

NCFR122

Foundations of Reprography

Duration: 75 hours

Credit units: 5

Module Overview

Reproduction of documents is an important service of providing exact copies of information and helps to preserve the original documents. The module is therefore intended to introduce learners to reprographic methods and the equipment used in the reproduction of information. Learners will acquire skills to operate reprographic machines and care for their conservation.

Learning Outcomes

By the end of this module, the learner should be able to:

- i) Reproduce documents using reprographic machines.
- ii) Produce information digitally.

Reading list

1. Artuff TA (2014). *Reprography in University libraries and copyright laws*. ESS-ESS publications New Delhi.
2. UC (2012) *Reprographic guidelines*. Printing and Reprographics; Atlanta printing plant.
3. Sayre, Irene H (1947). *Photography and plate-making for photo-lithography*. 3 ed. Chicago, Ill., Lithographic Textbook Publishing Co.





Sub-module 1

Reprography

Duration: 8 Hours

Content

- Meaning of reprography
- Developing reprographic program
- Reprographic activities

Competences

The learner:

- Develops the reprographic program to be followed when reproducing documents.



- Devises protective measures to keep documents safe.

Meaning of reprography

Paper is material manufactured in thin sheets from the pulp of wood or other fibrous substances used for writing, drawing or printing or as wrapping material.

Reprography refers to the production of copies from an original material to ensure longevity of the information contained in a given material.

Developing reprographic program

Whether it is photocopying, microfilming or digitisation it should be part of a well-planned programme that addresses management as well as technical considerations

- ☞ The first step in developing a reprography programme is to conduct a conservation assessment in undertaking of preservation surveys.
- ☞ The second step is cost-benefit analysis and needs assessment should be conducted. It is important to ensure it is appropriate.
- ☞ The next step is to identify appropriate materials for copying. However, it is important to consult with other institutions both nationally and internationally.

Reprographic activities

- ☞ **Photocopying** is process of making a photographic copy of a document made on photocopier.
- ☞ **Printing** is production computer documents to paper in form of books, newspapers or other printed materials.



- ☞ **Large format printing** is printing done on large paper which ranges from two to more than 15 feet in width.
- ☞ **Document Scanning** is a process of capturing paper documents and converting them to a digital format via a document scanner or multi-function printer.
- ☞ **Binding** is process of using strong covering to hold the pages of a book together.
- ☞ **Booklet making** is process of marking a folded piece of paper with one or more sheets that consist of four pages or panels in form of small book.
- ☞ **Graphic design** is the use of computer to create designs like cartoons, smart art to be published
- ☞ **Laminating** is a process of sealing documents to prevent them from damage from water.
- ☞ **Punching** is use of punching machine to make holes on documents so as to make filing simple.





Sub-module 2

Reprographic methods

Duration: 7 Hours

Content

- Printing
- Duplicating
- Photocopying
- Scanning

Competences

The learner applies different methods such as printing, duplicating, photocopying and scanning to reproduce documents.

Printing

Printing is production of computer/ digital work on a paper material



Principal categories of print

- ☞ **Dry Printing** is often referred to as reprographics. It has three components: desktop printing attached to a PC, walk up local photocopying and fast volume printing.
- ☞ **Wet Printing** is often referred to simply as Print. It is traditional printing via presses using inks.

Types of Printing

- ☞ **Offset Lithography** the most common printing process today. It offsets ink from metal plates to a rubber blanket cylinder to the paper.
- ☞ **Engraving** produces the sharpest image of all. Image feels indented run your fingers over the back side of the sheet. Most law firms, hospital charts still use engraving.
- ☞ **Thermograph raised printing** uses special powder that's adhered to any color ink. Mainly used for stationery products.
- ☞ **Digital printing** the newest printing process and the least understood includes all processes that use digital imaging to create printed pieces.
- ☞ **Screen or silk-screening** Ink is forced through a screen following a stencil pattern. Used for ring binders, t-shirts, bumper stickers, billboards.
- ☞ **Flexography** special type of printing for packaging products. Products include cardboard boxes, grocery bags, gift-wrap, and can and bottle labels.
- ☞ **Gravure prints** directly from cylinder to paper. Used when printing for millions of impressions think magazines, newspapers.



Characteristics of Paper for printing

- ☞ **Smooth Surface texture** smoother the paper, the better the ink sits up on the surface of the paper rather than being absorbed into the fibers.
- ☞ **Good Brightness** refers to the amount of light a sheet reflects 0 to 100 percent, with a crisp white sheet often exceeding 90 percent.
- ☞ **Good Color** of the paper and whether it has a high or a low glare which makes for easier reading.
- ☞ **Whiteness** this should be good it refers to the color of the reflected light either yellow-white or blue-white, i.e. warm or cool
- ☞ **High Opacity** A sheet with high opacity will prevent solids, screens and from being visible through the opposite side of the sheet.
- ☞ **Grain direction** should have parallel direction the fibers of a sheet have aligned during the papermaking process.
- ☞ **Weight & Size** should be high this is based on the size of 500 sheets a ream of paper to be safe, always ask for samples.
- ☞ **It has Higher bulk** will increase the overall thickness of a book. Therefore, it helps to know a paper's measure in pages.

Steps of Proof reading before Printing

- ☞ First, read the document to see if it is complete with all the information needed
- ☞ Read the document to see how it sounds. Listen to the sound of the voice in your head.



- ☞ A third reading can be used to identify other spelling and punctuation mistakes.
- ☞ Finally, check all content outside of the main body of the text like headers and footers.

Common typographical mistakes

- ☞ **Homophones** these are words which sound the same but have a different spelling and meaning. Right and write, deer and dear.
- ☞ **Leaving out silent letters** Febuary and February, lisen and listen.
- ☞ **Adding an Ending** mistakes can be made when changing the tense of a word by adding an ending. Hopeing and Hoping or Submiting and Submitting.
- ☞ **Missing words** most commonly with smaller words, to, it, is, of, a, etc. Or sometimes these words are used incorrectly in exchange for one another.
- ☞ **Ordering of letters** the most common of typing error is for letters to be the wrong caps way round.
- ☞ **Punctuation** apostrophes are the most common punctuation mistake. They should be used for the possessive e.g. Rama's ball, and missing letters e.g. it's or don't.
- ☞ **Amalgamating words/separating** some words should be separate for example 'a lot' rather than typing 'alot'
- ☞ **Verbs** adapt the verb to a singular or plural subject for example 'I was' and 'we were' not 'I were' and 'we was'.

Duplicating

Duplicating is a process in which the desired number of copies is prepared from a



master copy with the help of a duplicator.

Duplicating differ from copying and reproduction. Copying or reproduction means preparation of one copy or few copies from the original.

Duplicating is followed when the number of copies required is more than the capacity of the typewriter.

Duplicating machines or duplicators are used for preparing circulars, price lists, reports, office forms etc., with speed and accuracy.

Photocopying

Photocopying is making copies of original paper document

Methods of Photocopying Office Documents

- ☞ **Reflex** uses either one-sided originals or two-sided originals. The originals are placed in direct contact with a photo-sensitive paper.
- ☞ **Diazo** the Copy paper is treated with chemicals, called diazonium compounds and placed next to the original document.
- ☞ **Electrostatic** method uses copy paper treated with zinc oxide and a thermoplastic resin. The zinc oxide on this copy paper reacts with light.
- ☞ **Dual Spectrum** method uses two different sheets an intermediate sheet coated with an oxidant and a coupler and a secondary receptor sheet coated with an acrylic with silver salt.



Considerations to Make when Photocopying

Following is a list of main issues to consider when using photocopying as a preservation tool.

- ☞ Only small groups of records will be photocopied for preservation purposes.
- ☞ Photographs can be photocopied but the quality will not be high.
- ☞ If many copies might be needed of document a master copy should be made.
- ☞ Archival quality or acid-free paper should be used for preservation photocopies.
- ☞ Extra care should be taken copying bound materials not to damage the spine.
- ☞ All copies made should be labelled 'copy' in order to distinguish from originals.
- ☞ Black and white copies made of coloured items should be indicated as photo copy
- ☞ Copies made for researchers should always be labelled reference copy only
- ☞ It is important to note that copying does not actually reduce storage space.

Scanning

Imaging/Scanning is best used when multiple users are involved and with records that have short retention periods.

How to Scan Documents into PDF

Method 1 on Windows

- ☞ Connect your scanner to your computer do this via the USB cable, wireless.
- ☞ Place your document in the scanner to turn into a PDF or jpeg or png.
- ☞ Open Start/Click the Windows logo in the bottom-left corner of the screen.



- ☞ Type **fax and scan** into windows menu for the Fax and Scan program.
- ☞ Click **Fax and Scan** doing so will open your PC's Fax and Scan program.
- ☞ Click **New Scan**. This button is in the upper-left side of the Fax and Scan window.
- ☞ Make sure your scanner is selected. If there are multiple scanners on.
- ☞ Select a type of document. Click the Profile drop-down box.
- ☞ Click **Scan**. It's at the bottom of the window.
- ☞ Click **File**. Once your document finishes scanning.
- ☞ Select a save location. Click a folder on the left side of the window.
- ☞ Enter a name for your PDF do this in the field to the right of the "File name"
- ☞ Click **Save**. It's at the bottom of the window. Doing so will save your scanned file

Advantages of scanning

- ☞ It allows multiple users to access the information at the same time.
- ☞ Scanning is user-friendly.
- ☞ Minimize paper storage with the assistance of scanning soft-copy backups.
- ☞ Reduced costs for those who are renting space to store files.
- ☞ Environmentally friendly since less paper used.
- ☞ Convenience since you will be able to easily search and retrieve documents

Disadvantages of scanning

- ☞ Scanning software and hardware become obsolete in a short period of time.



- ☞ There are fewer standards in place for scanning than with microfilm.
- ☞ Time consuming that is scanning documents can require a lot of time.
- ☞ The cost of purchasing scanning software and machine can be expensive.
- ☞ It requires extra training in order to use a scanner.



Sub-module 3

Reprographic equipment

Duration: 16 Hours

Content

- Printing Machine
- Photocopying machine
- Duplicating machine
- Types of each machine
- Factors to consider when purchasing.
- Care and maintenance

Competences

The learner Operates reprographic equipment to produce documents.

Factors to consider when purchasing Reprographic equipment

The decision to buy a particular type of machine should be based upon the requirements of organization not because they are being purchased by other organizations.

- 👉 **Simple to operate** it should be easy to use the machine.
- 👉 **Flexibility** the machine must have flexibility to adopt for multiple purposes.
- 👉 **Durability** the machines must be strong and durable.
- 👉 **Portability** the size of the machines are small it is convenient to handle.



- ☞ **Benefit of the machine** accuracy and better result must be produced.
- ☞ **Service** Quick repairs and service facility is an essential to be looked upon.
- ☞ **Operating Cost** must be low and supplies must be at minimum.
- ☞ **Suppliers** the integrity and reputation of the manufacturer must be considered.
- ☞ **Style** Pleasing design and color is preferred it must be attractive.
- ☞ **Cost** of the machine is comparable in term of savings in labour, cost of repair.

Printing Machine

Types of printing Machine

- ☞ **Laser Printer** is the most common type of printing machine is the due to their ability to produce crisp and rapid printing.
- ☞ **A wireless printer** is a type of printer that receives the data wirelessly. This type of technology is relatively new.
- ☞ **3D printer** is type of printer of latest technology and it opens up many possibilities of printing. 3D printing is able to print 3 dimensional objects.
- ☞ Inkjet Printers.
- ☞ Digital Printers.
- ☞ Screen Printers.
- ☞ Heat Press Machines.
- ☞ Flexographic Printers.
- ☞ Pad Printers.



☞ Offset Printers.

Factors to consider when purchasing printing Machine

- ☞ **Image Quality** depending on your target market to consider the Resolution, Density, Ink Droplet Size and ICC Profiles.
- ☞ **Size & Speed** the size of the printer will depend on what image sizes you wish to offer and the most requested size and the speed it takes to make print.
- ☞ **Media Handling** so look at a printer's specifications sheet to find out what paper thickness it can handle on loading trays.
- ☞ **Ease of Use** the printer driver should be easy to setup and it should be easy to show others how to use the machine.
- ☞ **Support the** printer should be supported by phone/email to access experienced users and the parts should replaceable.
- ☞ A few more things to consider like the Price, Ink usage, Ink cost, Maintenance/Cleaning, Warranty, Printer longevity and Resale value.

Care and maintenance of a printing Machine

- ☞ **Clean your print head** it is essential at least once a month. Remove the cartridge and clean the head with warm water. Don't use wet tissues or alcohol.
- ☞ **Clean the insides** of the printer regularly. Don't wait until the dust and grime form layers, preventing your printer from operating efficiently.
- ☞ **Check under the hood** it is not enough to just pay attention to the toner cartridge.



You must lift the hood and check inside for any broken parts.

- ☞ **Invest in a maintenance kit for your printer** it will help clean the printer fan and other vulnerable parts that are prone to accumulating dust and residual ink.
- ☞ **Choose the right refill** cartridges are expensive and you might be tempted to buy cheap, Low quality cartridges will have an impact on the printer hardware.
- ☞ **Be careful when you replace cartridges** Exercise caution while replacing your cartridges.
- ☞ **Replace cartridges before they dry up** Don't wait till your cartridges run dry completely software provides notifications on cartridge levels fall below normal.
- ☞ **Turn off** your printer if you are not going to use it for a long time. Printers generate a lot of heat while they are on and the print header can dry up.
- ☞ **Download the latest drivers** remaining up-to-date by installing the latest drivers from the manufacturers of printer.
- ☞ **Use your printer regularly** leaving your printer untouched for days will dry up the ink and clog the print header. It is recommended to print once in 10 days.

Photocopying machine

A photocopier also known as a copier machine is a device that makes paper copies of documents and other visual images cheaply and quickly.

Types of Photocopying machine

- ☞ **Mono copiers** are copiers that use only one colour toner, usually black. These



machines come in different size ranges from low volume to high-volume.

- ☞ **Colour copiers** these are copiers in colour as well as black they have four drums and cartridges in four primary colours Cyan, Yellow, Magenta, and Black.
- ☞ **Network Copiers** are machines that can be connected to the office network and allow remote printing, Scan-to functionality it is available separately.
- ☞ **Multifunctional Copiers** are Copiers that perform more tasks than just copying, copying, scanning and faxing and option like booklet folding, stapling.
- ☞ **Desktop Copiers** are designed for A4 paper or smaller size only and desktop use table use. They are simply models of smaller copiers or multi-function copiers.

Factors to consider when purchasing Photocopying machine

- ☞ **The photocopier company** it may be smart to compare copier companies. The truth is, most of the popular photocopier brands are good.
- ☞ **New or pre-owned** choose between a new or pre-owned device. Buying a new machine means getting the most current technology available and warranty.
- ☞ **Lease or buy** choosing between leasing and buying basically comes down to how much money you are comfortable spending now versus over time.
- ☞ **Business needs of your office** more specifically, think about the volume of copying, types of projects, number of people using it and amount of space there.
- ☞ **High-tech features** discuss these types of features with your copier expert to decide which would be most useful for your company/organisation.



Care and maintenance of Photocopying machine

- ☞ **Train employees** give sufficient training and inform them of the hazards involved in photocopying and how to control them.
- ☞ **Turn off the Power** before you start cleaning or maintaining your machine, make sure you turn off the power. This will protect you and your machine.
- ☞ **Use the Right Products** check with the manufacturer to ensure you are using the best possible paper and toner for your copier.
- ☞ **Load Paper Properly** to avoid jamming it into the copier. Make sure that you do not load wet or folded paper into the machine, as this could cause it to jam.
- ☞ **Clean It Regularly** will extend its life significantly. To clean the glass, spray a lint-free, nonabrasive cloth with glass cleaner and clean the glass.
- ☞ **On the interior clean any visible dust** by wiping it clean you can remove dust on components with a small, fine-haired paint brush.
- ☞ **Have Regular Maintenance Service Checks** there are places within the copier that you can't reach to clean so hire a qualified service professional.

Duplicating machine

Types of Duplicating machine

- ☞ **Gelatine Duplicator** is duplicator that contains gelatines in a tray on which the master copy is pressed on the gelatines with a dampened roller to take a copy.
- ☞ **Stencil Duplicator or Mimeograph** is duplicator highly used in every business office.



A stencil is cut by a typewriter or by hand.

- ☞ **Electronic Stencil Duplicator** is an improvement of the original document where it is electronically scanned and produced on a stencil in another cylinder.
- ☞ **Multigraph or Typeset Duplicator** This machine uses letterpress type. Motor is used to operate the machine. Sometimes manual operation is also done.
- ☞ **Offset Lithography Machine** the master copy is fixed to a drum after producing a greasy image on it. The roller meets the inked cylinder and water.
- ☞ **Photostat/Photographic duplicator** photography of the documents is first taken out through camera and copies are produced soon developed.

Factors to consider when purchasing Duplicating machine

- ☞ Number of copies required.
- ☞ The frequency of need of copies.
- ☞ Speed of reproduction.
- ☞ Quality of paper is to be used.
- ☞ The cost of paper, materials and operator.
- ☞ The kind of image needed.
- ☞ Number of colours required.
- ☞ Durability of the matter and image.

Care and maintenance of Duplicating machine

- ☞ **Keeping the glass scanner area clean** since dust can scratch the copier glass and



can mess up your copies. Make sure to use a soft lint-free cloth and cleaner.

- ☞ **Replacing toner** when it needs it. Your copier should tell you when the ink is ready to be changed. It is important to change it out on a regular basis.
- ☞ **Turn off your copier** when it isn't being used, turn off the machine or put it into hibernate mode to prolong the life of the machine.
- ☞ **When the copier isn't in use, don't use it as a shelf** stack boxes and other items on top of it. Why? Because stacking things on top could crack your glass.
- ☞ **User manual** be sure to check your copier's user manual for special instructions before cleaning any parts of the copier.
- ☞ **Contact experts** if you aren't sure about how to clean certain parts, contact the Duplicating Products Company the can help you.



Sub-module 4

Printing of documents

Duration: 10 hours

Content

- Digital printing
- Offset printing
- Lithographic processes

Competences

The learner prints documents using the digital, offset, and lithographic methods.

Digital printing

Digital printing is the use computer technology to drive the printing devices to produce colour or black and white documents online.

Digital documents are designed on computers, using layout software and electronic content representing both text and images such as graphics and photos.

Use Proper Resolution in digital printing, recommended resolution for images is 300 ppi at 100 percent size.

Tips on Managing your Layout

- 👉 Name spot colors consistently with proper color spaces.
- 👉 Use style sheets for type and graphic elements such as rules.
- 👉 Use realistic margins note paper size or trim size, image area, bleed area.



- ☞ Build reader spreads build on your document as if you were reading a book.
- ☞ Proof read early and often.
- ☞ Creating a reliable color workspace RGB and CMYK.

Tips on Choosing Images for Digital Printing

- ☞ Work in RGB.
- ☞ Choose the highest resolution available.
- ☞ Use a higher bit depth. Bit depth is the smallest unit of data.
- ☞ Avoid already compressed images data such as JPEGs, yield unattractive.
- ☞ Avoid images with large light backgrounds.
- ☞ Use textures print clearer and demonstrate a printer colour rendering capabilities
- ☞ Avoid poor quality images.
- ☞ Choose images that are sharp and in focus.

Merits of digital printing

- ☞ Proofing reading can be done on computer screen and corrected within minutes.
- ☞ Makes marketing of documents flexible in short time.
- ☞ It produces brilliant colour which enhances businesses competitive edge.
- ☞ Digital printing enables print on demand or the publication of small prints.
- ☞ Digital printers require less maintenance and upkeep.
- ☞ Digital printing can be done at home.



Demerits of digital printing

- ☞ Printing solid blocks of colors remains a challenge.
- ☞ Sharpness some small type fonts can become fuzzy and unreadable.
- ☞ Ghosting of two contrasting colors creates unwanted whitish lines.
- ☞ Color Crossovers if a graphic is not positioned correctly disappear.
- ☞ Paper Sizes in digital printing remain limited.
- ☞ Special Colors create a challenge because ink doesn't exist in the digital.

Offset printing



Offset Lithography

The most common printing method in the industry, most printers use offset lithography to save on ink and limit set up time. Hence, you are able to avail of a more affordable and cost effective print job for your color printing requirements. What printers usually do is to offset the ink (thus, the name) from metal plates to a rubber cylinder and then transfer it onto the paper stock.

Basic steps involved in offset lithography

- ☞ Plate with photo chemically produced image and non-image areas is mounted on a cylinder.
- ☞ Plate is dampened with a mixture of Chemical concentrates in a water-based solution which adheres to the non-image areas of the plate.



- ☞ Plate surface is contacted by inked rollers which apply ink to only image areas of properly dampened printing plate.
- ☞ Right reading inked image on the printing plate is transferred under pressure to a rubber like blanket on which it becomes reversed i.e. mirror image.
- ☞ Inked image on the blanket is transferred under pressure to a sheet of paper or other printing substrate producing an impression of the inked image on paper.

Merits of offset printing

- ☞ Consistent high image quality, sharper and cleaner images are produced.
- ☞ Usability on a wide range of printing surfaces e.g. wood, cloth, metal, leather.
- ☞ There is quick and easy production of printing plates.
- ☞ It has longer plate life than other direct presses.
- ☞ It is common and used in almost all national daily newspapers, posters.
- ☞ They are used for printing of text books and other books.
- ☞ Large size maps, plans and packaging materials can be printed.

Demerits of offset printing

- ☞ The machines consume a lot of power.
- ☞ The machines occupy much space since they are large.
- ☞ They produce print on acidic paper.
- ☞ They cannot be used for printing small items.
- ☞ It requires skilled personnel to operate the machine.



☞ The make a lot of noise and can pose health threats due to chemicals.

Lithographic processes

In the lithographic process, ink is applied to a grease-treated image on the flat printing surface; non image areas, which hold moisture, repel the lithographic ink.

This inked surface is then printed either directly on paper, by means of a special press or onto a rubber cylinder. The following are the methods/processes:

- ☞ **Fine-art lithography** is method of creating lithographs involved the use of a block of porous limestone. The method of preparing such stones for hand printing.
- ☞ **Commercial lithography** processes were established for producing a variety of commercial work and for distributing popular topical, historical, and religious subjects
- ☞ **Offset lithography or offset printing** was first patented by John Strather of England. When rubber offset rollers were used on flat-bed presses for printing on metals.





Sub-module 5
Duplicating
Duration: 10 hours

Content

- Duplicating methods
 - Hectograph
 - Stencil duplicating
 - Sprit duplicating
- Duplicating process
- Merits and demerits of each method



Competences

The learner:

- Duplicates documents using hectographs, stencil, or spirit.
- Analyses the merits and demerits of each duplicating method.

Duplicating methods

Hectograph process

- ☞ A master is prepared by typing on the master with a ribbon or carbon paper impregnated with an analine dye, or by writing by a pen or pencil.
- ☞ When carbon paper is used, it is used exactly as ordinary carbon paper is used, between two sheets of paper the carbon copy is the hectograph master.
- ☞ Once prepared, the master is pressed, face down, upon a moistened sheet of gelatin for a brief period during which the dye from the master is transferred to the gelatin.
- ☞ Paper is then pressed down on the gelatine and some of the dye is transferred from the gelatine to the paper and the paper is pulled from the gelatine.

Merits of Hectograph

- ☞ It is cheap to make copies
- ☞ It doesn't require electrification to carryout
- ☞ Using dyes makes permanent prints
- ☞ It is user friendly
- ☞ It takes little to produce many copies



- ☞ It can be used for small publications

Demerits of Hectograph

- ☞ It poses health threats due of use of chemicals
- ☞ It is primitive way of duplicating
- ☞ Cannot be used for large scale duplicating
- ☞ Duplicates are not very pleasant and clear
- ☞ It is limited to only few colours
- ☞ Editing and proof reading can be difficult

Stencil duplicating Processes

- ☞ A stencil is cut by a typewriter or by hand. The stylus pencil is used to cut a stencil.
- ☞ The matter is to be typed within the frame marked in the stencil.
- ☞ The stencil is to be cut directly with the letters.
- ☞ The mistakes and errors are to be corrected by using correcting fluid.
- ☞ The cut stencil is fixed in a duplicating machine.
- ☞ If the machine is switched on, the papers are automatically feed and copying starts.

Merits of Stencil duplicating

- ☞ Many copies Up to 5000 copies can be obtained within a short period of time.
- ☞ Correcting fluid can be used to make alteration or corrections.
- ☞ The cost of stencil paper and duplicating paper is very cheap.



- ☞ The stylus pen is used to draw graphs and diagrams.
- ☞ Equipment is basic and easily maintained.
- ☞ Multiple colours possible so long as machine rollers changed.
- ☞ Stencils can be stored and used again for more copies when required.

Demerits of Stencil duplicating

- ☞ White paper cannot be used for legible looking of letters.
- ☞ Multicolour copies cannot be taken in a single run.
- ☞ The drum in the machine should be changed to take copies in different colours.
- ☞ A small business office cannot afford the cost of stencil, paper and machine
- ☞ Stencil duplicating requires separate runs are required for two or more colours.
- ☞ Stencil duplicating proves quite costly if only a few copies are required.

Sprit duplicating

A spirit duplicator also referred to as a Ditto machine was a low-volume printing method used mainly by schools and churches.

The term "spirit duplicator" refers to the alcohols which were a major component of the solvents used as "inks" in these machines.

Sprit duplicating process

- ☞ The spirit process master is prepared by typing or writing on a special master sheet placed on top of a dye impregnated carbon sheet used "wrong-side up"
- ☞ As one types, writes, or draws on the face of the master, dye from the carbon is



transferred to the verso of the master, producing a mirror image of the text or drawing.

- ☞ The master is then placed, verso out, on the cylinder of the duplicating machine.
- ☞ As the cylinder is revolved paper is drawn into the duplicator, moistened with an alcohol solution and brought in contact with the master, and dye is transferred to the paper.

Merits of Sprit duplicating

- ☞ Used mainly in educational establishments, that is class handouts.
- ☞ Individual duplicating copies are relatively cheap to produce, the duplicator
- ☞ It is simple and easily maintained.
- ☞ Multiple colors available simultaneously
- ☞ Master copy can be prepared easily.
- ☞ Good quality paper is used for copies.
- ☞ Many colours can be duplicated simultaneously.

Demerits of Sprit duplicating

- ☞ The copies are inferior in quality because the dye tends to spread and ink
- ☞ The copies tend to fade with time.
- ☞ The clarity of the image becomes progressively weaker as copies are rolled out.
- ☞ It is difficult to alter the master copy if there are mistakes in the master.
- ☞ Smell or aroma of pages fresh off the duplicator has alcohol.
- ☞ Cannot be used for large scale production





Sub-module 6

Photocopying

Duration: 14 hours

Content

- Photocopying methods
 - Thermography
 - Electrostatic (Wet method and Xerography)
 - Dyeline
- Merits and demerits of photocopying documents

Competences

The learner:

- Photocopies documents using thermograph, electrostatic, or dyeline methods.
- Analyses the merits and demerits of each photocopying method.



Photocopying methods

Thermography

Thermography/ heat writing is a method of copying that is based on the fact that dark regions of a document absorb heat more readily than do light spaces.

Process of Thermography

This process is now mainly used for the production of overhead projection transparencies rather than for conventional photocopying.

- ☞ **Thermo fax** Thermo-copying materials consist of a thin sheet of paper coated with chemicals which react, when heated, to develop a coloured image.
- ☞ **Dual spectrum** An intermediate sheet coated with a dye sensitized alpha naphthal is exposed with the original to reflected light.
- ☞ **The Eichner Process** A sheet coated with a heat sensitive dye thermo carbon is used as an intermediate for the formation of an image by the action of heat.
- ☞ **Thermal imaging** is non-contact technology which measures infrared wavelengths emitted from objects and converts these temperature information into image.

Advantages of Thermal Imaging

- ☞ This technology has created more efficient and safer method of measurement.
- ☞ Regular using thermal imaging products help in saving money.
- ☞ provides fast and accurate measurements of objects which are difficult to touch
- ☞ allows very accurate temperature measurements of machines from distance



- ☞ It can help in identifying air leakages, documenting irregular heat dispersion

Disadvantages of Thermal Imaging

- ☞ Thermal imaging products require high initial investment cost.
- ☞ Images are difficult to interpret in specific objects having erratic temperatures.
- ☞ Accurate temperature measurements are hindered by differing reflections surfaces.
- ☞ Thermal imaging cameras are not used for study of underwater objects.
- ☞ Most of the thermal imaging cameras have +/-2% accuracy or worse for temperature
- ☞ Thermal imaging cameras cannot see through glass as thermal energy can be reflected

Electrostatic

The electrostatic copying machine or xerography helps in getting exact copies of the original at a very fast speed. This eliminates the need for preparing a master copy.

Materials are toner and Plain Papers. Equipment required are Copier machines

Usually copiers are available on lease make sure you inquire and check for:

- ☞ The period of lease
- ☞ Conditions to which the lease can be terminated and a new copier used
- ☞ The method of charging for copies
- ☞ Charges for ancillary items, e.g. document handler, standing cabinet.
- ☞ Maintenance.

Advantages of electrostatic copying

- ☞ It is economic and cheap



- ☞ There is no master to be prepared.
- ☞ Copy quality is good
- ☞ It is fast means of production
- ☞ Accurate copies are made of original
- ☞ Less chemicals are used in production
- ☞ Machines occupy less space

Disadvantages of electrostatic copying

- ☞ Xerox machines are relatively expensive to run and to maintain
- ☞ Because they are easy to use, as a result they can suffer in expert handling.
- ☞ You may find that some sort of control is required.
- ☞ multicoloured copiers are very expensive
- ☞ Require electricity for them to run
- ☞ when over used dirty copies are produces
- ☞ the use strong light beams in process which is enemy of records
- ☞ machines make a lot of noise

Wet method

Wet methods although they produce sharper images, wet methods require the handling of liquid chemicals which a reliable to spillage and skin contact health risk to operators.

Merits of Wet method

- ☞ Produce sharp image



- ☞ Don't require electricity
- ☞ Cheap to carry out
- ☞ Can be used on majority of materials

Demerits of Wet method

- ☞ Dirtens office tables and walls with ink
- ☞ Poses health threats
- ☞ Smell of chemicals is bad
- ☞ Takes a lot of time to produce copy
- ☞ Requires skilled people in art
- ☞ Expensive to carryout

Xerography

Xerography is safer than the wet types of copying it use electrically machines do printing .

Merits of Xerography

- ☞ They are fast means of photocopying
- ☞ Make clear copies with many colours
- ☞ User friendly
- ☞ Photocopy on different sizes of paper
- ☞ It is safer than wet methods



Demerits of Xerography

- ☞ The toner contains chemicals which can cause skin irritation
- ☞ Use high electrical voltages
- ☞ Use strong Light which enemy to records
- ☞ Generate a lot of heat in process making room hot
- ☞ The generate noise can cause nuisance and discomfort

Dyeline

Merits and demerits of Dyeline

Demerits of Dyeline

Merits of photocopying documents

- ☞ It is economic and cheap
- ☞ There is no master to be prepared.
- ☞ Copy quality is good
- ☞ It is fast means of production
- ☞ Accurate copies are made of original



- ☞ Less chemicals are used in production
- ☞ Machines occupy less space

Dmerits of photocopying documents

- ☞ Photocopying machines can generate noise.
- ☞ Light, heat, and hazardous gases can harm the records.
- ☞ Photocopying disorganized arrangement records during process.
- ☞ Machine spoils book binds during the process of copying a book.
- ☞ Worst health effects to workers who use it or to those working nearby.
- ☞ It can produce dirty copies of the document at times.

