreneur
- 86. Discuss how to deal with failure
- 87. Discuss how market research is carried out
- 88. Describe the 4 Ps of marketing
- 89. Discuss the importance of idea generation
- 90. Recall basic business terminology
- 91. Discuss the need for CRM
- 92. Discuss the benefits of CRM
- 93. Discuss the need for networking
- 94. Discuss the benefits of networking
- 95. Discuss the importance of setting goals
- 96. Differentiate between short-term, medium-term and long-term goals
- 97. Discuss how to write a business plan
- 98. Explain the financial planning process
- 99. Discuss ways to manage your risk
- 100. Describe the procedure and formalities for applying for bank finance
- 101. Discuss how to manage your own enterprise
- 102. List important questions that every entrepreneur should ask before starting an enterprise

# **UNIT 8.1: Personal Strengths & Value Systems**

# Unit Objectives 6



#### At the end of this unit, participant will be able to:

- 1. Explain the meaning of health
- 2. List common health issues
- 3. Discuss tips to prevent common health issues
- 4. Explain the meaning of hygiene
- 5. Discuss the purpose of Swacch Bharat Abhiyan
- 6. Explain the meaning of habit
- 7. Discuss ways to set up a safe work environment
- 8. Discuss critical safety habits to be followed by employees
- 9. Explain the importance of self-analysis
- 10. Discuss motivation with the help of Maslow's Hierarchy of Needs
- 11. Discuss the meaning of achievement motivation
- 12. List the characteristics of entrepreneurs with achievement motivation
- 13. List the different factors that motivate you
- 14. Discuss the role of attitude in self-analysis
- 15. Discuss how to maintain a positive attitude
- 16. List your strengths and weaknesses
- 17. Discuss the qualities of honest people
- 18. Describe the importance of honesty in entrepreneurs
- 19. Discuss the elements of a strong work ethic
- 20. Discuss how to foster a good work ethic
- 21. List the characteristics of highly creative people
- 22. List the characteristics of highly innovative people
- 23. Discuss the benefits of time management
- 24. List the traits of effective time managers
- 25. Describe effective time management technique
- 26. Discuss the importance of anger management
- 27. Describe anger management strategies
- 28. Discuss tips for anger management
- 29. Discuss the causes of stress
- 30. Discuss the symptoms of stress
- 31. Discuss tips for stress management

## 8.1.1 Health, Habits, Hygiene: What is Health?

As per the World Health Organization (WHO), health is a "State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." This means being healthy does not simply mean not being unhealthy – it also means you need to be at peace emotionally and feel fit physically. For example, you cannot say you are healthy simply because you do not have any physical ailments like a cold or cough. You also need to think about whether you are feeling calm, relaxed and happy.

#### **Common Health Issues**

Some common health issues are:

- Allergies
- Asthma
- Skin Disorders
- **Depression and Anxiety**
- **Diabetes**
- Cough, Cold, Sore Throat
- **Difficulty Sleeping**
- Obesity

# 8.1.1.1 Tips to Prevent Health Issues



Taking measures to prevent ill health is always better than curing a disease or sickness. You can stay healthy by:

- Eating healthy foods like fruits, vegetables and nuts
- Cutting back on unhealthy and sugary foods
- Drinking enough water everyday
- Not smoking or drinking alcohol
- Exercising for at least 30 minutes a day, 4-5 times a week
- Taking vaccinations when required
- Practicing yoga exercises and meditation

How many of these health standards do you follow? Tick the ones that ap	ply to you.
1. Get minimum 7-8 hours of sleep every night.	
2. Avoid checking email first thing in the morning and right before you go to bed at night.	
3. Don't skip meals – eat regular meals at correct meal times.	
4. Read a little bit every single day.	
5. Eat more home cooked food than junk food.	
6. Stand more than you sit.	
7. Drink a glass of water first thing in the morning and have at least 8 glasses of water through the day.	
8. Go to the doctor and dentist for regular check-ups.	
9. Exercise for 30 minutes at least 5 days a week.	
10. Avoid consuming lots of aerated beverages.	

# 8.1.1.2 What is Hygiene?

As per the World Health Organization (WHO), "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases." In other words, hygiene means ensuring that you do whatever is required to keep your surroundings clean, so that you reduce the chances of spreading germs and diseases.

For instance, think about the kitchen in your home. Good hygiene means ensuring that the kitchen is always spick and span, the food is put away, dishes are washed, and dustbins are not overflowing with garbage. Doing all this will reduce the chances of attracting pests like rats or cockroaches, and prevent the growth of fungus and other bacteria, which could spread disease.

How many of these health standards do you follow? Tick the ones that apply to you.						
1.	Have a bath or shower every day with soap – and wash your hair with shampoo 2-3 times a week.					
2.	Wear a fresh pair of clean undergarments every day.					
3.	Brush your teeth in the morning and before going to bed.					
4.	Cut your fingernails and toenails regularly.					
5.	Wash your hands with soap after going to the toilet.					
6.	Use an anti-perspirant deodorant on your underarms if you sweat a lot.					
7.	Wash your hands with soap before cooking or eating.					
8.	Stay home when you are sick, so other people don't catch what you have.					
9.	Wash dirty clothes with laundry soap before wearing them again.					
10	Cover your nose with a tissue/your hand when coughing or sneezing.					
See how healthy and hygienic you are, by giving yourself 1 point for every ticked statement! Then take a look at what your score means.						
Your Score						
•	• <b>0-7/20:</b> You need to work a lot harder to stay fit and fine! Make it a point to practice good habits daily and see how much better you feel!					
•	<b>7-14/20:</b> Not bad, but there is scope for improvement! Try and add a few nabits to your daily routine.	nore good				
•	14-20/20: Great job! Keep up the good work! Your body and mind thank you!					

# -8.1.1.3 Swachh Bharat Abhiyan

We have already discussed the importance of following good hygiene and health practices for ourselves. But, it is not enough for us to be healthy and hygienic. We must also extend this standard to our homes, our immediate surroundings and to our country as a whole.

The 'Swachh Bharat Abhiyan' (Clean India Mission) launched by Prime Minister Shri Narendra Modi on 2nd October 2014, believes in doing exactly this. The aim of this mission is to clean the streets and roads of India and raise the overall level of cleanliness. Currently this mission covers 4,041 cities and towns across the country. Millions of our people have taken the pledge for a clean India. You should take the pledge too, and do everything possible to keep our country clean!

#### 8.1.1.4 What are Habits?

A habit is a behaviour that is repeated frequently. All of us have good habits and bad habits. Keep in mind the phrase by John Dryden: "We first make our habits, and then our habits make us." This is why it is so important that you make good habits a way of life, and consciously avoid practicing bad habits.

Some good habits that you should make part of your daily routine are:

- Always having a positive attitude
- Making exercise a part of your daily routine
- Reading motivational and inspirational stories
- Smiling! Make it a habit to smile as often as possible
- Making time for family and friends
- Going to bed early and waking up early

Some bad habits that you should guit immediately are:

- Skipping breakfast
- Snacking frequently even when you are not hungry
- Eating too much fattening and sugary food
- Smoking, drinking alcohol and doing drugs
- Spending more money than you can afford
- Worrying about unimportant issues
- Staying up late and waking up late

### Tips



- Following healthy and hygienic practices every day will make you feel good mentally and physically.
- Hygiene is two-thirds of health so good hygiene will help you stay strong and healthy!

### 8.1.2: Safety: Tips to Design a Safe Workplace

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Use ergonomically designed furniture and equipment to avoid stooping and twisting
- Provide mechanical aids to avoid lifting or carrying heavy objects
- Have protective equipment on hand for hazardous jobs
- Designate emergency exits and ensure they are easily accessible
- Set down health codes and ensure they are implemented
- Follow the practice of regular safety inspections in and around the workplace
- Ensure regular building inspections are conducted
- Get expert advice on workplace safety and follow it

### 8.1.2.1 Negotiable Employee Safety Habits

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Immediately report unsafe conditions to a supervisor
- Recognize and report safety hazards that could lead to slips, trips and falls
- Report all injuries and accidents to a supervisor
- Wear the correct protective equipment when required
- Learn how to correctly use equipment provided for safety purposes
- Be aware of and avoid actions that could endanger other people
- Take rest breaks during the day and some time off from work during the week

# Tips



- Be aware of what emergency number to call at the time of a workplace emergency
- Practice evacuation drills regularly to avoid chaotic evacuations

### 8.1.3 Self-Analysis – Attitude, Achievement Motivation

To truly achieve your full potential, you need to take a deep look inside yourself and find out what kind of person you really are. This attempt to understand your personality is known as self-analysis. Assessing yourself in this manner will help you grow, and will also help you to identify areas within yourself that need to be further developed, changed or eliminated. You can better understand yourself by taking a deep look at what motivates you, what your attitude is like, and what your strengths and weaknesses are.

#### 8.1.3.1 What is Motivation?

Very simply put, motivation is your reason for acting or behaving in a certain manner. It is important to understand that not everyone is motivated by the same desires – people are motivated by many, many different things. We can understand this better by looking at Maslow's Hierarchy of Needs.

## 8.1.3.2 Maslow's Hierarchy of Needs -

Famous American psychologist Abraham Maslow wanted to understand what motivates people. He believed that people have five types of needs, ranging from very basic needs (called physiological needs) to more important needs that are required for self-growth (called

self-actualization needs). Between the physiological and self-actualization needs are three other needs – safety needs, belongingness and love needs, and esteem needs.

Basic

needs

Self actualization:
achieving one's full
potential, including
creative activities

Esteem needs:
prestige and feeling of
accomplishment

Belongingness and love needs:
intimate relationships, friends

Safety needs:

Security, safety

**Physiological needs:** food, water, warmth, rest

These needs are usually shown as a pyramid with five levels and are known as Maslow's Hierarchy of Needs.

Fig. 8.1.1: Maslow's Hierarchy of Needs

The lowest level depicts the most basic needs. According to Maslow, our behaviour is driven by our basic needs, until those needs are fulfilled. Once they are fulfilled, we move to the next level and are motived by the next level of needs. Let's understand this better with an example.

Rupa comes from a very poor family. She never has enough food, water, warmth or rest. According to Maslow, until Rupa is sure that she will get these basic needs, she will not even think about the next level of needs – her safety needs. But, once Rupa is confident that her basic needs will be met, she will move to the next level, and her behaviour will then be motivated by her need for security and safety. Once these new needs are met, Rupa will once again move to the next level, and be motivated by her need for relationships and friends. Once this need is satisfied, Rupa will then focus on the fourth level of needs – her esteem needs, after which she will move up to the fifth and last level of needs – the desire to achieve her full potential.

### **8.1.3.3 Understanding Achievement Motivation**

We now know that people are motivated by basic, psychological and self-fulfillment needs. However, certain people are also motivated by the achievement of highly challenging accomplishments. This is known as Achievement Motivation, or 'need for achievement'.

The level of motivation achievement in a person differs from individual to individual. It is important that entrepreneurs have a high level of achievement motivation — a deep desire to accomplish something important and unique. It is equally important that they hire people who are also highly motivated by challenges and success.

W	hat Motivates You?
	hat are the things that really motivate you? List down five things that really motivate you member to answer honestly!
Ιá	am motivated by:
·h	aracteristics of Entrepreneurs with Achievement Motivation
	trepreneurs with achievement motivation can be described as follows:
	Unafraid to take risks for personal accomplishment
	Love being challenged Future-oriented Flexible and adaptive
	Value negative feedback more than positive feedback
	Very persistent when it comes to achieving goals
)	Extremely courageous
)	Highly creative and innovative
)	Restless - constantly looking to achieve more

### Think about it:

- How many of these traits do you have?
- Can you think of entrepreneurs who display these traits?

#### 8.1.3.4 How to Cultivate a Positive Attitude?

The good news is attitude is a choice. So, it is possible to improve, control and change our attitude, if we decide we want to!

The following tips help foster a positive mindset:

- Remember that you control your attitude, not the other way around
- Devote at least 15 minutes a day towards reading, watching or listening to something positive
- Avoid negative people who only complain and stop complaining yourself
- Expand your vocabulary with positive words and delete negative phrases from your mind
- Be appreciative and focus on what's good in yourself, in your life, and in others
- Stop thinking of yourself as a victim and start being proactive
- Imagine yourself succeeding and achieving your goals

#### 8.1.3.5 What is Attitude?

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

#### "The only disability in life is a bad attitude."

When you start a business, you are sure to encounter a wide variety of emotions, from difficult times and failures to good times and successes. Your attitude is what will see you through the tough times and guide you towards success. Attitude is also infectious. It affects everyone around you, from your customers to your employees to your investors. A positive attitude helps build confidence in the workplace while a negative attitude is likely to result in the demotivation of your people.

### 8.1.3.6 What Are Your Strengths and Weaknesses?

Another way to analyse yourself is by honestly identifying your strengths and weaknesses. This will help you use your strengths to your best advantage and reduce your weaknesses. Note down all your strengths and weaknesses in the two columns below. Remember to be honest with yourself!

Strengths	Weaknesses

# Tips



- Achievement motivation can be learned.
- Don't be afraid to make mistakes.
- Train yourself to finish what you start.
- Dream big.

### 8.1.4 Honesty & Work Ethics: What is Honesty?

Honesty is the quality of being fair and truthful. It means speaking and acting in a manner that inspires trust. A person who is described as honest is seen as truthful and sincere, and as someone who isn't deceitful or devious and doesn't steal or cheat. There are two dimensions of honesty — one is honesty in communication and the other is honesty in conduct.

Honesty is an extremely important trait because it results in peace of mind and builds relationships that are based on trust. Being dishonest, on the other hand, results in anxiety and leads to relationships full of distrust and conflict.

### 8.1.4.1 Qualities of Honest People

Honest individuals have certain distinct characteristics. Some common qualities among honest people are:

- They don't worry about what others think of them. They believe in being themselves they don't bother about whether they are liked or disliked for their personalities.
- They stand up for their beliefs. They won't think twice about giving their honest opinion, even if they are aware that their point of view lies with the minority.
- They are think skinned. This means they are not affected by others judging them harshly for their honest opinions.
- They forge trusting, meaningful and healthy friendships. Honest people usually surround themselves with honest friends. They have faith that their friends will be truthful and upfront with them at all times.

They are trusted by their peers. They are seen as people who can be counted on for truthful and objective feedback and advice.

- Honesty and employees: When entrepreneurs build honest relationships with their employees, it leads to more transparency in the workplace, which results in higher work performance and better results.
- Honesty and investors: For entrepreneurs, being honest with investors means not only sharing strengths but also candidly disclosing current and potential weaknesses, problem areas and solution strategies. Keep in mind that investors have a lot of experience with startups and are aware that all new companies have problems. Claiming that everything is perfectly fine and running smoothly is a red flag for most investors.

• Honesty with oneself: The consequences of being dishonest with oneself can lead to dire results, especially in the case of entrepreneurs. For entrepreneurs to succeed, it is critical that they remain realistic about their situation at all times, and accurately judge every aspect of their enterprise for what it truly is.

### **8.1.4.2** Importance of Honesty in Entrepreneurs

One of the most important characteristics of entrepreneurs is honesty. When entrepreneurs are honest with their customers, employees and investors, it shows that they respect those that they work with. It is also important that entrepreneurs remain honest with themselves.

Let's look at how being honest would lead to great benefits for entrepreneurs.

Honesty and customers: When entrepreneurs are honest with their customers it leads
to stronger relationships, which in turn results in business growth and a stronger
customer network.

#### 8.1.4.3 What are Work Ethics?

Being ethical in the workplace means displaying values like honesty, integrity and respect in all your decisions and communications. It means not displaying negative qualities like lying, cheating and stealing.

Workplace ethics play a big role in the profitability of a company. It is as crucial to an enterprise as high morale and teamwork. This is why most companies lay down specific workplace ethic guidelines that must compulsorily be followed by their employees. These guidelines are typically outlined in a company's employee handbook.

### 8.1.4.4 Elements of a Strong Work Ethic

An entrepreneur must display strong work ethics, as well as hire only those individuals who believe in and display the same level of ethical behavior in the workplace. Some elements of a strong work ethic are:

- **Professionalism:** This involves everything from how you present yourself in a corporate setting to the manner in which you treat others in the workplace.
- **Respectfulness:** This means remaining poised and diplomatic regardless of how stressful or volatile a situation is.
- **Dependability:** This means always keeping your word, whether it's arriving on time for a meeting or delivering work on time.
- **Dedication:** This means refusing to quit until the designated work is done, and completing the work at the highest possible level of excellence.
- **Determination:** This means embracing obstacles as challenges rather than letting them stop you, and pushing ahead with purpose and resilience to get the desired results.

- Accountability: This means taking responsibility for your actions and the consequences
  of your actions, and not making excuses for your mistakes.
- **Humility:** This means acknowledging everyone's efforts and had work, and sharing the credit for accomplishments.

#### 8.1.4.5 How to Foster a Good Work Ethic?

As an entrepreneur, it is important that you clearly define the kind of behaviour that you expect from each and every team member in the workplace. You should make it clear that you expect employees to display positive work ethics like:

- **Honesty:** All work assigned to a person should be done with complete honesty, without any deceit or lies.
- Good attitude: All team members should be optimistic, energetic, and positive.
- **Reliability:** Employees should show up where they are supposed to be, when they are supposed to be there.
- **Good work habits:** Employees should always be well groomed, never use inappropriate language, conduct themselves professionally at all times and so on.
- **Initiative:** Doing the bare minimum is not enough. Every team member needs to be proactive and show initiative.
- **Trustworthiness:** Trust is non-negotiable. If an employee cannot be trusted, it's time to let that employee go.
- **Respect:** Employees need to respect the company, the law, their work, their colleagues and themselves.
- **Integrity:** Each and every team member should be completely ethical and must display above board behaviour at all times.
- **Efficiency:** Efficient employees help a company grow while inefficient employees result in a waste of time and resources.

### Tips



- Don't get angry when someone tells you the truth and you don't like what you hear.
- Always be willing to accept responsibility for your mistakes.

### -8.1.5 Creativity & Innovation

#### What is Creativity?

Creativity means thinking outside the box. It means viewing things in new ways or from different perspectives, and then converting these ideas into reality. Creativity involves two parts: thinking and producing. Simply having an idea makes you imaginative, not creative. However, having an idea and acting on it makes you creative.

#### **Characteristics of Highly Creative People**

Some characteristics of creative people are:

- They are imaginative and playful
- They see issues from different angles
- They notice small details
- They have very little tolerance for boredom
- They detest rules and routine
- They love to daydream
- They are very curious

#### What is Innovation?

There are many different definitions of innovation. In simple terms, innovation means turning an idea into a solution that adds value. It can also mean adding value by implementing a new product, service or process, or significantly improving on an existing product, service or process.

#### **Characteristics of Highly Innovative People**

Some characteristics of highly innovative people are:

- They embrace doing things differently
- They don't believe in taking shortcuts
- They are not afraid to be unconventional
- They are highly proactive and persistent
- They are organized, cautious and risk-averse

### Tips



- Take regular breaks from your creative work to recharge yourself and gain fresh perspective.
- Build prototypes frequently, test them out, get feedback, and make the required changes.

### 8.1.6 Time Management

Time management is the process organizing your time and deciding how to allocate your time between different activities. Good time management is the difference between working smart (getting more done in less time) and working hard (working for more time to get more done).

Effective time management leads to an efficient work output, even when you are faced with tight deadlines and high-pressure situations. On the other hand, not managing your time effectively results in inefficient output and increases stress and anxiety.

#### **Benefits of Time Management**

Time management can lead to huge benefits like:

- Greater productivity
- Higher efficiency
- Better professional reputation
- Reduced stress
- Higher chances for career advancement
- Greater opportunities to achieve goals

Not managing time effectively can result in undesirable consequences like:

- Missing deadlines
- Inefficient work output
- Substandard work quality
- Poor professional reputation
- Stalled career
- Increase in stress and anxiety

### -8.1.6.1 Traits of Effective Time Managers

Some traits of effective time managers are:

- They begin projects early
- They set daily objectives
- They modify plans if required, to achieve better results
- They are flexible and open-minded
- They inform people in advance if their help will be required
- They know how to say no
- They break tasks into steps with specific deadlines
- They continually review long term goals
- They think of alternate solutions if and when required
- They ask for help when required
- They create backup plans

### 8.1.6.2 Effective Time Management Techniques

You can manage your time better by putting into practice certain time management techniques. Some helpful tips are:

- Plan out your day as well as plan for interruptions. Give yourself at least 30 minutes to figure out your time plan. In your plan, schedule some time for interruptions.
- Put up a "Do Not Disturb" sign when you absolutely have to complete a certain amount of work.
- Close your mind to all distractions. Train yourself to ignore ringing phones, don't reply to chat messages and disconnect from social media sites.
- **Delegate your work.** This will not only help your work get done faster, but will also show you the unique skills and abilities of those around you.
- **Stop procrastinating.** Remind yourself that procrastination typically arises due to the fear of failure or the belief that you cannot do things as perfectly as you wish to do them.
- **Prioritize.** List each task to be completed in order of its urgency or importance level. Then focus on completing each task, one by one.
- Maintain a log of your work activities. Analyse the log to help you understand how efficient you are, and how much time is wasted every day.
- **Create time management goals** to reduce time wastage.

# Tips 🖳

- Always complete the most important tasks first.
- Get at least 7 8 hours of sleep every day.
- Start your day early.
- Don't waste too much time on small, unimportant details.
- Set a time limit for every task that you will undertake.
- Give yourself some time to unwind between tasks.

### 8.1.7 Anger Management

Anger management is the process of:

- 1. Learning to recognize the signs that you, or someone else, is becoming angry
- 2. Taking the best course of action to calm down the situation in a positive way

Anger management does not mean suppressing anger.

#### **Importance of Anger Management**

Anger is a perfectly normal human emotion. In fact, when managed the right way, anger can be considered a healthy emotion. However, if it is not kept in check, anger can make us act inappropriately and can lead to us saying or doing things that we will likely later regret.

#### Extreme anger can:

- **Hurt you physically**: It leads to heart disease, diabetes, a weakened immune system, insomnia, and high blood pressure.
- **Hurt you mentally**: It can cloud your thinking and lead to stress, depression and mental health issues.
- **Hurt your career**: It can result in alienating your colleagues, bosses, clients and lead to the loss of respect.
- **Hurt your relationships**: It makes it hard for your family and friends to trust you, be honest with you and feel comfortable around you.

This is why anger management, or managing anger appropriately, is so important.

### 8.1.7.1 Anger Management Strategies

Here are some strategies that can help you control your anger:

#### **Strategy 1: Relaxation**

Something as simple as breathing deeply and looking at relaxing images works wonders in calming down angry feelings. Try this simple breathing exercise:

- 1. Take a deep breath from your diaphragm (don't breathe from your chest)
- 2. Visualize your breath coming up from your stomach
- 3. Keep repeating a calming word like 'relax' or 'take it easy' (remember to keep breathing deeply while repeating the word)
- 4. Picture a relaxing moment (this can be from your memory or your imagination)

Follow this relaxation technique daily, especially when you realize that you're starting to feel angry.

#### **Strategy 2: Cognitive Restructuring**

Cognitive restructuring means changing the manner in which you think. Anger can make you curse, swear, exaggerate and act very dramatically. When this happens, force yourself to replace your angry thoughts with more logical ones. For instance, instead of thinking 'Everything is ruined' change your mindset and tell yourself 'It's not the end of the world and getting angry won't solve this'.

#### Strategy 3: Problem Solving

Getting angry about a problem that you cannot control is a perfectly natural response. Sometimes, try as you may, there may not be a solution to the difficulty you are faced with. In such cases, stop focusing on solving the problem, and instead focus on handling and facing the problem. Remind yourself that you will do your best to deal with the situation, but that you will not blame yourself if you don't get the solution you desire.

#### **Strategy 4: Better Communication**

When you're angry, it is very easy to jump to inaccurate conclusions. In this case, you need to force yourself to stop reacting, and think carefully about what you want to say, before saying it. Avoid saying the first thing that enters your head. Force yourself to listen carefully to what the other person is saying. Then think about the conversation before responding.

#### **Strategy 5: Changing Your Environment**

If you find that your environment is the cause of your anger, try and give yourself a break from your surroundings. Make an active decision to schedule some personal time for yourself, especially on days that are very hectic and stressful. Having even a brief amount of quiet or alone time is sure to help calm you down.

# 8.1.7.2 Tips for Anger Management 🖳



The following tips will help you keep your anger in check:

- Take some time to collect your thoughts before you speak out in anger.
- Express the reason for your anger in an assertive, but non-confrontational manner once you have calmed down.
- Do some form of physical exercise like running or walking briskly when you feel yourself getting angry.
- Make short breaks part of your daily routine, especially during days that are stressful.
- Focus on how to solve a problem that's making you angry, rather than focusing on the fact that the problem is making you angry.

### 8.1.8 Stress Management

We say we are 'stressed' when we feel overloaded and unsure of our ability to deal with the pressures placed on us. Anything that challenges or threatens our well-being can be defined as a stress. It is important to note that stress can be good and bad. While good stress keeps us going, negative stress undermines our mental and physical health. This is why it is so important to manage negative stress effectively.

#### **Causes of Stress**

Stress can be caused by internal and external factors.

#### Internal causes of stress

- Constant worry
- Rigid thinking
- Unrealistic expectations
- Pessimism
- Negative self-talk
- All in or all out attitude

#### **External causes of stress**

- Major life changes
- Difficulties with relationships
- Having too much to do
- Difficulties at work or in school
- Financial difficulties
- Worrying about one's children and/or family

# -8.1.8.1 Symptoms of Stress

Stress can manifest itself in numerous ways. Take a look at the cognitive, emotional, physical and behavioural symptoms of stress.

Cognitive Symptoms	Emotional Symptoms
Memory problems	• Depression
Concentration issues	Agitation
Lack of judgement	<ul> <li>Irritability</li> </ul>
Pessimism	<ul> <li>Loneliness</li> </ul>
Anxiety	<ul><li>Anxiety</li></ul>
Constant worrying	Anger

Physical Symptoms	Behavioural Symptoms	
Aches and pain	Increase or decrease in appetite	
Diarrhoea or constipation	Over sleeping or not sleeping	
Nausea	enough	
Dizziness	Withdrawing socially	
Chest pain and/or rapid heartbeat	<ul> <li>Ignoring responsibilities</li> </ul>	
Frequent cold or flu like feelings	Consumption of alcohol or	
	cigarettes	
	Nervous habits like nail biting and	
	pacing	

# 8.1.8.2 Tips to Manage Stress

The following tips can help you manage your stress better:

- Note down the different ways in which you can handle the various sources of your stress.
- Remember that you cannot control everything, but you can control how you respond.
- Discuss your feelings, opinions and beliefs rather than reacting angrily, defensively or passively.
- Practice relaxation techniques like meditation, yoga or tai chi when you start feeling stressed.
- Devote a part of your day towards exercise.
- Eat healthy foods like fruits and vegetables. Avoid unhealthy foods especially those containing large amounts of sugar.
- Plan your day so that you can manage your time better, with less stress.
- Say no to people and things when required.
- Schedule time to pursue your hobbies and interests.
- Ensure you get at least 7-8 hours of sleep.
- Reduce your caffeine intake.
- Increase the time spent with family and friends.

# **UNIT 8.2: Digital Literacy: A Recap**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Identify the basic parts of a computer
- 2. Identify the basic parts of a keyboard
- 3. Recall basic computer terminology
- 4. Recall the functions of basic computer keys
- 5. Discuss the main applications of MS Office
- 6. Discuss the benefits of Microsoft Outlook
- 7. Discuss the different types of e-commerce
- 8. List the benefits of e-commerce for retailers and customers
- 9. Discuss how the Digital India campaign will help boost e-commerce in India
- 10. Describe how you will sell a product or service on an e-commerce platform

### 8.2.1 Computer and Internet basics

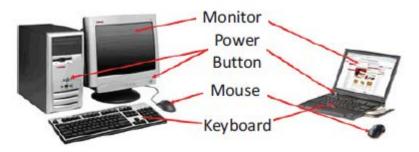


Fig.8.2.1. Parts of a Computer



Fig.8.2.2. Parts of a Keyboard

#### **Basic Parts of a Computer**

- 1. Central Processing Unit (CPU): The brain of the computer. It interprets and carries out program instructions.
- 2. Hard Drive: A device that stores large amounts of data.
- Monitor: The device that contains the computer screen where the information is visually displayed.

- 4. **Desktop:** The first screen displayed after the operating system loads.
- 5. **Background:** The image that fills the background of the desktop.
- 6. **Mouse:** A hand-held device used to point to items on the monitor.
- 7. **Speakers:** Devices that enable you to hear sound from the computer.
- 8. **Printer:** A device that converts output from a computer into printed paper documents.
- 9. **Icon:** A small picture or image that visually represents something on your computer.
- 10. Cursor: An arrow which indicates where you are positioned on the screen.
- 11. **Program Menu:** A list of programs on your computer that can be accessed from the Start menu.
- 12. **Taskbar:** The horizontal bar at the bottom of the computer screen that lists applications that are currently in use.
- 13. **Recycle Bin:** A temporary storage for deleted files.

#### **Basic Internet Terms**

- **The Internet:** A vast, international collection of computer networks that transfers information.
- The World Wide Web: A system that lets you access information on the Internet.
- **Website:** A location on the World Wide Web (and Internet) that contains information about a specific topic.
- **Homepage:** Provides information about a website and directs you to other pages on that website.
- **Link/Hyperlink:** A highlighted or underlined icon, graphic, or text that takes you to another file or object.
- Web Address/URL: The address for a website.
- Address Box: A box in the browser window where you can type in a web address.

#### **Basic Computer Keys**

- **Arrow Keys:** Press these keys to move your cursor.
- Space bar: Adds a space.
- Enter/Return: Moves your cursor to a new line.
- Shift: Press this key if you want to type a capital letter or the upper symbol of a key.
- Caps Lock: Press this key if you want all the letters you type to be capital letters. Press it again to revert back to typing lowercase letters.
- Backspace: Deletes everything to the left of your cursor

### Tips



- When visiting a .com address, there no need to type http://or even www. Just type the name of the website and then press Ctrl + Enter. (Example: Type 'apple' and press Ctrl + Enter to go to www.apple.com)
- Press the Ctrl key and press the + or to increase and decrease the size of text.
- Press F5 or Ctrl + R to refresh or reload a web page.

#### 8.2.2 MS Office and Email

#### **About MS Office**

MS Office or Microsoft Office is a suite of computer programs developed by Microsoft. Although meant for all users, it offers different versions that cater specifically to students, home users and business users. All the programs are compatible with both, Windows and Macintosh.

#### **Most Popular Office Products**

Some of the most popular and universally used MS Office applications are:

- Microsoft Word: Allows users to type text and add images to a document.
- **Microsoft Excel**: Allows users to enter data into a spreadsheet and create calculations and graphs.
- Microsoft PowerPoint: Allows users to add text, pictures and media and create slideshows and presentations.
- Microsoft Outlook: Allows users to send and receive email.
- **Microsoft OneNote**: Allows users to make drawings and notes with the feel of a pen on paper.
- Microsoft Access: Allows users to store data over many tables.

#### Why Choose Microsoft Outlook?

A popular email management choice especially in the workplace, Microsoft Outlook also includes an address book, notebook, web browser and calendar. Some major benefits of this program are:

- Integrated search function: You can use keywords to search for data across all Outlook programs.
- **Enhanced security**: Your email is safe from hackers, junk mail and phishing website email.
- **Email syncing**: Sync your mail with your calendar, contact list, notes in One Note and...your phone!
- Offline access to email: No Internet? No problem! Write emails offline and send them when you're connected again.

### Tips



- Press Ctrl+R as a shortcut method to reply to email.
- Set your desktop notifications only for very important emails.
- Flag messages quickly by selecting messages and hitting the Insert key.
- Save frequently sent emails as a template to reuse again and again.
- Conveniently save important emails as files.

#### -8.2.3 E-Commerce

#### What is E-Commerce?

E-commerce is the buying or selling of goods and services, or the transmitting of money or data, electronically on the internet. E-Commerce is the short form for "electronic commerce."

#### **Examples of E-Commerce**

Some examples of e-commerce are:

- Online shopping
- Online auctions
- Online ticketing
- Electronic payments
- Internet banking

#### **Types of E-Commerce**

E-commerce can be classified based on the types of participants in the transaction. The main types of e-commerce are:

- **Business to Business (B2B)**: Both the transacting parties are businesses.
- Business to Consumer (B2C): Businesses sell electronically to end-consumers.
- **Consumer to Consumer (C2C):** Consumers come together to buy, sell or trade items to other consumers.
- Consumer-to-Business (C2B): Consumers make products or services available for purchase to companies looking for exactly those services or products.
- **Business-to-Administration (B2A)**: Online transactions conducted between companies and public administration.
- Consumer-to-Administration (C2A): Online transactions conducted between individual and public administration.

#### 8.2.3.1 Benefits of E-Commerce

The e-commerce business provides some benefits for retailers and customers.

#### Benefits for retailers

- Establishes an online presence
- Reduces operational costs by removing overhead costs
- Increases brand awareness through the use of good keywords
- Increases sales by removing geographical and time constraints

#### **Benefits for customers**

- Offers a wider range of choice than any physical store
- Enables goods and services to be purchased from remote locations
- Enables consumers to perform price comparisons

### 8.2.3.2 Digital India Campaign

Prime Minister Narendra Modi launched the Digital India campaign in 2015, with the objective of offering every citizen of India access to digital services, knowledge and information. The campaign aims to improve the country's online infrastructure and increase internet connectivity, thus boosting the e-commerce industry.

Currently, the majority of online transactions come from tier 2 and tier 3 cities. Once the Digital India campaign is in place, the government will deliver services through mobile connectivity, which will help deliver internet to remote corners of the country. This will help the e-commerce market to enter India's tier 4 towns and rural areas.

#### **E-Commerce Activity**

Choose a product or service that you want to sell online. Write a brief note explaining how you will use existing e-commerce platforms, or create a new e-commerce platform, to sell your product or service.

# Tips



- Before launching your e-commerce platform, test everything.
- Pay close and personal attention to your social media.

### **UNIT 8.3: Money Matters**

# **Unit Objectives**



#### At the end of this unit, you will be able to:

- 1. Discuss the importance of saving money
- 2. Discuss the benefits of saving money
- 3. Discuss the main types of bank accounts
- 4. Describe the process of opening a bank account
- 5. Differentiate between fixed and variable costs
- 6. Describe the main types of investment options
- 7. Describe the different types of insurance products
- 8. Describe the different types of taxes
- 9. Discuss the uses of online banking
- 10. Discuss the main types of electronic funds transfers

### 8.3.1 Personal Finance – Why to Save?

#### Importance of Saving

We all know that the future is unpredictable. You never know what will happen tomorrow, next week or next year. That's why saving money steadily through the years is so important. Saving money will help improve your financial situation over time. But more importantly, knowing that you have money stashed away for an emergency will give you peace of mind. Saving money also opens the door to many more options and possibilities.

#### **Benefits of Saving**

Inculcating the habit of saving leads to a vast number of benefits. Saving helps you:

- Become financially independent: When you have enough money saved up to feel secure you can start making your choices, from taking a vacation whenever you want, to switching careers or starting your own business.
- **Invest in yourself through education**: Through saving, you can earn enough to pay up for courses that will add to your professional experience and ultimately result in higher paying jobs.
- Get out of debt: Once you have saved enough as a reserve fund, you can use your savings to pay off debts like loans or bills that have accumulated over time.
- Be prepared for surprise expenses: Having money saved enables you to pay for unforeseen expenses like sudden car or house repairs, without feeling financially
- Pay for emergencies: Saving helps you deal with emergencies like sudden health issues or emergency trips without feeling financially burdened.

- Afford large purchases and achieve major goals: Saving diligently makes it possible to
  place down payments towards major purchases and goals, like buying a home or a car.
- **Retire**: The money you have saved over the years will keep you comfortable when you no longer have the income you would get from your job.

# Tips



- Break your spending habit. Try not spending on one expensive item per week, and put the money that you would have spent into your savings.
- Decide that you will not buy anything on certain days or weeks and stick to your word.

### 8.3.2 Types of Bank Accounts

In India, banks offer four main types of bank accounts. These are:

- 1. Current Accounts
- 2. Savings Accounts
- 3. Recurring Deposit Accounts
- 4. Fixed Deposit Accounts

#### **Current Accounts**

Current accounts offer the most liquid deposits and thus, are best suited for businessmen and companies. As these accounts are not meant for investments and savings, there is no imposed limit on the number or amount of transactions that can be made on any given day. Current account holders are not paid any interest on the amounts held in their accounts. They are charged for certain services offered on such accounts.

#### **Saving Accounts**

Savings accounts are meant to promote savings, and are therefore the number one choice for salaried individuals, pensioners and students. While there is no restriction on the number and amount of deposits made, there are usually restrictions on the number and amount of withdrawals. Savings account holders are paid interest on their savings.

#### **Recurring Deposit Accounts**

Recurring Deposit accounts, also called RD accounts, are the accounts of choice for those who want to save an amount every month, but are unable to invest a large sum at one time. Such account holders deposit a small, fixed amount every month for a pre-determined period (minimum 6 months). Defaulting on a monthly payment results in the account holder being charged a penalty amount. The total amount is repaid with interest at the end of the specified period.

#### **Fixed Deposit Accounts**

Fixed Deposit accounts, also called FD accounts, are ideal for those who wish to deposit their savings for a long term in return for a high rate of interest. The rate of interest offered depends on the amount deposited and the time period, and also differs from bank to bank. In the case of an FD, a certain amount of money is deposited by the account holder for a fixed period of time. The money can be withdrawn when the period expires. If necessary, the depositor can break the fixed deposit prematurely. However, this usually attracts a penalty amount which also differs from bank to bank.

### 8.3.2.1 Opening a Bank Account

Opening a bank account is quite a simple process. Take a look at the steps to open an account of your own:

#### Step 1: Fill in the Account Opening Form

This form requires you to provide the following information:

- Personal details (name, address, phone number, date of birth, gender, occupation, address)
- Method of receiving your account statement (hard copy/email)
- Details of your initial deposit (cash/cheque)
- Manner of operating your account (online/mobile banking/traditional via cheque, slip books)
- Ensure that you sign wherever required on the form.

#### **Step 2: Affix your Photograph**

Stick a recent photograph of yourself in the allotted space on the form.

#### Step 3: Provide your Know Your Customer (KYC) Details

KYC is a process that helps banks verify the identity and address of their customers. To open an account, every individual need to submit certain approved documents with respect to photo identity (ID) and address proof. Some Officially Valid Documents (OVDs) are:

- Passport
- Driving License
- Voters' Identity Card
- PAN Card
- UIDAI (Aadhar) Card

#### **Step 4: Submit All your Documents**

Submit the completed Account Opening Form and KYC documents. Then wait until the forms are processed and your account has been opened!

# Tips



- Select the right type of account.
- Fill in complete nomination details.
- Ask about fees.
- Understand the rules.
- Check for online banking it's convenient!
- Keep an eye on your bank balance.

#### -8.3.3 Costs: Fixed vs Variable

#### What are Fixed and Variable Costs?

Fixed costs and variable costs together make up a company's total cost. These are the two types of costs that companies have to bear when producing goods and services. A fixed cost does not change with the volume of goods or services a company produces. It always remains the same.

A variable cost, on the other hand, increases and decreases depending on the volume of goods and services produced. In other words, it varies with the amount produced.

#### **Differences between Fixed and Variable Costs**

Let's take a look at some of the main differences between fixed and variable costs:

Criteria	Fixed Costs	Variable Costs	
Meaning	A cost that stays the same, regardless of the output produced.	A cost that changes when the	
Nature	Time related.	Volume related.	
Incurred	Incurred irrespective of units being produced.	Incurred only when units are produced	
Unit cost	Inversely proportional to the number of units produced	Remains the same, per unit.	
Examples	Depreciation, rent, salary, insurance and tax	Material consumed, wages, commission on sales and packing expenses	

# Tips

When trying to determine whether a cost is fixed or variable, simply ask the following
question: Will the particular cost change if the company stopped its production
activities? If the answer is no, then it is a fixed cost. If the answer is yes, then it is
probably a variable cost.

### -8.3.4 Investment, Insurance and Taxes

#### Investment

Investment means that money is spent today with the aim of reaping financial gains at a future time. The main types of investment options are as follows:

- **Bonds:** Bonds are instruments used by public and private companies to raise large sums of money too large to be borrowed from a bank. These bonds are then issued in the public market and are bought by lenders.
- **Stocks:** Stocks or equity are shares that are issued by companies and are bought by the general public.
- Small Savings Schemes: Small Savings Schemes are tools meant to save money in small amounts. Some popular schemes are the Employees Provident Fund, Sukanya Samriddhi Scheme and National Pension Scheme.
- **Mutual Funds:** Mutual Funds are professionally managed financial instruments that invest money in different securities on behalf of investors.
- **Fixed Deposits:** A fixed amount of money is kept aside with a financial institution for a fixed amount of time in return for interest on the money.
- **Real Estate:** Loans are taken from banks to purchase real estate, which is then leased or sold with the aim of making a profit on the appreciated property price.
- Hedge Funds: Hedge funds invest in both financial derivatives and/or publicly traded securities.
- **Private Equity:** Private Equity is trading in the shares of an operating company that is not publicly listed and whose shares are not available on the stock market.
- **Venture Capital:** Venture Capital involves investing substantial capital in a budding company in return for stocks in that company.

#### Insurance

There are two types of insurance, Life Insurance and General Insurance.

#### **Life Insurance Products**

The main life insurance products are:

• **Term Insurance:** This is the simplest and cheapest form of insurance. It offers financial protection for a specified tenure, say 15 to 20 years. In the case of your death, your family is paid the sum assured. In the case of your surviving the term, the insurer pays nothing.

- **Endowment Policy:** This offers the dual benefit of insurance and investment. Part of the premium is allocated towards the sum assured, while the remaining premium gets invested in equity and debt. It pays a lump sum amount after the specified duration or on the death of the policyholder, whichever is earlier.
- Unit-Linked Insurance Plan (ULIP): Here part of the premium is spent on the life cover, while the remaining amount is invested in equity and debt. It helps develop a regular saving habit.
- Money Back Life Insurance: While the policyholder is alive, periodic payments of the
  partial survival benefits are made during the policy tenure. On the death of the insured,
  the insurance company pays the full sum assured along with survival benefits.
- Whole Life Insurance: It offers the dual benefit of insurance and investment. It offers insurance cover for the whole life of the person or up to 100 years whichever is earlier.

#### **General Insurance**

General Insurance deals with all insurance covering assets like animals, agricultural crops, goods, factories, cars and so on.

#### **General Insurance Products**

The main general insurance products are:

- **Motor Insurance:** This can be divided into Four-Wheeler Insurance and Two-Wheeler insurance.
- **Health Insurance:** The main types of health insurance are individual health insurance, family floater health insurance, comprehensive health insurance and critical illness insurance.
- **Travel Insurance:** This can be categorised into Individual Travel Policy, Family Travel Policy, Student Travel Insurance and Senior Citizen Health Insurance.
- **Home Insurance:** This protects the house and its contents from risk.
- Marine Insurance: This insurance covers goods, freight and cargo against loss or damage during transit by rail, road, sea and/or air.

#### **Taxes**

There are two types of taxes:

- 1. Direct Taxes
- 2. Indirect Taxes.

#### **Direct Tax**

Direct taxes are levied directly on an entity or a person and are non-transferrable. Some examples of Direct Taxes are:

- **Income Tax:** This tax is levied on your earning in a financial year. It is applicable to both, individuals and companies.
- Capital Gains Tax: This tax is payable whenever you receive a sizable amount of money. It is usually of two types short term capital gains from investments held for less than 36 months and long term capital gains from investments held for longer than 36 months.

- **Securities Transaction Tax:** This tax is added to the price of a share. It is levied every time you buy or sell shares.
- **Perquisite Tax:** This tax is levied is on perks that have been acquired by a company or used by an employee.
- Corporate Tax: Corporate tax is paid by companies from the revenue they earn.

#### Indirect Tax

Indirect taxes are levied on goods or services. Some examples of Indirect Taxes are:

- Sales Tax: Sales Tax is levied on the sale of a product.
- Service Tax: Service Tax is added to services provided in India.
- Value Added Tax: Value Added Tax is levied at the discretion of the state government. The tax is levied on goods sold in the state. The tax amount is decided by the state.
- **Customs Duty & Octroi:** Customs Duty is a charge that is applied on purchases that are imported from another country. Octroi is levied on goods that cross state borders within India.
- Excise Duty: Excise Duty is levied on all goods manufactured or produced in India

# Tips



- Think about how quickly you need your money back and pick an investment option accordingly.
- Ensure that you are buying the right type of insurance policy for yourself.
- Remember, not paying taxes can result in penalties ranging from fines to imprisonment.

### 8.3.5 Online Banking, NEFT, RTGS etc.

#### What is Online Banking?

Internet or online banking allows account holders to access their account from a laptop at any location. In this way, instructions can be issued. To access an account, account holders simply need to use their unique customer ID number and password.

Internet banking can be used to:

- Find out an account balance
- Transfer amounts from one account to another
- Arrange for the issuance of cheques
- Instruct payments to be made
- Request for a cheque book
- Request for a statement of accounts
- Make a fixed deposit

#### **Electronic Funds Transfers**

Electronic funds transfer is a convenient way of transferring money from the comfort of one's own home, using integrated banking tools like internet and mobile banking.

Transferring funds via an electronic gateway is extremely convenient. With the help of online banking, you can choose transferring funds:

- Into your accounts of the same bank.
- Into other people's accounts of the same bank.
- Into accounts in different banks through NEFT.
- Into other bank accounts though RTGS.
- Into various accounts through IMPS.

#### **NEFT**

NEFT stands for National Electronic Funds Transfer. This money transfer system allows you to electronically transfer funds from your respective bank accounts to any other account, either in the same bank or belonging to any other bank. NEFT can be used by individuals, firms and corporate organizations to transfer funds between accounts.

In order to transfer funds via NEFT, two things are required:

- A transferring bank
- A destination bank

Before you can transfer funds through NEFT, you will need to register the beneficiary who will be receiving the funds. In order to complete this registration, you will require the following information:

- Recipient's name
- Recipient's account number
- Recipient's bank's name
- Recipient's bank's IFSC code

#### **RTGS**

RTGS stands for Real Time Gross Settlement. This is a real time funds transfer system which enables you to transfer funds from one bank to another, in real time or on a gross basis. The transferred amount is immediately deducted from the account of one bank, and instantly credited to the other bank's account. The RTGS payment gateway is maintained by the Reserve Bank of India. The transactions between banks are made electronically.

RTGS can be used by individuals, companies and firms to transfer large sums of money. Before remitting funds through RTGS, you will need to add the beneficiary and his bank account details via your online banking account.

In order to complete this registration, you will require the following information:

- Name of the beneficiary
- Beneficiary's account number
- Beneficiary's bank address
- Bank's IFSC code

#### **IMPS**

IMPS stands for Immediate Payment Service. This is a real-time, inter-bank, electronic funds transfer system used to transfer money instantly within banks across India. IMPS enables users to make instant electronic transfer payments using mobile phones through both, Mobile Banking and SMS. It can also be used through ATMs and online banking. IMPS is available 24 hours a day and 7 days a week. The system features a secure transfer gateway and immediately confirms orders that have been fulfilled.

To transfer money through IMPS, you need to:

- Register for IMPS with your bank
- Receive a Mobile Money Identifier (MMID) from the bank
- Receive a MPIN from the bank

Once you have both these, you can login or make a request through SMS to transfer a particular amount to a beneficiary.

In order for the beneficiary to receive the transferred money, he must:

- Link his mobile number with his respective account
- Receive the MMID from the bank

In order to initiate a money transfer through IMPS, you will need to enter the following information:

- The beneficiary's mobile number
- The beneficiary's MMID
- The transfer amount
- Your MPIN

As soon as money has been deducted from your account and credited into the beneficiary's account, you will be sent a confirmation SMS with a transaction reference number, for future reference.

### -8.3.5.1 Differences between NEFT, RTGS & IMPS

Criteria	NEFT	RTGS	IMPS
Settlement	Done in batches	Real-time	Real-time
Full form	National Electronic Fund Transfer	Real Time Gross Settlement	Immediate Payment Service
Timings on Monday  – Friday	8:00 am – 6:30 pm	9:00 am – 4:30 pm	24x7
Timings on Saturday	8:00 am – 1:00 pm	9:00 am – 1:30 pm	24x7
Minimum amount of money transfer limit	₹1	₹2 lacs	₹1
Maximum amount of money transfer limit	₹10 lacs	₹10 lacs per day	₹2 lacs
Maximum charges as per RBI	Up to 10,000 – ₹2.5 above 10,000 – 1 lac - ₹5 above 1 – 2 lacs ₹15 above 2 – 5 lacs ₹25 above 5 – 10 lacs ₹25	above 2 – 5 lacs ₹25 above 5 – 10 lacs ₹50	Up to 10,000 -₹5 above 10,000 -1 lac -₹5 above 1 - 2 lacs -₹15

Fig.8.3.2: Differences Between NEFT, RTGS & IMPS

# Tips



- Never click on any links in any e-mail message to access your online banking website.
- You will never be asked for your credit or debit card details while using online banking.
- Change your online banking password regularly.

### **UNIT 8.4: Preparing for Employment & Self-Employment**

# Unit Objectives 6



#### At the end of this unit, you will be able to:

- 1. Discuss the steps to prepare for an interview
- 2. Discuss the steps to create an effective Resume
- 3. Discuss the most frequently asked interview questions
- 4. Discuss how to answer the most frequently asked interview questions
- 5. Discuss basic workplace terminology

### -8.4.1 Interview Preparation: How to Prepare for an Interview?

The success of your getting the job that you want depends largely on how well your interview for that job goes. Therefore, before you go in for your interview, it is important that you prepare for it with a fair amount of research and planning. Take a look at the steps to follow in order to be well prepared for an interview:

- Research the organization that you are having the interview with.
  - Studying the company beforehand will help you be more prepared at the time of the interview. Your knowledge of the organization will help you answer questions at the time of the interview, and will leave you looking and feeling more confident. This is sure to make you stand out from other, not as well informed, candidates.
  - Look for background information on the company. Ty and find an overview of the company and its industry profile.
  - Visit the company website to get a good idea of what the company does. A company website offers a wealth of important information. Read and understand the company's mission statement. Pay attention to the company's products/services and client list. Read through any press releases to get an idea of the company's projected growth and stability.
  - Note down any questions that you have after your research has been completed.
- 2. Think about whether your skills and qualifications match the job requirements.
  - Carefully read through and analyse the job description.
  - Make a note of the knowledge, skills and abilities required to fulfil the job requirements.
  - Take a look at the organization hierarchy. Figure out where the position you are applying for fits into this hierarchy.

#### 3. Go through the most typical interview questions asked, and prepare your responses.

- Remember, in most interviews a mix of resume-based, behavioural and case study questions are asked.
- Think about the kind of answers you would like to provide to typical questions asked in these three areas.
- Practice these answers until you can express them confidently and clearly.

#### 4. Plan your attire for the interview.

- It is always safest to opt for formal business attire, unless expressly informed to dress in business casual (in which case you should use your best judgement).
- Ensure that your clothes are clean and well-ironed. Pick neutral colours nothing too bright or flashy.
- The shoes you wear should match your clothes, and should be clean and suitable for an interview.
- Remember, your aim is to leave everyone you meet with the impression that you are a professional and highly efficient person.

#### 5. Ensure that you have packed everything that you may require during the interview.

- Carry a few copies of your resume. Use a good quality paper for your resume print outs.
- Always take along a notepad and a pen.
- Take along any information you may need to refer to, in order to fill out an application form.
- Carry a few samples of your work, if relevant.

#### 6. Remember the importance of non-verbal communication.

- Practice projecting confidence. Remind yourself to smile and make eye contact. Practice giving a firm handshake.
- Keep in mind the importance of posture. Practice sitting up straight. Train yourself to stop nervous gestures like fidgeting and foot-tapping.
- Practice keeping your reactions in check. Remember, your facial expressions provide a good insight into your true feelings. Practice projecting a positive image.

#### 7. Make a list of questions to end the interview with.

- Most interviews will end with the interviewer(s) asking if you have any questions.
   This is your chance to show that you have done your research and are interested in learning more about the company.
- If the interviewer does not ask you this question, you can inform him/her that you have some queries that you would like to discuss. This is the time for you to refer to the notes you made while studying the company.
- Some good questions to ask at this point are:
  - O What do you consider the most important criteria for success in this job?
  - o How will my performance be evaluated?
  - O What are the opportunities for advancement?
  - O What are the next steps in the hiring process?
- Remember, never ask for information that is easily available on the company website.

# Tips



- Ask insightful and probing questions.
- When communicating, use effective forms of body language like smiling, making eye contact, and actively listening and nodding. Don't slouch, play with nearby items, fidget, chew gum, or mumble.

# 8.4.2 Preparing an Effective Resume

A resume is a formal document that lists a candidate's work experience, education and skills. A good resume gives a potential employer enough information to believe the applicant is worth interviewing. That's why it is so important to create a résumé that is effective. Take a look at the steps to create an effective resume:

#### **Step 1: Write the Address Section**

The Address section occupies the top of your resume. It includes information like your name, address, phone number and e-mail address. Insert a bold line under the section to separate it from rest of your resume.

#### **Example:**

**Jasmine Watts** 

Breach Candy, Mumbai – India Contact No: +91 2223678270 Email: jasmine.watts@gmail.com

#### **Step 2: Add the Profile Summary Section**

This part of your resume should list your overall experiences, achievements, awards, certifications and strengths. You can make your summary as short as 2-3 bullet points or as long as 8-10 bullet points.

#### **Example:**

#### **Profile Summary**

- A Content Writer graduated from University of Strathclyde having 6 years of experience in writing website copy.
- Core expertise lies in content creation for e-learning courses, specifically for the K-12 segment.

#### **Step 3: Include Your Educational Qualifications**

When listing your academic records, first list your highest degree. Then add the second highest qualification under the highest one and so on. To provide a clear and accurate picture of your educational background, it is critical that include information on your position, rank, percentage or CPI for every degree or certification that you have listed.

If you have done any certifications and trainings, you can add a Trainings & Certifications section under your Educational Qualifications section.

#### **Example:**

#### **Educational Qualifications**

- Masters in International Management (2007) from Columbia University with 8.8 CPI.
- Bachelor of Management Studies (2004) from Mumbai University with 87% marks.
- 10+2 with Math, Stats (2001) from Maharashtra Board with 91% marks.
- High School (1999) from Maharashtra Board with 93% marks.

#### Step 4: List Your Technical Skills

When listing your technical skills, start with the skills that you are most confident about. Then add the skills that you do not have as good a command over. It is perfectly acceptable to include just one skill, if you feel that particular skill adds tremendous value to your résumé. If you do not have any technical skills, you can omit this step.

#### **Example:**

#### **Technical Skills**

- Flash
- Photoshop

#### Step 5: Insert Your Academic Project Experience

List down all the important projects that you have worked on. Include the following information in this section:

- Project title
- Organization
- Platform used

- Contribution
- Description

#### **Example:**

#### **Academic Projects**

**Project Title:** Different Communication Skills

**Organization**: True Blue Solutions

Platform used: Articulate

Contribution: Content writing and graphic visualization

**Description**: Development of storyboards for corporate induction & training programs

#### **Step 6: List Your Strengths**

This is where you list all your major strengths. This section should be in the form of a bulleted list.

#### **Example:**

#### Strengths

- Excellent oral, written and presentation skills
- Action-oriented and result-focused
- Great time management skills

#### **Step 7: List Your Extracurricular Activities**

It is very important to show that you have diverse interests and that your life consists of more than academics. Including your extracurricular activities can give you an added edge over other candidates who have similar academic scores and project experiences. This section should be in the form of a bulleted list.

#### **Example:**

#### **Extracurricular Activities**

- Member of the Debate Club
- Played tennis at a national level
- Won first prize in the All India Camel Contest, 2010

#### **Step 8: Write Your Personal Details**

The last section of your résumé must include the following personal information:

Date of birth

• Gender & marital status

Nationality

Languages known

#### **Example:**

Personal Details

Date of birth: 25<sup>th</sup> May, 1981
 Gender & marital status: Female, Single

Nationality: Indian

Languages known: English, Hindi, Tamil, French

# Tips

- Keep your resume file name short, simple and informational.
- Make sure the resume is neat and free from typing errors.
- Always create your resume on plain white paper.

### **8.4.3 Interview FAQs**

Take a look at some of the most frequently asked interview questions, and some helpful tips on how to answer them.

#### Q1. Can you tell me a little about yourself?

#### Tips to answer:

- Don't provide your full employment or personal history.
- Offer 2-3 specific experiences that you feel are most valuable and relevant.
- Conclude with how those experiences have made you perfect for this specific role.

#### Q2. How did you hear about the position?

#### Tips to answer:

- Tell the interviewer how you heard about the job whether it was through a friend (name the friend), event or article (name them) or a job portal (say which one).
- Explain what excites you about the position and what in particular caught your eye about this role.

#### Q3. What do you know about the company?

#### Tips to answer:

- Don't recite the company's About Us page.
- Show that you understand and care about the company's goals.
- Explain why you believe in the company's mission and values.

#### Q4. Why do you want this job?

#### Tips to answer:

- Show that you are passionate about the job.
- Identify why the role is a great fit for you.
- Explain why you love the company.

#### Q5. Why should we hire you?

#### Tips to answer:

- Prove through your words that you can not only do the work, but can definitely deliver excellent results.
- Explain why you would be a great fit with the team and work culture.
- Explain why you should be chosen over any other candidate.

#### Q6. What are your greatest professional strengths?

#### Tips to answer:

- Be honest share some of your real strengths, rather than give answers that you think sound good.
- Offer examples of specific strengths that are relevant to the position you are applying for.
- Provide examples of how you've demonstrated these strengths.

### Q7. What do you consider to be your weaknesses?

### Tips to answer:

- The purpose of this question is to gauge your self-awareness and honesty.
- Give an example of a trait that you struggle with, but that you're working on to improve.

### Q8. What are your salary requirements?

#### Tips to answer:

- Do your research beforehand and find out the typical salary range for the job you are applying for.
- Figure out where you lie on the pay scale based on your experience, education, and skills.
- Be flexible. Tell the interviewer that you know your skills are valuable, but that you want the job and are willing to negotiate.

### Q9. What do you like to do outside of work?

#### Tips to answer:

- The purpose of this question is to see if you will fit in with the company culture.
- Be honest open up and share activities and hobbies that interest and excite you.

### Q10. If you were an animal, which one would you want to be?

#### Tips to answer:

- The purpose of this question is to see if you are able to think on your feet.
- There's no wrong answer but to make a great impression try to bring out your strengths or personality traits through your answer.

### Q11: What do you think we could do better or differently?

### Tips to answer:

- The purpose of this question is to see if you have done your research on the company, and to test whether you can think critically and come up with new ideas.
- Suggest new ideas. Show how your interests and expertise would help you execute these ideas.

### Q12: Do you have any questions for us?

### Tips to answer:

- Do not ask questions to which the answers can be easily found on the company website or through a quick online search.
- Ask intelligent questions that show your ability to think critically.

# Tips



- Be honest and confident while answering.
- Use examples of your past experiences wherever possible to make your answers more impactful.

### 8.4.4 Work Readiness – Terms & Terminologies

Every employee should be well versed in the following terms:

- Annual leave: Paid vacation leave given by employers to employees.
- **Background Check:** A method used by employers to verify the accuracy of the information provided by potential candidates.
- **Benefits:** A part of an employee's compensation package.
- **Breaks:** Short periods of rest taken by employees during working hours.
- **Compensation Package:** The combination of salary and benefits that an employer provides to his/her employees.
- Compensatory Time (Comp Time): Time off in lieu of pay.
- **Contract Employee:** An employee who works for one organization that sells said employee's service to another company, either on a project or time basis.
- **Contract of Employment:** When an employee is offered work in exchange for wages or salary, and accepts the offer made by the employer, a contract of employment exists.
- **Corporate Culture:** The beliefs and values shared by all the members of a company, and imparted from one generation of employees to another.
- **Counter Offer/Counter Proposal:** A negotiation technique used by potential candidates to increase the amount of salary offered by a company.
- **Cover Letter:** A letter that accompanies a candidate's resume. It emphasizes the important points in the candidate's resume and provides real examples that prove the candidate's ability to perform the expected job role.
- **Curriculum Vitae (CV)/Resume:** A summary of a candidate's achievements, educational work experience, skills and strengths.
- **Declining Letter:** A letter sent by an employee to an employer, turning down the job offer employer to the employee.
- **Deductions:** Amounts subtracted from an employee's pay and listed on the employee's pay slip.
- **Discrimination:** The act of treating one person not as favourably as another person.
- **Employee:** A person who works for another person in exchange for payment.
- **Employee Training:** A workshop or in-house training that an employee is asked to attend by his or her superior, for the benefit of the employer.
- **Employment Gaps:** Periods of unemployed time between jobs.
- **Fixed-Term Contract:** A contract of employment which gets terminated on an agreed-upon date.
- **Follow-Up:** The act of contacting a potential employer after a candidate has submitted his or her resume.
- Freelancer/Consultant/Independent Contractor: A person who works for him or herself for temporary jobs and projects with different employers.
- Holiday: Paid time-off from work.
- **Hourly Rate**: The amount of salary or wages paid for 60 minutes of work.

- **Internship**: A job opportunity offered by an employer to a potential employee, called an at the employer's company for a fixed, limited time period.
- **Interview**: A conversation between a potential employee and a representative of an order to determine if the potential employee should be hired.
- **Job Application**: A form which asks for a candidate's information like the candidate's name, details and work experience. The purpose of a candidate submitting a job application, is to show that candidate's interest in working for a particular company.
- Job Offer: An offer of employment made by an employer to a potential employee.
- **Job Search Agent**: A program that enables candidates to search for employment opportunities by selecting criteria listed in the program, for job vacancies. background, made by the and pitches intern, to work employer, in address, contact
- Lay Off: A lay off occurs when an employee is temporarily let go from his or her job, due to the employer not having any work for that employee.
- **Leave**: Formal permission given to an employee, by his or her employer, to take a leave of absence from work.
- **Letter of Acceptance**: A letter given by an employer to an employee, confirming the offer of employment made by the employer, as well as the conditions of the offer.
- Letter of Agreement: A letter that outlines the terms of employment.
- Letter of Recommendation: A letter written for the purpose of validating the work skills of a person.
- **Maternity Leave**: Leave taken from work by women who are pregnant, or who have just given birth.
- **Mentor**: A person who is employed at a higher level than you, who offers you advice and guides you in your career.
- Minimum wage: The minimum wage amount paid on an hourly basis.
- **Notice**: An announcement made by an employee or an employer, stating that the employment contract will end on a particular date.
- Offer of Employment: An offer made by an employer to a prospective employee that contains important information pertaining to the job being offered, like the starting date, salary, working conditions etc.
- **Open-Ended Contract**: A contract of employment that continues till the employer or terminates it.
- **Overqualified**: A person who is not suited for a particular job because he or she has too m any years of work experience, or a level of education that is much higher than required f or the job, or is currently or was previously too highly paid.
- **Part-Time Worker**: An employee who works for fewer hours than the standard number of hours normally worked.
- Paternity Leave: Leave granted to a man who has recently become a father.
- Recruiters/Head-hunters/Executive Search Firms: Professionals who are paid by employers to search for people to fill particular positions.
- **Resigning/Resignations**: When an employee formally informs his or her employer that he or she is quitting his or her job.

- **Self-Employed**: A person who has his or her own business and does not work in the capacity of an employee.
- **Time Sheet**: A form that is submitted to an employer, by an employee, that contains the number of hours worked every day by the employee.

## **UNIT 8.5: Understanding Entrepreneurship**

# Unit Objectives 6



### At the end of this unit, you will be able to:

- 1. Discuss the concept of entrepreneurship
- 2. Discuss the importance of entrepreneurship
- 3. Describe the characteristics of an entrepreneur
- 4. Describe the different types of enterprises
- 5. List the qualities of an effective leader
- 6. Discuss the benefits of effective leadership
- 7. List the traits of an effective team
- 8. Discuss the importance of listening effectively
- 9. Discuss how to listen effectively
- 10. Discuss the importance of speaking effectively
- 11. Discuss how to speak effectively
- 12. Discuss how to solve problems
- 13. List important problem solving traits
- 14. Discuss ways to assess problem solving skills
- 15. Discuss the importance of negotiation
- 16. Discuss how to negotiate
- 17. Discuss how to identify new business opportunities
- 18. Discuss how to identify business opportunities within your business
- 19. Understand the meaning of entrepreneur
- 20. Describe the different types of entrepreneurs
- 21. List the characteristics of entrepreneurs
- 22. Recall entrepreneur success stories
- 23. Discuss the entrepreneurial process
- 24. Describe the entrepreneurship ecosystem
- 25. Discuss the government's role in the entrepreneurship ecosystem
- 26. Discuss the current entrepreneurship ecosystem in India
- 27. Understand the purpose of the Make in India campaign
- 28. Discuss the relationship between entrepreneurship and risk appetite
- 29. Discuss the relationship between entrepreneurship and resilience
- 30. Describe the characteristics of a resilient entrepreneur
- 31. Discuss how to deal with failure

### **8.5.1 Concept Introduction**

Anyone who is determined to start a business, no matter what the risk, is an entrepreneur. Entrepreneurs run their own start-up, take responsibility for the financial risks and use creativity, innovation and vast reserves of self-motivation to achieve success. They dream big and are determined to do whatever it takes to turn their idea into a viable offering. The aim of an entrepreneur is to create an enterprise. The process of creating this enterprise is known as entrepreneurship.

## 8.5.1.1 Importance of Entrepreneurship

Entrepreneurship is very important for the following reasons:

- 1. It results in the creation of new organizations
- 2. It brings creativity into the marketplace
- 3. It leads to improved standards of living
- 4. It helps develop the economy of a country

### -8.5.1.2 Characteristics of Entrepreneurs

All successful entrepreneurs have certain characteristics in common.

### They are all:

- Extremely passionate about their work
- Confident in themselves
- Disciplined and dedicated
- Motivated and driven
- Highly creative
- Visionaries
- Open-minded
- Decisive

Entrepreneurs also have a tendency to:

- Have a high-risk tolerance
- Thoroughly plan everything
- Manage their money wisely
- Make their customers their priority
- Understand their offering and their market in detail
- Ask for advice from experts when required
- Know when to cut their losses

### 8.5.1.3 Examples of Famous Entrepreneurs

Some famous entrepreneurs are:

- Bill Gates (Founder of Microsoft)
- Steve Jobs (Co-founder of Apple)
- Mark Zuckerberg (Founder of Facebook)
- Pierre Omidyar (Founder of eBay)

### **8.5.1.4 Types of Enterprises**

As an entrepreneur in India, you can own and run any of the following types of enterprises:

### **Sole Proprietorship**

In a sole proprietorship, a single individual owns, manages and controls the enterprise. This type of business is the easiest to form with respect to legal formalities. The business and the owner have no separate legal existence. All profit belongs to the proprietor, as do all the losses the liability of the entrepreneur is unlimited.

### **Partnership**

A partnership firm is formed by two or more people. The owners of the enterprise are called partners. A partnership deed must be signed by all the partners. The firm and its partners have no separate legal existence. The profits are shared by the partners. With respect to losses, the liability of the partners is unlimited. A firm has a limited life span and must be dissolved when any one of the partners dies, retires, claims bankruptcy or goes insane.

### **Limited Liability Partnership (LLP)**

In a Limited Liability Partnership or LLP, the partners of the firm enjoy perpetual existence as well as the advantage of limited liability. Each partner's liability is limited to their agreed contribution to the LLP. The partnership and its partners have a separate legal existence.

# Tips



- Learn from others' failures.
- Be certain that this is what you want.
- Search for a problem to solve, rather than look for a problem to attach to your idea.

## 8.5.2 Leadership & Teamwork: Leadership and Leaders

Leadership means setting an example for others to follow. Setting a good example means not asking someone to do something that you wouldn't willingly want to do yourself. Leadership is about figuring out what to do in order to win as a team, and as a company.

Leaders believe in doing the right things. They also believe in helping others to do the right things. An effective leader is someone who:

- Creates an inspiring vision of the future.
- Motivates and inspires his team to pursue that vision.

### 8.5.2.1 Leadership Qualities That All Entrepreneurs Need

Building a successful enterprise is only possible if the entrepreneur in charge possesses excellent leadership qualities. Some critical leadership skills that every entrepreneur must have are:

- 1. **Pragmatism:** This means having the ability to highlight all obstacles and challenges, in order to resolve issues and reduce risks.
- 2. **Humility:** This means admitting to mistakes often and early, and being quick to take responsibility for your actions. Mistakes should be viewed as challenges to overcome, not opportunities to point blame.
- 3. **Flexibility:** It is critical for a good leader to be very flexible and quickly adapt to change. It is equally critical to know when to adapt and when not to.
- 4. **Authenticity:** This means showing both, your strengths and your weaknesses. It means being human and showing others that you are human.
- 5. **Reinvention:** This means refreshing or changing your leadership style when necessary. To do this, it's important to learn where your leadership gaps lie and find out what resources are required to close them.
- 6. **Awareness:** This means taking the time to recognize how others view you. It means understanding how your presence affects those around you.

# -8.5.2.2 Benefits of Effective Leadership

Effective leadership results in numerous benefits. Great leadership leads to the leader successfully:

- Gaining the loyalty and commitment of the team members
- Motivating the team to work towards achieving the company's goals and objectives
- Building morale and instilling confidence in the team members
- Fostering mutual understanding and team-spirit among team members
- Convincing team members about the need to change when a situation requires adaptability

### 8.5.2.3 Teamwork and Teams

Teamwork occurs when the people in a workplace combine their individual skills to pursue a common goal. Effective teams are made up of individuals who work together to achieve this common goal. A great team is one who holds themselves accountable for the end result.

### 8.5.2.4 Importance of Teamwork in Entrepreneurial Success

For an entrepreneurial leader, building an effective team is critical to the success of a venture. An entrepreneur must ensure that the team he builds possesses certain crucial qualities, traits and characteristics. An effective team is one which has:

- 1. **Unity of purpose:** All the team members should clearly understand and be equally committed to the purpose, vision and goals of the team.
- 2. **Great communication skills:** Team members should have the ability to express their concerns, ask questions and use diagrams, and charts to convey complex information.
- 3. **The ability to collaborate:** Every member should feel entitled to provide regular feedback on new ideas.
- 4. **Initiative:** The team should consist of proactive individuals. The members should have the enthusiasm to come up with new ideas, improve existing ideas, and conduct their own research.
- 5. **Visionary members:** The team should have the ability to anticipate problems and act on these potential problems before they turn into real problems.
- 6. **Great adaptability skills:** The team must believe that change is a positive force. Change should be seen as the chance to improve and try new things.
- 7. **Excellent organizational skills:** The team should have the ability to develop standard work processes, balance responsibilities, properly plan projects, and set in place methods to measure progress and ROI.

# Tips



- Don't get too attached to your original idea. Allow it to evolve and change.
- Be aware of your weaknesses and build a team that will complement your shortfalls.
- Hiring the right people is not enough. You need to promote or incentivize your most talented people to keep them motivated.
- Earn your team's respect.

### 8.5.3 Communication Skills

Listening is the ability to correctly receive and understand messages during the process of communication. Listening is critical for effective communication. Without effective listening skills, messages can easily be misunderstood. This results in a communication breakdown and can lead to the sender and the receiver of the message becoming frustrated or irritated.

It's very important to note that listening is not the same as hearing. Hearing just refers to sounds that you hear. Listening is a whole lot more than that. To listen, one requires focus. It means not only paying attention to the story, but also focusing on how the story is relayed, the way language and voice is used, and even how the speaker uses their body language. The ability to listen depends on how effectively one can perceive and understand both, verbal and non-verbal cues.

### 8.5.3.1 How to Listen Effectively?

To listen effectively you should:

- Stop talking
- Stop interrupting
- Focus completely on what is being said
- Nod and use encouraging words and gestures
- Be open-minded
- Think about the speaker's perspective
- Be very, very patient
- Pay attention to the tone that is being used
- Pay attention to the speaker's gestures, facial expressions and eye movements
- Not try and rush the person
- Not let the speaker's mannerisms or habits irritate or distract you

### 8.5.3.2 The Importance of Speaking Effectively

How successfully a message gets conveyed depends entirely on how effectively you are able to get it through. An effective speaker is one who enunciates properly, pronounces words correctly, chooses the right words and speaks at a pace that is easily understandable. Besides this, the words spoken out loud need to match the gestures, tone and body language used.

What you say, and the tone in which you say it, results in numerous perceptions being formed. A person who speaks hesitantly may be perceived as having low self-esteem or lacking in knowledge of the discussed topic. Those with a quiet voice may very well be labelled as shy. And those who speak in commanding tones with high levels of clarity, are usually considered to be extremely confident. This makes speaking a very critical communication skill.

# 8.5.3.3 How to Speak Effectively?

To speak effectively you should:

- Incorporate body language in your speech like eye contact, smiling, nodding, gesturing etc.
- Build a draft of your speech before actually making your speech.
- Ensure that all your emotions and feelings are under control.
- Pronounce your words distinctly with the correct pitch and intensity. Your speech should
  be crystal clear at all times. Use a pleasant and natural tone when speaking. Your
  audience should not feel like you are putting on an accent or being unnatural in any way.
- Use precise and specific words to drive your message home. Ambiguity should be avoided at all costs.
- Ensure that your speech has a logical flow.

- Be brief. Don't add any unnecessary information.
- Make a conscious effort to avoid irritating mannerisms like fidgeting, twitching etc.
- Choose your words carefully and use simple words that the majority of the audience will have no difficulty understanding.
- Use visual aids like slides or a whiteboard.
- Speak slowly so that your audience can easily understand what you're saying. However, be careful not to speak too slowly because this can come across as stiff, unprepared or even condescending.
- Remember to pause at the right moments.

# Tips



- If you're finding it difficult to focus on what someone is saying, try repeating their words in your head.
- Always maintain eye contact with the person that you are communicating with, when speaking as well as listening. This conveys and also encourages interest in the conversation.

### -8.5.4 Problem Solving & Negotiation Skills

As per The Concise Oxford Dictionary (1995), a problem is, "A doubtful or difficult matter requiring a solution"

All problems contain two elements:

- 1. Goals
- 2. Obstacles

The aim of problem solving is to recognize the obstacles and remove them in order to achieve the goals.

### 8.5.4.1 How to Solve Problems?

Solving a problem requires a level of rational thinking. Here are some logical steps to follow when faced with an issue:

- Step 1: Identify the problem
- Step 2: Study the problem in detail
- Step 3: List all possible solutions
- Step 4: Select the best solution
- Step 5: Implement the chosen solution
- Step 6: Check that the problem has really been solved

### 8.5.4.2 Important Traits for Problem Solving

Highly developed problem-solving skills are critical for both, business owners and their employees. The following personality traits play a big role in how effectively problems are solved:

- Being open minded
- Asking the right questions
- Being proactive
- Not panicking
- Having a positive attitude
- Focusing on the right problem

### 8.5.4.3 How to Assess for Problem Solving Skills?

As an entrepreneur, it would be a good idea to assess the level of problem solving skills of potential candidates before hiring them. Some ways to assess this skill are through:

- 1. **Application forms:** Ask for proof of the candidate's problem solving skills in the application form.
- 2. **Psychometric tests:** Give potential candidates logical reasoning and critical thinking tests and see how they fare.
- 3. **Interviews:** Create hypothetical problematic situations or raise ethical questions and see how the candidates respond.
- 4. **Technical questions:** Give candidates examples of real life problems and evaluate their thought process.

# 8.5.4.4 What is Negotiation?

Negotiation is a method used to settle differences. The aim of negotiation is to resolve differences through a compromise or agreement while avoiding disputes. Without negotiation, conflicts are likely to lead to resentment between people. Good negotiation skills help satisfy both parties and go a long way towards developing strong relationships.

### Why Negotiate?

Starting a business requires many, many negotiations. Some negotiations are small while others are critical enough to make or break a start-up. Negotiation also plays a big role inside the workplace. As an entrepreneur, you need to know not only know how to negotiate yourself, but also how to train employees in the art of negotiation.

### How to Negotiate?

Take a look at some steps to help you negotiate:

- Step 1: Pre-Negotiation Preparation: Agree on where to meet to discuss the problem, decide who all will be present and set a time limit for the discussion.
- Step 2: Discuss the problem: This involves asking questions, listening to the other side, putting your views forward and clarifying doubts.
- Step 3: Clarify the Objective: Ensure that both parties want to solve the same problem and reach the same goal.
- Step 4: Aim for a Win-Win Outcome: Try your best to be open minded when negotiating. Compromise and offer substitute solutions to arrive at an outcome where both win.
- Step 5: Clearly Define the Agreement: When an agreement has been reached, the details of the agreement should be crystal clear to both sides, with no scope for misunderstandings.
- Step 6: Implement the Agreed Upon Solution: Agree on a course of action to set the solution in motion.

# Tips



- Know exactly what you want before you work towards getting it
- Give more importance to listening and thinking, than speaking
- Focus on building a relationship rather than winning
- Remember that your people skills will affect the outcome
- Know when to walk away sometimes reaching an agreement may not be possible

# 8.5.5 Business Opportunities Identification

"The entrepreneur always searches for change, responds to it and exploits it as an opportunity."

Peter Drucker

The ability to find good business opportunities is an important characteristic of an entrepreneur.

### What is an Opportunity?

The word opportunity suggests a good chance or a favourable situation to do something offered by circumstances.

A business opportunity is typically a good/favourable change that can be used to run a business in a given environment, at a given point of time.

### **Common Questions Faced by Entrepreneurs**

A critical question that all entrepreneurs face is how to go about finding the business opportunity that is right for them.

Some common questions that entrepreneurs constantly think about are:

- Should the new enterprise introduce a new product or service based on an unmet need?
- Should the new enterprise select an existing product or service from one market and offer it in another where it may not be available?
- Should the enterprise be based on a tried and tested formula that has worked elsewhere?

It is therefore extremely important that entrepreneurs must learn how to identify new and existing business opportunities and evaluate their chances of success.

### When is an Idea an Opportunity?

An idea is an opportunity when:

- It creates or adds value to a customer
- It solves a significant problem, removes a pain point or meets a demand
- Has a robust market and profit margin
- Is a good fit with the founder and management team at the right time and place

### **Factors to Consider When Looking for Opportunities**

Consider the following when looking for business opportunities:

- Economic trends
- Changes in funding
- Changing relationships between vendors, partners and suppliers
- Market trends
- Changes in political support
- Shift in target audience

### Ways to Identify New Business Opportunities

- **Identify Market Inefficiencies:** When looking at a market, consider what inefficiencies are present in the market. Think about ways to correct these inefficiencies.
- **Remove Key Hassles:** Rather than create a new product or service, you can innovatively improve a product, service or process.
- **Create Something New:** Think about how you can create a new experience for customers, based on existing business models.
- **Pick a Growing Sector/Industry:** Research and find out which sectors or industries are growing and think about what opportunities you can tap in the same.
- Think About Product Differentiation: If you already have a product in mind, think about ways to set it apart from the existing ones.

### Ways to Identify Business Opportunities within Your Business

### 1. SWOT Analysis

An excellent way to identify opportunities inside your business is by creating a SWOT analysis. The acronym SWOT stands for strengths, weaknesses, opportunities, and threats. SWOT analysis framework:

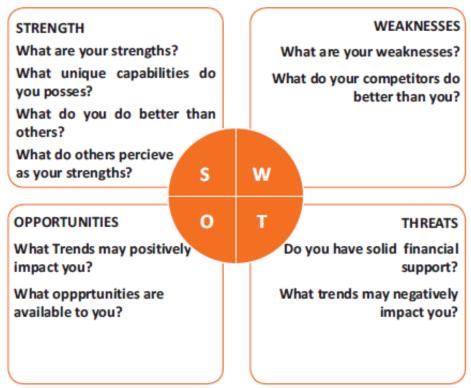


Fig.8.5.1. SWOT Analysis

### Consider the following when looking for business opportunities:

By looking at yourself and your competitors using the SWOT framework, you can uncover opportunities that you can exploit, as well as manage and eliminate threats that could derail your success.

### 2. Establishing Your USP

Establish your USP in such a way that positions you differently from your competitors. Identify the uniqueness about your product that will motivate customers to buy from you and then promote that reason.

### **Opportunity Analysis**

Once you have identified an opportunity, you need to analyse it. To analyse an opportunity, you must:

- Focus on the idea
- Focus on the market of the idea
- Talk to industry leaders in the same space as the idea
- Talk to players in the same space as the idea

# Tips

- Remember, opportunities are situational.
- Look for a proven track record.
- Avoid the latest craze.
- Love your idea.

### 8.5.6 Entrepreneurship Support Eco-System

An entrepreneur is a person who:

- Does not work for an employee
- Runs a small enterprise
- Assumes all the risks and rewards of the enterprise, idea, good or service

### **Types of Entrepreneurs**

There are four main types of entrepreneurs:

- 1. The Traditional Entrepreneur: This type of entrepreneur usually has some kind of skill they can be a carpenter, mechanic, cook etc. They have businesses that have been around for numerous years like restaurants, shops and carpenters. Typically, they gain plenty of experience in a particular industry before they begin their own business in a similar field.
- 2. **The Growth Potential Entrepreneur:** The desire of this type of entrepreneur is to start an enterprise that will grow, win many customers and make lots of money. Their ultimate aim is to eventually sell their enterprise for a nice profit. Such entrepreneurs usually have a science or technical background.
- 3. **The Project-Oriented Entrepreneur:** This type of entrepreneur generally has a background in the Arts or psychology. Their enterprises tend to be focus on something that they are very passionate about.
- 4. **The Lifestyle Entrepreneur:** This type of entrepreneur has usually worked as a teacher or a secretary. They are more interested in selling something that people will enjoy, rather than making lots of money.

#### Characteristics of an Entrepreneur

Successful entrepreneurs have the following characteristics:

- They are highly motivated
- They are creative and persuasive
- They are mentally prepared to handle each and every task
- They have excellent business skills they know how to evaluate their cash flow, sales and revenue

- They are willing to take great risks
- They are very proactive this means they are willing to do the work themselves, rather than wait for someone else to do it
- They have a vision they are able to see the big picture
- They are flexible and open-minded
- They are good at making decisions

### **8.5.6.1 Entrepreneur Success Stories**

#### Dhiru Bhai Ambani

Dhirubhai Ambani began his entrepreneurial career by selling "bhajias" to pilgrims in Mount Girnar on weekends. At 16, he moved to Yemen where he worked as a gas-station attendant, and as a clerk in an oil company. He returned to India with Rs. 50,000 and started a textile trading company. Reliance went on to become the first Indian company to raise money in global markets and the first Indian company to feature in Forbes 500 list.

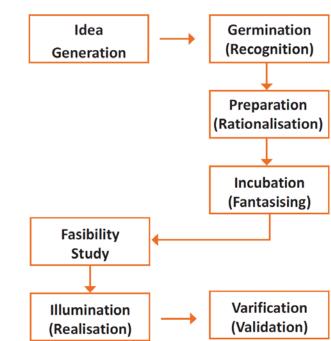
#### Dr. Karsanbhai Patel

Karsanbhai Patel made detergent powder in the backyard of his house. He sold his product door-to door and offered a money back guarantee with every pack that was sold. He charged Rs.3 per kg when the cheapest detergent at that time was Rs.13 per kg. Dr. Patel eventually started Nirma which became a whole new segment in the Indian domestic detergent market.

# 8.5.6.2 The Entrepreneurial Process

Let's take a look at the stages of the entrepreneurial process.

- **Stage 1:** Idea Generation. The entrepreneurial process begins with an idea that has been thought of by the entrepreneur. The idea is a problem that has the potential to be solved.
- **Stage 2:** Germination or Recognition. In this stage a possible solution to the identified problem is thought of.
- **Stage 3:** Preparation or Rationalization. The problem is studied further and research is done to find out how others have tried to solve the same problem.
- **Stage 4:** Incubation or Fantasizing. This stage involves creative thinking for the purpose of coming up with more ideas. Less thought is given to the problem areas.
- **Stage 5:** Feasibility Study: The next step is the creation of a feasibility study to determine if the idea will make a profit and if it should be seen through.
- **Stage 6:** Illumination or Realization. This is when all uncertain areas suddenly become clear. The entrepreneur feels confident that his idea has merit.
- **Stage 7:** Verification or Validation. In this final stage, the idea is verified to see if it works and if it is useful.



Take a look at the diagram below to get a better idea of this process.

Fig.8.5.2: Stages of the entrepreneurial process

### 8.5.6.3 What is an Entrepreneur?

The entrepreneurship support ecosystem signifies the collective and complete nature of entrepreneurship. New companies emerge and flourish not only because of the courageous, visionary entrepreneurs who launch them, but they thrive as they are set in an environment or 'ecosystem' made of private and public participants. These players nurture and sustain the new ventures, facilitating the entrepreneurs' efforts. An entrepreneurship ecosystem comprises of the following six domains:

- 1. **Favourable Culture:** This includes elements such as tolerance of risk and errors, valuable networking and positive social standing of the entrepreneur.
- 2. **Facilitating Policies & Leadership:** This includes regulatory framework incentives and existence of public research institutes.
- 3. **Financing Options:** Angel financing, venture capitalists and micro loans would be good examples of this.
- 4. **Human Capital:** This refers to trained and untrained labour, entrepreneurs and entrepreneurship training programmes, etc.
- 5. **Conducive Markets for Products & Services:** This refers to an existence or scope of existence of a market for the product/service.
- 6. **Institutional & Infrastructural Support:** This includes legal and financing advisers, telecommunications, digital and transportation infrastructure, and entrepreneurship networking programmes.

These domains indicate whether there is a strong entrepreneurship support ecosystem and what actions should the government put in place to further encourage this ecosystem.

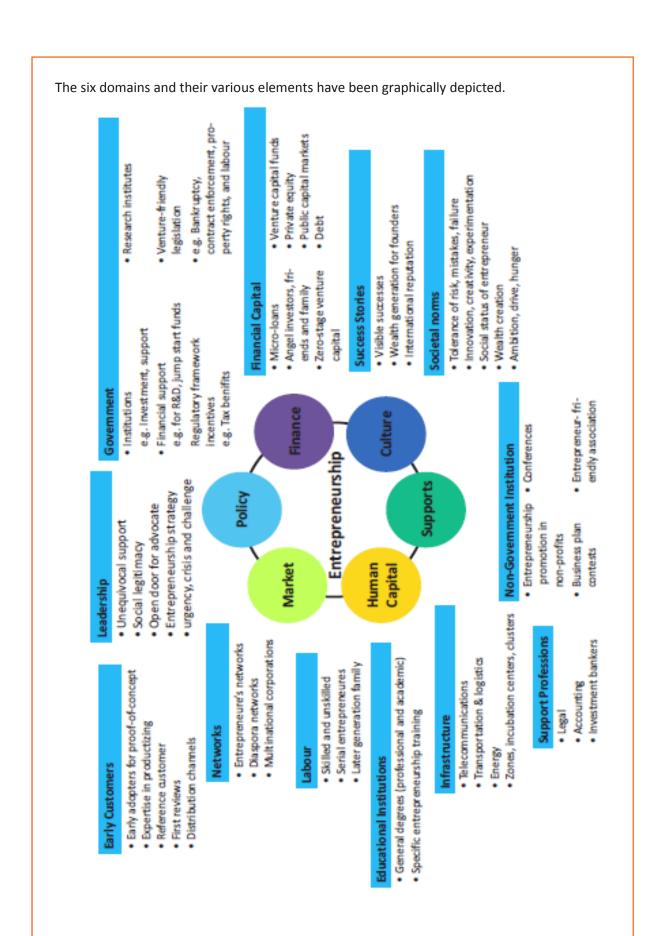


Fig.8.5.3. Entrepreneurship at a Glance

Every entrepreneurship support ecosystem is unique and all the elements of the ecosystem are interdependent. Although every region's entrepreneurship ecosystem can be broadly described by the above features, each ecosystem is the result of the hundred elements interacting in highly complex and particular ways.

Entrepreneurship ecosystems eventually become (largely) self-sustaining. When the six domains are resilient enough, they are mutually beneficial. At this point, government involvement can and should be significantly minimized. Public leaders do not need to invest a lot to sustain the ecosystem. It is imperative that the entrepreneurship ecosystem incentives are formulated to be self-liquidating, hence focusing on sustain ability of the environment.

# 8.5.6.4 Government's Role in the Entrepreneurship Ecosystem

Encouraging new ventures is a major focus for policymakers. Governments across the world are recognizing that new businesses flourish in distinctive types of supportive environments. Policymakers should study the scenario and take into account the following points whilst they formulate policies and regulations that enable successful entrepreneurship support ecosystems.

- Policymakers should avoid regulations that discourage new entrants and work towards building efficient methods for business startups. Policies and regulations which help existing, leading firms over entrepreneurial ventures, limit competition and obstruct growth/formation of new companies.
- Therefore, in place of developing policies that are intended to improve market failures, policymakers should interact with entrepreneurs and understand the challenges faced by them. The feedback is used to develop policies which encourage exploring ideas, developing new products and increase the rates of deal flow.
- Entrepreneurial supporters ideally need to create a database that enables identifying who the members in the ecosystem are and how they are connected. The ecosystem database are useful tools in developing engagement strategies.
- Disruptions are inevitable in economic as well as social life. However, it's important to
  note that economic disruption gives rise to entrepreneurial opportunities. Architects of
  the entrepreneurship ecosystems (entrepreneurs, mentors, policymakers and
  consumers,) should anticipate these dips, thus capitalizing on the opportunities they
  create.

# 8.5.6.5 Snapshot of the Entrepreneurship Ecosystem in India

Entrepreneurship has earned a newfound respect in India. Many Indians, with exposure to the world of business, who traditionally would have opted for a job, are setting up their own ventures. Many elements of the entrepreneurship ecosystem are beginning to come together. For example, increase in venture capitalists, government schemes and incubators, academia industry linkages, and emerging clusters and support to rural economy.

All these initiatives are effective but there is a need to scale up and enrich the ecosystem further in the following ways:

- 1. We need to review our attitude towards failures and accept them as learning experiences.
- 2. We must encourage the educated to become entrepreneurs and provide students in schools and colleges with entrepreneurship skills.
- 3. Universities, research labs and the government need to play the role of enablers in the entrepreneurship support ecosystem.
- 4. Policymakers need to focus on reducing the obstacles such as corruption, red tape and bureaucracy.
- 5. We need to improve our legal systems and court international venture capital firms and bring them to India.
- 6. We must devise policies and methods to reach the secondary and tertiary towns in India, where people do not have access to the same resources available in the cities.

Today, there is a huge opportunity in this country to introduce innovative solutions that are capable of scaling up, and collaborating within the ecosystem as well as enriching it.

### 8.5.6.6 Make in India Campaign

Every entrepreneur has certain needs. Some of their important needs are:

- To easily get loans
- To easily find investors
- To get tax exemptions
- To easily access resources and good infrastructure
- To enjoy a procedure that is free of hassles and is quick
- To be able to easily partner with other firms

The Make in India campaign, launched by Prime Minister Modi aims to satisfy all these needs of young, aspiring entrepreneurs. Its objective is to:

- Make investment easy
- Support new ideas
- Enhance skill development
- Safeguard the ideas of entrepreneurs
- Create state-of-the-art facilities for manufacturing goods

# Tips 🖳

- Research the existing market, network with other entrepreneurs, venture capitalists, angel investors, and thoroughly review the policies in place to enable your entrepreneurship.
- Failure is a stepping stone and not the end of the road. Review yours and your peers' errors and correct them in your future venture.

• Be proactive in your ecosystem. Identify the key features of your ecosystem and enrich them to ensure self-sustainability of your entrepreneurship support ecosystem.

### 8.5.7 Risk Appetite & Resilience

#### **Entrepreneurship and Risk**

Entrepreneurs are inherently risk takers. They are path-makers not path-takers. Unlike a normal, cautious person, an entrepreneur would not think twice about quitting his job (his sole income) and taking a risk on himself and his idea.

An entrepreneur is aware that while pursuing his dreams, assumptions can be proven wrong and unforeseen events may arise. He knows that after dealing with numerous problems, success is still not guaranteed. Entrepreneurship is synonymous with the ability to take risks. This ability, called risk-appetite, is an entrepreneurial trait that is partly genetic and partly acquired.

### What is Risk Appetite?

Risk appetite is defined as the extent to which a company is equipped to take risk, in order to achieve its objectives. Essentially, it refers to the balance, struck by the company, between possible profits and the hazards caused by changes in the environment (economic ecosystem, policies, etc.). Taking on more risk may lead to higher rewards but have a high probability of losses as well. However, being too conservative may go against the company as it can miss out on good opportunities to grow and reach their objectives.

The levels of risk appetite can be broadly categorized as "low", "medium" and "high." The company's entrepreneur(s) need to assess all possible alternatives and choose the option most likely to succeed. Companies have varying levels of risk appetites for different objectives. The levels depend on:

- The type of industry
- Market pressures
- Company objectives

For example, a start-up with a revolutionary concept will have a very high risk appetite. The start-up can afford short term failures before it achieves longer term success. This type of appetite will not remain constant and will be adjusted to account for the present circumstances of the company.

#### **Risk Appetite Statement**

Companies have to define and articulate their risk appetite in sync with decisions made about their objectives and opportunities. The point of having a risk appetite statement is to have a framework that clearly states the acceptance and management of risk in business. It sets risk taking limits within the company. The risk appetite statement should convey the following:

- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- How much risk to accept in all the risk categories.
- The desired trade-off between risk and reward.

Measures of risk and methods of examining and regulating risk exposures.

### **Entrepreneurship and Resilience**

Entrepreneurs are characterized by a set of qualities known as resilience. These qualities play an especially large role in the early stages of developing an enterprise. Risk resilience is an extremely valuable characteristic as it is believed to protect entrepreneurs against the threat of challenges and changes in the business environment.

### What is Entrepreneurial Resilience?

Resilience is used to describe individuals who have the ability to overcome setbacks related to their life and career aspirations. A resilient person is someone who is capable of easily and quickly recovering from setbacks. For the entrepreneur, resilience is a critical trait. Entrepreneurial resilience can be enhanced in the following ways:

- By developing a professional network of coaches and mentors
- By accepting that change is a part of life
- By viewing obstacles as something that can be overcome

### **Characteristics of a Resilient Entrepreneur**

The characteristics required to make an entrepreneur resilient enough to go the whole way in their business enterprise are:

- A strong internal sense of control
- Ability to diversify and expand
- Strong social connections
- Survivor attitude
- Skill to learn from setbacks
- Cash-flow conscious habits
- Ability to look at the bigger picture
- Attention to detail

# Tips



- Cultivate a great network of clients, suppliers, peers, friends and family. This will not
  only help you promote your business, but will also help you learn, identify new
  opportunities and stay tuned to changes in the market.
- Don't dwell on setbacks. Focus on what you need to do next to get moving again.
- While you should try, and curtail expenses, ensure that it is not at the cost of your growth.

### 8.5.8 Success & Failures

### **Understanding Successes and Failures in Entrepreneurship**

Shyam is a famous entrepreneur, known for his success story. But what most people don't know, is that Shyam failed numerous times before his enterprise became a success. Read his interview to get an idea of what entrepreneurship is really about, straight from an entrepreneur who has both, failed and succeeded.

**Interviewer:** Shyam, I have heard that entrepreneurs are great risk-takers who are never afraid of failing. Is this true?

**Shyam:** Ha ha, no of course it's not true! Most people believe that entrepreneurs need to be fearlessly enthusiastic. But the truth is, fear is a very normal and valid human reaction, especially when you are planning to start your own business! In fact, my biggest fear was the fear of failing. The reality is, entrepreneurs fail as much as they succeed. The trick is to not allow the fear of failing to stop you from going ahead with your plans. Remember, failures are lessons for future success!

**Interviewer:** What, according to you, is the reason that entrepreneurs fail?

**Shyam:** Well, there is no one single reason why entrepreneurs fail. An entrepreneur can fail due to numerous reasons. You could fail because you have allowed your fear of failure to defeat you. You could fail because you are unwilling to delegate (distribute) work. As the saying goes, "You can do anything, but not everything!" You could fail because you gave up too easily — maybe you were not persistent enough. You could fail because you were focusing your energy on small, insignificant tasks and ignoring the tasks that were most important. Other reasons for failing are partnering with the wrong people, not being able to sell your product to the right customers at the right time at the right price... and many more reasons!

Interviewer: As an entrepreneur, how do you feel failure should be looked at?

**Shyam:** I believe we should all look at failure as an asset, rather than as something negative. The way I see it, if you have an idea, you should try to make it work, even if there is a chance that you will fail. That's because not trying is failure right there, anyway! And failure is not the worst thing that can happen. I think having regrets because of not trying, and wondering 'what if' is far worse than trying and actually failing.

**Interviewer:** How did you feel when you failed for the first time?

**Shyam:** I was completely heartbroken! It was a very painful experience. But the good news is, you do recover from the failure. And with every subsequent failure, the recovery process gets a lot easier. That's because you start to see each failure more as a lesson that will eventually help you succeed, rather than as an obstacle that you cannot overcome. You will start to realize that failure has many benefits.

**Interviewer:** Can you tell us about some of the benefits of failing?

**Shyam:** One of the benefits that I have experienced personally from failing is that the failure made me see things in a new light. It gave me answers that I didn't have before. Failure can make you a lot stronger. It also helps keep your ego in control.

**Interviewer:** What advice would you give entrepreneurs who are about to start their own enterprises?

**Shyam:** I would tell them to do their research and ensure that their product is something that is actually wanted by customers. I'd tell them to pick their partners and employees very wisely and cautiously. I'd tell them that it's very important to be aggressive — push and market your product as aggressively as possible. I would warn them that starting an enterprise is very expensive and that they should be prepared for a situation where they run out of money. I would tell them to create long term goals and put a plan in action to achieve that goal. I would tell them to build a product that is truly unique. Be very careful and ensure that you are not copying another start-up. Lastly, I'd tell them that it's very important that they find the right investors.

**Interviewer:** That's some really helpful advice, Shyam! I'm sure this will help all entrepreneurs to be more prepared before they begin their journey! Thank you for all your insight!

# Tips



- Remember that nothing is impossible.
- Identify your mission and your purpose before you start.
- Plan your next steps don't make decisions hastily.

# **UNIT 8.6: Preparing to be an Entrepreneur**

# **Unit Objectives**



### At the end of this unit, you will be able to:

- 1. Discuss how market research is carried out
- 2. Describe the 4 Ps of marketing
- 3. Discuss the importance of idea generation
- 4. Recall basic business terminology
- 5. Discuss the need for CRM
- 6. Discuss the benefits of CRM
- 7. Discuss the need for networking
- 8. Discuss the benefits of networking
- 9. Discuss the importance of setting goals
- 10. Differentiate between short-term, medium-term and long-term goals
- 11. Discuss how to write a business plan
- 12. Explain the financial planning process
- 13. Discuss ways to manage your risk
- 14. Describe the procedure and formalities for applying for bank finance
- 15. Discuss how to manage your own enterprise
- 16. List important questions that every entrepreneur should ask before starting an enterprise

# -8.6.1 Market Study/The 4 Ps of Marketing/Importance of an-**IDEA**

### **Understanding Market Research**

Market research is the process of gathering, analysing and interpreting market information on a product or service that is being sold in that market. It also includes information on:

- Past, present and prospective customers
- Customer characteristics and spending habits
- The location and needs of the target market
- The overall industry
- Relevant competitors

Market research involves two types of data:

- **Primary information.** This is research collected by yourself or by someone hired by you.
- Secondary information. This is research that already exists and is out there for you to find and use.

### **Primary research**

Primary research can be of two types:

- **Exploratory:** This is open-ended and usually involves detailed, unstructured interviews.
- Specific: This is precise and involves structured, formal interviews. Conducting specific

#### Secondary research

Secondary research uses outside information. Some common secondary sources are:

- **Public sources:** These are usually free and have a lot of good information. Examples are government departments, business departments of public libraries etc.
- **Commercial sources:** These offer valuable information but usually require a fee to be paid. Examples are research and trade associations, banks and other financial institutions etc.
- **Educational institutions:** These offer a wealth of information. Examples are colleges, universities, technical institutes etc.

### 8.6.1.1 The 4 Ps of Marketing

The 4 Ps of marketing are Product, Price, Promotion and Place.

Let's look at each of these 4 Ps in detail.

#### **Product**

A product can be tangible, like a good or intangible, like a service.

Whatever your product is, it is critical that you have a clear understanding of what you are offering, and what its unique characteristics are, before you begin with the marketing process.

Some questions to ask yourself are:

- What need does the customer have for the product/service?
- What needs does it satisfy?
- Are there any more features that can be added?
- Does it have any expensive and unnecessary features?
- How will customers use it?
- What should it be called?
- How is it different from similar products?
- How much will it cost to produce?
- Can it be sold at a profit?

#### **Price**

Once all the elements of Product have been established, the Price factor needs to be considered. The Price of a Product will depend on several factors such as profit margins, supply, demand and the marketing strategy.

Some typical questions to ask yourself include:

- What is the value of the product/service to customers?
- Do local products/services have established price points?
- Is the customer price sensitive?
- Should discounts be offered?
- How is your price compared to that of your competitors?

#### **Promotion**

Once you are certain about your Product and your Price, the next step is to look at ways to promote it. Some key elements of promotion are advertising, public relations, social media marketing, email marketing, search engine marketing, video marketing and more.

Some questions to ask yourself are:

- Where should you promote your product or service?
- What is the best medium to use to reach your target audience
- When would be the best time to promote your product?
- How are your competitors promoting their products?

#### **Place**

According to most marketers, the basis of marketing is about offering the right product, at the right price, at the right place, at the right time. For this reason, selecting the best possible location is critical for converting prospective clients into actual clients.

Some questions to ask yourself are:

- Will your product or service be looked for in a physical store, online or both?
- What should you do to access the most appropriate distribution channels?
- Will you require a sales force?
- Where are your competitors offering their products or services?
- Should you follow in your competitors' footsteps?
- Should you do something different from your competitors?

### Importance of an IDEA

Ideas are the foundation of progress. An idea can be small or ground-breaking, easy to accomplish or extremely complicated to implement. Whatever the case, the fact that it is an idea gives it merit. Without ideas, nothing is possible. Most people are afraid to speak out their ideas, out for fear of being ridiculed. However, if are an entrepreneur and want to remain competitive and innovative, you need to bring your ideas out into the light.

Some ways to do this are by:

- Establishing a culture of brainstorming where you invite all interested parties to contribute
- Discussing ideas out loud so that people can add their ideas, views, opinions to them

- Being open minded and not limiting your ideas, even if the idea who have seems ridiculous
- Not discarding ideas that you don't work on immediately, but instead making a note of them and shelving them so they can be revisited at a later date.

# Tips



- Keep in mind that good ideas do not always have to be unique.
- Remember that timing plays a huge role in determining the success of your idea.
- Situations and circumstances will always change, so be flexible and adapt your idea accordingly.

# 8.6.2 Business Entity Concepts: Basic Business Terminology

If your aim is to start and run a business, it is crucial that you have a good understanding of basic business terms. Every entrepreneur should be well versed in the following terms:

- **Accounting:** A systematic method of recording and reporting financial transactions.
- Accounts payable: Money owed by a company to its creditors.
- Accounts Receivable: The amount a company is owed by its clients.
- Assets: The value of everything a company owns and uses to conduct its business.
- **Balance Sheet:** A snapshot of a company's assets, liabilities and owner's equity at a given moment.
- **Bottom Line:** The total amount a business has earned or lost at the end of a month.
- **Business:** An organization that operates with the aim of making a profit.
- Business to Business (B2B): A business that sells goods or services to another business.
- **Business to Consumer (B2C):** A business that sells goods or services directly to the end user.
- **Capital:** The money a business has in its accounts, assets and investments. The two main types of capital are debt and equity.
- Cash Flow: The overall movement of funds through a business each month, including income and expenses.
- **Cash Flow Statement:** A statement showing the money that entered and exited a business during a specific period of time.
- **Contract:** A formal agreement to do work for pay.
- **Depreciation:** The degrading value of an asset over time.
- **Expense:** The costs that a business incurs through its operations.
- **Finance:** The management and allocation of money and other assets.
- Financial Report: A comprehensive account of a business' transactions and expenses.
- **Fixed Cost:** A one-time expense.

- **Income Statement (Profit and Loss Statement):** Shows the profitability of a business during a period of time.
- Liabilities: The value of what a business owes to someone else.
- Marketing: The process of promoting, selling and distributing a product or service.
- Net Income/Profit: Revenues minus expenses.
- Net Worth: The total value of a business.
- Payback Period: The amount of time it takes to recover the initial investment of a business.
- **Profit Margin:** The ratio of profit, divided by revenue, displayed as a percentage.
- **Return on Investment (ROI):** The amount of money a business gets as return from an investment.
- **Revenue:** The total amount of income before expenses are subtracted.
- Sales Prospect: A potential customer.
- **Supplier:** A provider of supplies to a business.
- Target Market: A specific group of customers at which a company's products and services are aimed.
- Valuation: An estimate of the overall worth of the business.
- Variable Cost: Expenses that change in proportion to the activity of a business.
- Working Capital: Calculated as current assets minus current liabilities.

### 8.6.3 CRM & Networking

#### What is CRM?

CRM stands for Customer Relationship Management. Originally the expression Customer Relationship Management meant managing one's relationship with customers. However, today it refers to IT systems and software designed to help companies manage their relationships.

### The Need for CRM

The better a company can manage its relationships with its customers, the higher the chances of the company's success. For any entrepreneur, the ability to successfully retain existing customers and expand the enterprise is paramount. This is why IT systems that focus on addressing the problems of dealing with customers on a daily basis are becoming more and more in demand.

Customer needs change over time, and technology can make it easier to understand what customers really want. This insight helps companies to be more responsive to the needs of their customers. It enables them to modify their business operations when required, so that their customers are always served in the best manner possible. Simply put, CRM helps companies recognize the value of their clients and enables them to capitalize on improved customer relations.

#### **Benefits of CRM**

CRM has a number of important benefits:

- It helps improve relations with existing customers which can lead to:
  - o Increased sales
  - Identification of customer needs
  - Cross-selling of products
- It results in better marketing of one's products or services
- It results in better marketing of one's products or services
- It enhances customer satisfaction and retention
- It improves profitability by identifying and focusing on the most profitable customers

### -8.6.3.1 What is Networking? -

In business, networking means leveraging your business and personal connections in order to bring in a regular supply of new business. This marketing method is effective as well as low cost. It is a great way to develop sales opportunities and contacts. Networking can be based on referrals and introductions, or can take place via phone, email, and social and business networking websites.

#### The Need for Networking

Networking is an essential personal skill for business people, but it is even more important for entrepreneurs. The process of networking has its roots in relationship building. Networking results in greater communication and a stronger presence in the entrepreneurial ecosystem. This helps build strong relationships with other entrepreneurs.

Business networking events held across the globe play a huge role in connecting like-minded entrepreneurs who share the same fundamental beliefs in communication, exchanging ideas and converting ideas into realities. Such networking events also play a crucial role in connecting entrepreneurs with potential investors. Entrepreneurs may have vastly different experiences and backgrounds but they all have a common goal in mind – they all seek connection, inspiration, advice, opportunities and mentors. Networking offers them a platform to do just that.

### **Benefits of Networking**

Networking offers numerous benefits for entrepreneurs. Some of the major benefits are:

- Getting high quality leads
- Increased business opportunities
- Good source of relevant connections
- Advice from like-minded entrepreneurs
- Gaining visibility and raising your profile
- Meeting positive and enthusiastic people

- Increased self-confidence
- Satisfaction from helping others
- Building strong and lasting friendships

# Tips



- Use social media interactions to identify needs and gather feedback.
- When networking, ask open-ended questions rather than yes/no type questions.

### 8.6.4 Business Plan: Why Set Goals?

Setting goals is important because it gives you long-term vision and short-term motivation. Goals can be short term, medium term and long term.

### **Short-Term Goals**

These are specific goals for the immediate future.

**Example:** Repairing a machine that has failed.

### **Medium-Term Goals**

- These goals are built on your short-term goals.
- They do not need to be as specific as your short-term goals.

**Example:** Arranging for a service contract to ensure that your machines don't fail again.

### **Long-Term Goals**

These goals require time and planning.

They usually take a year or more to achieve.

**Example:** Planning your expenses so you can buy new machinery

### Why Create a Business Plan?

A business plan is a tool for understanding how your business is put together. It can be used to monitor progress, foster accountable and control the fate of the business. It usually offers a 3-5year projection and outlines the plan that the company intends to follow to grow its revenues. A business plan is also a very important tool for getting the interest of key employees or future investors.

A business plan typically comprises of eight elements.

### 8.6.4.1 Elements of a Business Plan

### **Executive Summary**

The executive summary follows the title page. The summary should clearly state your desires as the business owner in a short and business like way. It is an overview of your business and your plans. Ideally this should not be more than 1-2 pages.

Your Executive Summary should include:

• The Mission Statement: Explain what your business is all about.

### **Example: Nike's Mission Statement**

Nike's mission statement is "To bring inspiration and innovation to every athlete in the world"

- **Company Information:** Provide information like when your business was formed, the names and roles of the founders, the number of employees, your business location(s) etc.
- **Growth Highlights:** Mention examples of company growth. Use graphs and charts where possible.
- Your Products/Services: Describe the products or services provided.
- Financial Information: Provide details on current bank and investors.
- Summarize future plans: Describe where you see your business in the future.

### **Business Description**

The second section of your business plan needs to provide a detailed review of the different elements of your business. This will help potential investors to correctly understand your business goal and the uniqueness of your offering.

Your Business Description should include:

- A description of the nature of your business
- The market needs that you are aiming to satisfy
- The ways in which your products and services meet these needs
- The specific consumers and organizations that you intend to serve
- Your specific competitive advantages

### **Market Analysis**

The market analysis section usually follows the business description. The aim of this section is to showcase your industry and market knowledge. This is also the section where you should lay down your research findings and conclusions.

Your Market Analysis should include:

- Your industry description and outlook
- Information on your target market
- The needs and demographics of your target audience
- The size of your target market

- The amount of market share you want to capture
- Your pricing structure
- Your competitive analysis
- Any regulatory requirements

### **Organization & Management**

This section should come immediately after the Market Analysis. Your Organization & Management section should include:

- Your company's organizational structure
- Details of your company's ownership
- Details of your management team
- Qualifications of your board of directors
- Detailed descriptions of each division/department and its function
- The salary and benefits package that you offer your people

#### **Service or Product Line**

The next section is the service or product line section. This is where you describe your service or product, and stress on their benefits to potential and current customers. Explain in detail why your product of choice will fulfil the needs of your target audience.

Your Service or Product Line section should include:

- A description of your product/service
- A description of your product or service's life cycle
- A list of any copyright or patent filings
- A description of any R&D activities that you are involved in or planning

### Marketing & Sales

Once the Service or Product Line section of your plan has been completed, you should start on the description of the marketing and sales management strategy for your business.

Your Marketing section should include the following strategies:

- Market penetration strategy: This strategy focuses on selling your existing products or services in existing markets, in order to increase your market share.
- **Growth strategy:** This strategy focuses on increasing the amount of market share, even if it reduces earnings in the short-term.
- **Channels of distribution strategy:** These can be wholesalers, retailers, distributers and even the internet.
- **Communication strategy:** These can be written strategies (e-mail, text, chat), oral strategies (phone calls, video chats, face-to-face conversations), non-verbal strategies (body language, facial expressions, tone of voice) and visual strategies (signs, webpages, illustrations).

Your Sales section should include the following information:

- A salesforce strategy: This strategy focuses on increasing the revenue of the enterprise.
- A breakdown of your sales activities: This means detailing out how you intend to sell your products or services will you sell it offline or online, how many units do you intend to sell, what price do you plan to sell each unit at, etc.

### **Funding Request**

This section is specifically for those who require funding for their venture. The Funding Request section should include the following information:

- How much funding you currently require.
- How much funding you will require over the next five years. This will depend on your long-term goals.
- The type of funding you want and how you plan to use it. Do you want funding that can be used only for a specific purpose, or funding that can be used for any kind of requirement?
- Strategic plans for the future. This will involve detailing out your long-term plans what these plans are and how much money you will require to put these plans in motions.
- Historical and prospective financial information. This can be done by creating and maintaining all your financial records, right from the moment your enterprise started, to the present day. Documents required for this are your balance sheet which contains details of your company's assets and liabilities, your income statement which lists your company's revenues, expenses and net income for the year, your tax returns (usually for the last three years) and your cash flow budget which lists the cash that came in, the cash that went out and states whether you had a cash deficit (negative balance) or surplus (positive balance) at the end of each month.

### **Financial Planning**

Before you begin building your enterprise, you need to plan your finances. Take a look at the steps for financial planning:

- Step 1: Create a financial plan. This should include your goals, strategies and timelines for accomplishing these goals.
- Step 2: Organize all your important financial documents. Maintain a file to hold your investment details, bank statements, tax papers, credit card bills, insurance papers and any other financial records.
- Step 3: Calculate your net worth. This means figure out what you own (assets like your house, bank accounts, investments etc.), and then subtract what you owe (liabilities like loans, pending credit card amounts etc.) the amount you are left with is your net worth.
- Step 4: Make a spending plan. This means write down in detail where your money will come from, and where it will go.
- Step 5: Build an emergency fund. A good emergency fund contains enough money to cover at least 6 months' worth of expenses.
- Step 6: Set up your insurance. Insurance provides long term financial security and protects you against risk.

### **Risk Management**

As an entrepreneur, it is critical that you evaluate the risks involved with the type of enterprise that you want to start, before you begin setting up your company. Once you have identified potential risks, you can take steps to reduce them. Some ways to manage risks are:

- Research similar business and find out about their risks and how they were minimized.
- Evaluate current market trends and find out if similar products or services that launched a while ago are still being well received by the public.
- Think about whether you really have the required expertise to launch your product or service.
- Examine your finances and see if you have enough income to start your enterprise.
- Be aware of the current state of the economy, consider how the economy may change over time, and think about how your enterprise will be affected by any of those changes.
- Create a detailed business plan.

# Tips



- Ensure all the important elements are covered in your plan.
- Scrutinize the numbers thoroughly.
- Be concise and realistic.
- Be conservative in your approach and your projections.
- Use visuals like charts, graphs and images wherever possible.

### 8.6.5 Procedure and Formalities for Bank Finance

#### The Need for Bank Finance

For entrepreneurs, one of the most difficult challenges faced involves securing funds for start-ups. With numerous funding options available, entrepreneurs need to take a close look at which funding methodology works best for them. In India, banks are one of the largest funders of start-ups, offering funding to thousands of start-ups every year.

# 8.6.5.1 What Information Should Entrepreneurs Offer Banks for Funding?

When approaching a bank, entrepreneurs must have a clear idea of the different criteria that banks use to screen, rate and process loan applications. Entrepreneurs must also be aware of the importance of providing banks with accurate and correct information. It is now easier than ever for financial institutions to track any default behaviour of loan applicants. Entrepreneurs looking for funding from banks must provide banks with information relating to their general credentials, financial situation and guarantees or collaterals that can be offered.

#### **General Credentials**

This is where you, as an entrepreneur, provide the bank with background information on yourself. Such information includes:

- Letter(s) of Introduction: This letter should be written by a respected business person who knows you well enough to introduce you. The aim of this letter is set across your achievements and vouch for your character and integrity.
- Your Profile: This is basically your resume. You need to give the bank a good idea of your educational achievements, professional training, qualifications, employment record and achievements.
- **Business Brochure:** A business brochure typically provides information on company products, clients, how long the business has been running for etc.
- Bank and Other References: If you have an account with another bank, providing those bank references is a good idea.
- **Proof of Company Ownership or Registration:** In some cases, you may need to provide the bank with proof of company ownership and registration. A list of assets and liabilities may also be required.

#### **Financial Situation**

Banks will expect current financial information on your enterprise. The standard financial reports you should be prepared with are:

- Balance Sheet
- Cash-Flow Statement
- Business Plan
- Profit-and-Loss Account
- Projected Sales and Revenues
- Feasibility Study

### **Guarantees or Collaterals**

Usually banks will refuse to grant you a loan without security. You can offer assets which the bank can seize and sell off if you do not repay the loan. Fixed assets like machinery, equipment, vehicles etc. are also considered to be security for loans.

# -8.6.5.2 The Lending Criteria of Banks

Your request for funding will have a higher chance of success if you can satisfy the following lending criteria:

- Good cash flow
- Adequate shareholders' funds
- Adequate security
- Experience in business
- Good reputation

### The Procedure

To apply for funding the following procedure will need to be followed.

- Submit your application form and all other required documents to the bank.
- The bank will carefully assess your credit worthiness and assign ratings by analysing your business information with respect to parameters like management, financial, operational and industry information as well as past loan performance.
- The bank will make a decision as to whether or not you should be given funding.

# Tips



- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

### 8.6.6 Enterprise Management - An Overview

To manage your enterprise effectively you need to look at many different aspects, right from managing the day-to-day activities to figuring out how to handle a large-scale event. Let's take a look at some simple steps to manage your company effectively.

### Step 1: Use your leadership skills and ask for advice when required.

Let's take the example of Ramu, an entrepreneur who has recently started his own enterprise. Ramu has good leadership skills – he is honest, communicates well, knows how to delegate work etc. These leadership skills definitely help Ramu in the management of his enterprise. However, sometimes Ramu comes across situations that he is unsure how to handle. What should Ramu do in this case? One solution is for him to find a more experienced manager who is willing to mentor him. Another solution is for Ramu to use his networking skills so that he can connect with managers from other organizations, who can give him advice on how to handle such situations.

# Step 2: Divide your work amongst others — realize that you cannot handle everything yourself.

Even the most skilled manager in the world will not be able to manage every single task that an enterprise will demand of him. A smart manager needs to realize that the key to managing his enterprise lies in his dividing all his work between those around him. This is known as delegation. However, delegating is not enough. A manager must delegate effectively if he wants to see results. This is important because delegating, when done incorrectly, can result in you creating even more work for yourself. To delegate effectively, you can start by making two lists. One list should contain the things that you know you need to handle yourself. The second list should contain the things that you are confident can be given to others to manage and handle.

Besides incorrect delegation, another issue that may arise is over-delegation. This means giving away too many of your tasks to others. The problem with this is, the more tasks you delegate, the more time you will spend tracking and monitoring the work progress of those you have handed the tasks to. This will leave you with very little time to finish your own work.

### Step 3: Hire the right people for the job.

Hiring the right people goes a long way towards effectively managing your enterprise. To hire the best people suited for the job, you need to be very careful with your interview process. You should ask potential candidates the right questions and evaluate their answers carefully. Carrying out background checks is always a good practice. Running a credit check is also a good idea, especially if the people you are planning to hire will be handling your money. Create a detailed job description for each role that you want filled and ensure that all candidates have a clear and correct understanding of the job description. You should also have an employee manual in place, where you put down every expectation that you have from your employees. All these actions will help ensure that the right people are approached for running your enterprise.

#### Step 4: Motivate your employees and train them well.

Your enterprise can only be managed effectively if your employees are motivated to work hard for your enterprise. Part of being motivated involves your employees believing in the vision and mission of your enterprise and genuinely wanting to make efforts towards pursuing the same. You can motivate your employees with recognition, bonuses and rewards for achievements. You can also motivate them by telling them about how their efforts have led to the company's success. This will help them feel pride and give them a sense of responsibility that will increase their motivation. Besides motivating your people, your employees should be constantly trained in new practices and technologies. Remember, training is not a one-time effort. It is a consistent effort that needs to be carried out regularly.

### Step 5: Train your people to handle your customers well.

Your employees need to be well-versed in the art of customer management. This means they should be able to understand what their customers want, and also know how to satisfy their needs. For them to truly understand this, they need to see how you deal effectively with customers.

This is called leading by example. Show them how you sincerely listen to your clients and the efforts that you put into understand their requirements. Let them listen to the type of questions that you ask your clients so they understand which questions are appropriate.

### Step 6: Market your enterprise effectively.

Also, hire a marketing agency if you feel you need help in this area. Now that you know what is required to run your enterprise effectively, put these steps into play, and see how much easier managing your enterprise becomes!

# Tips



- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

### -8.6.7 Considering Entrepreneurship

Questions to ask yourself before considering entrepreneurship.

- 1. Why am I starting a business?
- 2. What problem am I solving?
- 3. Have others attempted to solve this problem before? Did they succeed or fail?
- 4. Do I have a mentor1 or industry expert that I can call on?
- 5. Who is my ideal customer2?
- 6. Who are my competitors3?
- 7. What makes my business idea different from other business ideas?
- 8. What are the key features of my product or service?
- 9. Have I done a SWOT4 analysis?
- 10. What is the size of the market that will buy my product or service?
- 11. What would it take to build a minimum viable product5 to test the market?
- 12. How much money do I need to get started?
- 13. Will I need to get a loan?
- 14. How soon will my products or services be available?
- 15. When will I break even6 or make a profit?
- 16. How will those who invest in my idea make a profit?
- 17. How should I set up the legal structure7 of my business?
- 18. What taxes 8 will I need to pay?
- 19. What kind of insurance9 will I need?
- 20. Have I reached out to potential customers for feedback

# Tips



- It is very important to validate your business ideas before you invest significant time, money and resources into it.
- The more questions you ask yourself, the more prepared you will be to handle to highs and lows of starting an enterprise.

#### **Footnotes:**

- 1. A mentor is a trusted and experienced person who is willing to coach and guide you.
- 2. A customer is someone who buys goods and/or services.
- 3. A competitor is a person or company that sells products and/or services similar to your products and/or services.
- 4. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. To conduct a SWOT analysis of your company, you need to list down all the strengths and weaknesses of your company, the opportunities that are present for your company and the threats faced by your company.
- 5. A minimum viable product is a product that has the fewest possible features, that can be sold to customers, for the purpose of getting feedback from customers on the product.
- 6. A company is said to break even when the profits of the company are equal to the costs.
- 7. The legal structure could be a sole proprietorship, partnership or limited liability partnership.
- 8. There are two types of taxes direct taxes payable by a person or a company, or indirect taxes charged on goods and/or services.
- 9. There are two types of insurance life insurance and general insurance. Life insurance overs human life while general insurance covers assets like animals, goods, cars etc.

Notes

