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Tailoring and Dress Designing • Apparel and Textile Design

Tailoring and Dress Designing

Apparel and Textile Design

NETAJI SUBHAS OPEN UNIVERSITY

PREFACE

In the curricular structure introduced by this University for students of Diploma programme, the opportunity to pursue Vocational course in Subjects introduced by the University is equally available to all learners. Instead of being guided by any presumption about ability level, it would perhaps stand to reason if receptivity of a learner is judged in the course of the learning process. That would be entirely in keeping with the objectives of open education which does not believe in artificial differentiation. The syllabus of this particular course has been designed in line with the NSQF.

Keeping this in view, study materials of the Diploma level in different subjects are being prepared on the basis of a well laid-out syllabus. The course structure combines the best elements in the approved syllabi of Central and State Universities in respective subjects. It has been so designed as to be upgradable with the addition of new information as well as results of fresh thinking and analysis.

The accepted methodology of distance education has been followed in the preparation of these study materials. Co-operation in every form of experienced scholars in indispensable for a work of this kind. We, therefore, owe an enormous debt of gratitude to everyone whose tireless efforts went into the writing, editing and devising of a proper lay-out of the materials. Practically speaking, their role amounts to an involvement in 'invisible teaching'. For, whoever makes use of these study materials would virtually derive the benefit of learning under their collective care without each being seen by the other.

The more a learner would seriously pursue these study materials the easier it will be for him or her to reach out to larger horizons of a subject. Care has also been taken to make the language lucid and presentation attractive so that they may be rated as quality self learning materials. If anything remains still obscure or difficult to follow, arrangements are there to come to terms with them through the counselling sessions regularly available at the network of study centres set up by the University.

Needless to add, a great deal of these efforts is still experimental—in fact, pioneering in certain areas. Naturally, there is every possibility of some lapse or deficiency here and there. However, these do admit of rectification and further improvement in due course. On the whole, therefore, these study materials are expected to evoke wider appreciation the more they receive serious attention of all concerned.

Professor (Dr.) Subha Sankar Sarkar
Vice-Chancellor

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NETAJI SUBHAS OPEN UNIVERSITY

Tailoring and Dress Designing

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Tailoring and Dress Designing

PAPER

APPAREL AND TEXTILE DESIGN

Unit 1 ❑ Introduction to Textile Fibre and Yarn

Structure

1.0 Objectives

After going through this unit you shall be able to know—

- the textile fibres
- the classification of textile fibres
- the properties for end-use requirements
- the types of yarn having an important effect on the fabric

- the types, uses, and optimum applications of sewing threads
- how woven fabrics are manufactured
- various types of weaves

Learning Outcome :

After learning this lesson we know about textile fibres and its classification, identification and characteristics, different types of yearns and their application and fabric properties.

1.1 Introduction

Textile is a broad term referring to any material that can be made into fabric by any method. Textile industry encompasses the production and marketing of fibres, yarns and fabrics, including trimmings and findings. This production and marketing chain includes the following steps : fibre production, yarn production/formation, fabric production, dyeing, printing and finishing. Textile industry basically represents the first level of the fashion industry. Textile mills and converters are the producers of yarns and fabrics and the suppliers to the apparel industry.

Textile mills are the producers of yarns and fabrics. Same industry produce any yarn, whereas others manufactured knitted and woven unfinished fabric, called greige goods either from their own yarn or purchased yarns. Many composite industries produce born greige goods and finished fabrics.

1.2 Fibre Sources

Fibres are classified into those found in nature, called **natural fibres**, or those that are **manufactured** through the use of chemicals, called **Manufactured fibres or** man made fibres.

1.2.1. Natural Fibres

Natural fibres are obtained from plants or animals, plants or vegetable fibres may come from stems (e.g., flax, hemp jute ramie), leaves (e.g., sisal, abaca), or seeds (e.g., cotton, kapok) of plants

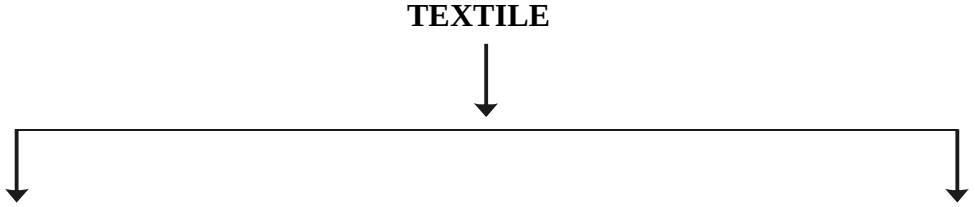
Animal fibres (e.g., wool, cashmere, mohair, and vicuana) protect people against the cold the same as they do animals. Silk is considered an animal

fibre, although it comes from the cocoon of a silkworm rather than a mammal's fur. Both silk and wool are classified as animal protein fibres.

1.2.2. Manufactured Fibres

Manufactured or man-made fibres are made from chemical solutions that are forced through tiny holes, similar to water passing through a showerhead. The device used to form the filaments is called a **spinnerette.** It looks like a thimble with tiny holes on the top or flat surface area. The fine liquid streams of solution that are forced through the holes are hardened into continuous strand called filament fibres or simply filament.

The fibre may be classified as follows—



NATURAL FIBRES

A) VEGETABLE FIBRES (Cellulose)
- o Seed fibres
  - ● Cotton
  - ● Kapok
  - ● Coconut
- o Bast fibres
  - ● Flax
  - ● Hemp
  - ● Jute
  - ● Ramila
- o Leaf fibres
  - ● Sisal
  - ● Manila

MANUFACTURED FIBRES

A) NATURAL POLYMER FIBRES
- o Cellulosic origin
  - ● Viscose
  - ● Lyocell
  - ● Modal
  - ● Cupro
  - ● Acetate
  - ● Triacetate
- o Alginate origin
  - ● Alginate
- o Rubber origin
  - ● ~~Rub~~ber

B) ANIMAL PROTEIN FIBRES

(i) Wool

- o Fine hair origin
  - ● Alpaca
  - ● Llama
  - ● Vicuna
  - ● Guanaco
  - ● Camel
  - ● Rabbit
  - ● Angora
  - ● Mohair origin
- o Coarse hairs
  - ● Cattle
  - ● Horse
  - ● Goat

(ii) Silk

- ● Cultivated
- ● Wild(e.g., Tussah)

alcohol

B) SYNTHETIC POLYMER FIBRES

- o Elastomeric origin
  - ● Elastane
  - ● Elastodiene
- o Polyacrylics origin
  - ● Acrylic
  - ● Modacrylic
- o Polyamides origin
  - ● Nylon
  - ● Aramid
- o Polyester origin
  - ● Polyester
- o Polyolefins origin
  - ● Polyethylene
  - ● Polypropylene
- o Vinylal origin
  - ● Polyvinyl

C) MINERAL FIBRES

- o Asbestos

D) INORGANIC FIBRES

- o Glass origin
  - ● Glass
- o Carbon origin
  - ● Carbon
- o Metalic origin
  - ● Metal

1.2.3. Identification of Textile Fibres

It is not possible to distinguish one fiber from another merely by touch or sight. Textile fibres must be identified using different techniques. Different tests, each of which has advantages and disadvantage, must be performed. Some are easy, quick and relatively inexpensive. But do not allow clear distinction to be made between fibres with the same characteristics.

In the absence of proper labels, the fibre type can be identified by simple tests as follows:

Microscopy: A good microscope is needed. Cotton and wool have distinctive appearances.

Burning Test: A specimen of fibres, yarns or fabric is held horizontally with tweezers. Its behavior as it approaches the flame, how it burns, the smell and the residue are all observed.

Dry Tearing Test: A piece of fabric is snipped and then torn by hand. The length of the broken fibre ends is observed.

Wet tearing Test: A drop of water is applied and the behavior of the wet piece is observed during tearing.

Solubility Test: Used mainly to identify fibre blends. The material is immersed in various chemicals for several hours. Acids are used in concentrated form.

1.2.4. End Uses of Fibres

a) **Natural Vegitable Fibres**

i) ***Cotton Fibres :*** The end uses of cotton include a wide range of products in the apparel, interior furnishing, and industrial areas. Examples blouses, pants, jackets, towel, carpets, curtains, belts, and sneakers.

ii) ***Flax Fibres :*** The principal end uses of flax include dresses suits, sports jackets, and luxury tablecloths and napkins etc.

b) Natural Animal Fibres

i) ***Silk Fibres :*** The principal end uses of silk include dresses, scarves, blouses and other apparel. Some silk is used in household furnishing, particularly decorative pillows.

ii) ***Wool Fibres :*** The principal end uses of wool include overcoats, suits, sweaters, carpets and felt fabrics.

c) Manufactured Regenerated Cellulose Fibres

i) ***Viscose Rayon Fibres :*** The end uses of viscose rayon include a wide range of products in the apparel, interior furnishings, and industrial areas. Examples include dresses, shirts, lingerie, jackets, draperies, medical products, non-woven fabrics, hygiene products.

ii) ***Acetate Fibres :*** The principal end uses of this fibre include lining fabric, lingerie, backing fabric for bonded materials and cigarette filter material.

iii) ***Lyocell Fibres :*** The end uses of this fibre include apparel, interior furnishings, and industrial products.

d) Manufactured Synthetic Fibres

i) ***Polyester Fibres :*** The end uses include a wide range of products in the apparel, interior furnishing, and industrial areas. Suits, skirts, lingerie, curtains, carpeting, sails, tire card, fiberfill, used to stuff pillows, and comforter threads are some examples of its uses.

ii) ***Nylon Fibres :*** The end uses include a wide range of products in the apparel, interior furnishing and industrial areas. Examples are lingerie, swimwear, exercise weae, hosiery jackets, bedspreads, carpets, upholstery, tents, fish nets, sleeping bags, rope, luggage.

iii) ***Acrylic Fibres :*** The principal end uses of this fibre include sweaters, blankets, carpeting, children's garments, and outdoor products, such as bunting and canopies.

iv) ***Polypropylene Fibres :*** The important apparel end uses are athletic clothes, exercise suits and underwear because of its excellent wicking action. Significantend uses are non-wovens and carpt face yarns. The fibre is also used in upholstery, and industrial fabrics loke filter cloth, bagging, cordage and geotextiles.

v) ***Spandex Fibres :*** The principal end uses include undergarment, support products, ski pants, swimwear, athletic apparel, and other articles where stretch is required.

1.3 Fibre Distribution

Fibres are sold to mills for yarn spinning and weaving or knitting. The farmers who produce natural fibres sell their goods at the market organised by their various

trade associations. On the other hand the large chemical companies that produce man-made fibres have their own sales forces and set prices based on their costs.

Fabric Product Development : Fabric is becoming the driving force of the fashion industry. There are many exciting innovations in fabric especially in blends which create interesting new texture.

1.4 Textile Yarn Production

The word yarn(or thread) is used in common practice to cover all of the linear textile structure, namely spun yarns, filament yarns(mono and multi-filament). Assembled1yarns i.e. folded or plied yarns. Yarns can be either 'single' or 'folded'. Thus a yarn is an assembly of fibres or filaments having a substantial length and relatively small cross-section, with or without twist, being the end-product of a spinning and twisting process.

Assemblies of fibres or filaments which are intermediate products in a spinning process are given special names such as "Sliver", "Roving", "Bave", "Top" or "Tow", depending on the process and the particular intermediate stage.

1.4.1 Classification of Yarns

Yarns can be classified into several categories as follows:

1. Staple Yarns
2. Filament Yarns
   - Multi-filament yarn
   - Monofilament yarn
3. Assembled Yarns
4. Folded or plied Yarns

Spun Yarns are made by mechanical assembly and twisting together (spinning) of staple fibres. From staple fibres such as cotton, flax, wool, spun and noil silk, broken or cut man-made fibres, spun yarns are produced. Fibres from the compressed bales are first opened up and then assembled into a yarn in the following stage:

Loose stock >>>>> Opening & Cleaning >>>>> Orientation >>>>> Sliver formation >>>>> Drawing >>>>> Roving formation >>>>> Yarn formation (Spining)

So, spinning is the final processing stage in the formation of yarns by the spinner and rewind the yarn from the spinning bobbins onto cross-wound cones by the winder in winding machine to obtain larger packages of yarns.

Filament Yarns are made by the assembly of continuous filaments, made from silk or man-made fibres. A multi-Filament Yarn is a filament yarn made from multiple filaments, assembled with or without twist. A monofilament Yarn consists of only a single continuous filament.

Two or more yarns, which are wound side by side onto the same package, but without twisting around each other, are called **assembled yarns.**

Folded or Plied Yarns are yarns made by twisting together two or more single (and/or folded) yarns of the same or different types.

Twist : The term twist stands for both the direction of twisting and the number of turns in a yarn. If the direction of inclination of the fibres appearing at the surface of a yarn (or of the single yarn components of a folded yarn) is to the right, when the yarn is held vertically, then this is called Z-twist.

If the direction of inclination of thefibres appearing at the surface of a yarn (or of the single yarn components of a folded yarn) is to the left, when the yarn is held vertically, then this is called S-twist.

Twist is the number of turns per inch, in single or folded yarns, per unit of length. Highly twisted yarns are used for smooth and dense fabrics. Low twisted yarns have greater volume and are used for rougher and thicker fabrics.

1.4.2 Uses of Various Types of Yarns

Yarns are used for many purposes like for the production of woven fabrics, knitted fabrics, net and laces, braided fabrics, sewing threads, cords, etc.

Uses of yarns can be categorized for many ways as follows:

- Set Texturedyarns yarns made of filament polyester fiber, can be used in many fabrics including gabardine, interlock, and crepe-de-chine.

- Yarns that have the capability of stretching are increasingly being used in textile materials. Aside from the traditional materials used in foundation garments and swimwear, fabrics made from yarns that stretch are being used in apparel to provide increased comfort when sitting bending, stooping, or engaged in active sports or work activities.
- Stretch textured yarn is made primarily from nylon and used extensively in stretch ski pants, stretch hosiery, and similar products. These yarns can be stretched from 30% to 50% of their relaxed length.
- Bare elastic yarns are used in Power stretch fabrics.
- Covered elastic yarns are used in power stretch fabrics
- Core-spun elastic yarns are used in comfprt stretch fabrics because they possess very low recovery force. Stretch chino, a popular cotton sportswear fabric used for tennis shorts and other active sportswear, is made from core-spun cotton yarns.
- Typical novelty yarns are slub, thick and thin, spiral, flock and boucle, etc. Npvelty yarns give fabrics made from them interesting and decorative surface effects. Using novelty yarns is one means by which textile designers can create cloth with raised or nubby surface textures as distinguished from the usual flat surface of most textile materials.
- Chenille yarns are used in woven fabric to produce soft pile-like effects on bedspreads and other decorative fabrics. Chenille yarns have rather low resistance to abrasion, and their use should be avoided in products that will be subjected to even minimal fabric rubbing.
- Metallic yarns are mostly used for decorative rather than functional purposes; a wide range of colours and effects is available.

1.5 Threads

Thread is supplied by yarn producers. Formed by spinning and twisting textile fibres or flaments to gather in to a continuous strand, it is vital in determining the quality of workmanship in a garment. Before the advent of man made fibres cotton and other natural fibre threads met requirements of durability, appearance and

sewability because the majority of fabrics available were also made of natural fibres. However the advent of man made fibres brought about the development of many new fabrics including knitts. Some of the thread choice includes (i) cotton used in cotton and wool garments, (ii) silk used in silk garments and mens wear, (iii) nylon a mono filament used primarily in mens wear, (iv) polyester and polyester blends, (v) Lycra or spandex for streachables and inner garments.

1.5.1 Labels

Labels are the sources of indentification for garments. A label showing fibre content, care instructions and country of origin. The predominant fibre in the garment is listed first along with its content percentage, followed by the other fibres in decreasing order of content. Care instructions are recommended and is very specific. These instructions not only protect the consumer but also protect the manufacturer.

1.5.2 Space

The other elements of color, texture, line and shape, yet as vitally important is the element of space. Essentially, design spaces came in two forms ; two dimensional spaces that can be anything from canvases and billboards to swatches of fabric and three dimensional spaces, such as blocks of wood, pieces of stones, from room interiors to areas in a landscape. In two dimensional art forms, such as drawings, paintings and prints, the artist often want to conveys a feeling of space or depth. Here space is an illusion, for the images rendered on paper, canvas or board are essantially flat. The canest way to creat an illusion of space or distance is through size. Using relative sizes to give a feeling of space or depth is very common to many periods and styles of art. Overlapping is a simple device for creating an illusion of depth. Vertical location is a special device in which elevation on the page or format indicates a recession into depth. Aerial or atmospheric, perspective describes the use of colour or value (dark and light) to shame depth.

All space, within the confines of design is limited. Creations are confined by boundaries demarcated by a given project. These boundaries may be two-dimensional or three dimensional ; they may be structural or visual ; they may be tangible or intangible.

1.5.3 Texture

Texture refers to the surface quality of objects. It is the most sensuous element of design and appeals to our sense of touch. Many art forms have a basic concern with texture and its visual effects. In most of the craft areas texture is an important consideration ceramics, jewellary and furniture design often rely heavily on the texture of the materials to enhance the design effect. In weaving and the textle arts, texture is a primary consideration.

There are two categories of artistic texture - tactile and visual. Tactile refers to the feel or what in fashion partance is called “hand” of a surface. Texture engages three senses. touch, sight and sometimes sound.

Collage : Creating a design by pasting down bits and pieces of coloured and textured papers, cloth or other materials is called collage. This artistic technique has been popular for centuries, mainly in the area of folk art. Only in the 20th century collage has been seriously considered a logotimate medium of the fine arts.

In painting artists can create the impression of texture on a flat, smooth paint surface. By reproducing colour and value patterns of familiar textures, painters can encourage us to see textures where non actually exist. This is called visual textures. The impression of texture is purely visual, it cannot be felt or enjoyed by touch. It is only suggested to our eyes. One of the pleasure of still-life paintaings is the contrast of visual texture. The ultimate point in partraying visual texture is called trompe I’oeil. The French term meaning “to fool the eye”. This style is commonly defined as “depictive painting”.

Texture and Pattern : It would be difficult to draw a strict line between texture and pattern. The word “pattern” mainly associated with printed fabrics such as stripes, polka, dots and floral patterns. Pattern is usually defined as a repetitive design, with the same motif appearing again and again. Textures, too often repeats but its variations. Usually do not involve such perfect regularity. The essential distinction between texture and patterns seems to be whether the surface arouses our sense of touch or merely provides design appealing to the eye. In other world while every texture makes a sort of patterns, not every pattern could be condered as a texture.

1.6 Textile Fibres

Like most of the substances textile fibres are made up of molecules. Fibre molecules are called polymers and the unit of a polymer is termed as menomer. Fibre forming polymers of apparel fibres should be (i) hydrophilic, (ii) chemically resistant, (iii) linear, (iv) long, (v) capable of leing oriented and (vi) able to form high-melting point polymers system. The polymer systems of commonly used apparel fibres are the acrylics cotton, flax, nylon, polyester, viscose, wool to a very large extent meet the above requirements. On the other hand, man-made fibres such as the chloro-fibres, polyethylene and polynopylene fibres are restricted in their apparel use because they do not satisfactorily meet the first, fifth and sixth requirements listed above. Natural celluloise fibres such as coir, hemp, jute and sisal have very restricted apparel use because they are very stiff and uncomfort to wear.

General considerations with regard to fibre properties

(1) Fibre Morphology : Morphology is the study of size, shape and structure of a material or textile fibres and their relationship between these properties.

(a) **Fibre length and thickness :** Fibres are several thousand times longer than their thickness. The length of the most apparel grade fibres ranges from 15mm–115mm. with some exceptions like flax, the thickness of these fibres ranges from about 10μm – 50μm. A filament is a very long fibre. The length of a filament may range from a few 100 meters to several kilometers.

(b) **Fibre length to diameter ratio :** This ratio determines whether or not a fibre is suitable for spinning into yarn. A ratio of 1000:1 or more indicates a fibre which should readily spin into a useful yarn.

(c) **Colour :** Natural fibres and delustred man-made fibres are white to off-white in colour. White or colourless fibres and flaments are preferred because they can be dyed or printed easily.

(d) **Lustre :** This is a subjective measure of the reflection of incident light from a fibre, filament or textile material. Cotton has a convoluted fibre structure and wool a scally surface structure results dullness, whereas more regular and even structure of mercerised cotton and silk gives a distinct lustre.

Fibre tenacity :

The tenacity or strength of a fibre is in general directly related to the length of its polymer, orientation and types of inter-polymer forces of attraction.

Hygroscopic nature :

The hygroscopic nature of a fibre is directly related to the polarity of its polymers and the ratio of its amorphous and crystalline region.

Thermal properties :

The most important thermal property of a textile fibre is the temperature at which it may soften or begin to melt. This temperature is a relative measure of the fibre's heat resistance.

Chemical properties :

This gives an indication of the extent to which the polymers of a fibre may react with the common degreading ofents such as acid, akali, atmospheric pollutant, sunlight etc.

The cellulosic fibres

Cellulosic fibres can be categorised under (i) Natural cellulosic fibres i.e. cotton, flax, jute, kenal, sisal, etc. and (ii) regenerated cellulosic fibre like viscose, cuprammorium etc.

Cotton

Cotton fibre is obtained from a plant and it is classified as a natural, cellulosic, seed, unicellular staple fibre. Under a microscope, a cotton fibre appears as a very fine and regular fibre. Fibre length ranges from 10mm – 65 mm depending upon the quality of the fibre and density of the fibre is 1.52g/cm^3, which makes cotton a rather heavy fibre. The longer the cotton fibre, the earier it is to spin into a smoother and stronger yarn, resulting in a more comfortable, durable and attractive fabric and garments.

The cotton fibre is a single plant cell and has a distinct cuticle, well developed primary and secondary walls, and a lumen.

Properties

1. Cotton fibre is very absorbent and the hygroscopic nature ordinarily prevents cotton textile materials from developing static electricity.

2. Wet strength of cotton fibre is more than its dry strength.
3. Cotton fibres are weakened and destroyed by strong mineral acids.
4. Cotton fibres are resistant to alkalies and are relatively unaffected by normal landering.
5. The most common bleaches used on cotton textile materials are sodium hypochlorite and sodium perborate.
6. The ultraviolet rays of sunlight provide photochemical energy and the infrared rays provide heat energy necessary to degrade the cotton polymers in the presence of atmospheric oxygen, moisture and air pollutants.
7. Cotton in considered to be a relatively easy fibre to dye and print. The classes of dye which they be used to colour cotton are direct, reactive, azuic, vat and sulphur dyes.

The Protein Fibre

Wool fibre :

Wool is a natural ptotein staple fibre having density of 1.31g/cm^3, which tends to make wool a medium weight fibre. Wool fibre in a crimped, fine to thick, regular fibre. Fiber variety of wool have 10 crimps per cm, while the coarser veriety have less than 4 crimps per 10 cm. The crimped configuration prevents wool fibres from aligning themselves too clesely when being spun into yarn. The warmth of wool fabrics is due to the more air spaces in the material then to the fibre. Wool fibres may vary from off white to light cream in colour. This variation in colour in due to the disulphide bonds.

The characteristic longitudival microscopic appearance of wool is the over lapping surface cell structure. These surface cells, known as epithelial cells, and commonly called scales, point towards the tip of the fibre. The scales give the wool fibre a servated surface. Felting of wool is the irreversible shrinkage of the length, breadth and/or thickness of the material and the tendency of wool to felt is a disadvantage of woollen articles of clothing that require frequent loundering.

Polyester fibre

Polyester is a man-made fibre. The most common polyester filament or staple fibre in usually composed of polyethylene terephthalate polymers, polyesters are

medium weight fibre with a density of 1.39 g/cm^3 and due to this polyester textile materials are manufacture as light weight fabrics. Polyester filaments or staple fibrics. Polyester filaments or staple fibres are fine, regular and translucent and have no identifiable microscopic appearance. The longitudiual appearance of the fibre is very regular with circular cross-section.

Properties :

1. Polyester filaments and staple fibres are very strong because of their extremely crystalline polymer system.
2. Polyester filaments and staple fibres are hydrophobic which attracts fats, greases, oils etc.
3. Alkaline conditions as encountered during laundering may hydrolyse the polyester polymers.
4. Normally polyester textile materials do not require any bleaching action.
5. The acid resistance of polyesters help protect polyester textile materials from the slightly acidic conditions that occur in polluted atmosphere.
6. Only disperse dyes are used to dye and print polyester fibres.

Nylon

Nylon is a man-made synthetic polyamide fibres having density 1.14 g/cm^3. The nylon filament or staple fibres display no characteristics microscopic appearance. Nylon filament a staple fibres are not absorbent even though there is a relatively strong attraction for water molecules by the polar amide groups. Nylon is less resistant to acids than it is so alkalis. The amide groups in the nylon polymers are readily hydrolysed under acidic conditions. Prolonged and frequent exposure to alkaline condition cause significant alkali hydrolysis and nylon plymers. Nylon textile materials are inherently white and do not require bleaching. Acid and metal-complex class of dyes are frequently used for dyeing of nylon.

Acrylic fibre

Polyacrylonitrile (PAN) fibres are generally referred to as the acrylic fibres. The acrylic fibres availabe in the market are termed as modified acrylic. These modified acrylic fibres must composed of at least 35% but not more than 85% by weight of

acylaritrile units. The acrylic fibres appear as regular, translucent, slighthy wavy filaments or staple fibres. Acrylic fibres are hydrophobic because the polymer system is highly crystaline. The acrylic fibres are resistant to acid and alkali. Acrylic fibres are not usually bleached in practice and are the most sunlight and weather resistant fibres in common use. Modified acrylic fibre are most commonly dyed with basic dyes.

Flax fibre

Flax fibre is classified as a natural cellulosic, bast and multi-cellular fibre. It has a fibre density of 1.50 g/cm^3 and is considered as heavy fibre. The flax fibre is thick, regular fibre with a subdued lustre. Flax is a very strong fibre and melartic in nature and has an ability to absorb moisture quality.

Viscose fibre

Viscose is a regenerated cellulosic filament or staple fibre. It is a fine, reugular filament or staple fibre. The wet strength of viscose rayon is almost half than its dry strength. The very amorphous polymer system of viscose makes it the most absorbent fibre in common use for apparel. With regard to dyeing and printing viscose absorbs more colour. Reactive, Direct class of dyes are most commonly used for dyeing and printing purpose.

Silk fibre

Silk is a natural protein filament having density of 1.34 g/cm^3, which makes it a medium weight fibre. The raw silk strand consists of two silk filaments encased by a protein called sericin, which makes it thick, uneven and irregular surface and coarse handle. The silk polymer is a linear, fibroin polymer like wool, the repeating unit of silk is the amino acid. The silk filament is strong, but in wet condition it loses strength. Silk is degraded more readily by acids than the wool, wheras alkaline solution cause the silk filament to swell. Chlorine containing bleaching agents are not preferred for bleaching purpose and the resistance of silk to the environement is not as good as that of wool. Acid, metal-complex and reactive class of dyestuffs are most commonly used for dyeing and printing of silk materials.

Relative Importance of Different Fabric Properties as per End-Use Requirement for Diversified Jute and Jute Blended Fabrics

Table : 1. Upholstery

Properties	Relative importance
Abrasion Resistance	***
Light Fastness	***
Thickness	**
Flexural Rigidity	**
Rubbing Fastness	**
Wash Fastness	*
Dimensional Stability	*

Table : 2. Curtains

Properties	Relative importance
Drapability	***
Dimensional Stability	***
Light Fastness	***
Wash Fastness	*
Crease Resistance	*

Table : 3. Table Cloth

Properties	Relative importance
Drapability	***
Wash Fastness	***
Light Fastness	***
Dimensional Stability	**
Crease Resistance	**
Abrasion Resistance	*

Properties	Upholstery	Curtains	Table Cloth	Wall Hanging	Bag Cloth	Blanket	Floor Covering
1. Thickness	**					**	*
2. Strength					***		
3. Abrasion Resistance	***		*				***
4. Drapability		***	***				
5. Flexural Rigidity	**						
6. Bending Rigidity					**		***
7. Dimensional Stability	*	***	**	**	**		
8. Compressibility and Racovery	**		*				**
9. Rubbing Fastness	***	***	***	***	***	**	**
10. Light Fastness	*	*	***		**		
11. Wash Fastness						*	
12. Drycleaning Fastness		*	**				
13. Crease Resistance							
14. Pilling Resistance						**	
15. Thermal Resistance						***	

Table : 4. Wall Hanging

Properties	Relative importance
Light Fastness	***
Dimensional Stability	**

Table : 5. Bag Cloth

Properties	Relative importance
Strenght	***
Light Fastness	***
Dimensional Stability	**
Wash Fastness	**
Bending Rigidity	**

Table : 6. Blanket

Properties	Relative importance
Thermal Resistance	***
Thickness	**
Pilling Resistance	**
Compressibility and Recovery	**
Light Fastness	**
Dry Cleaning Fastness	*

Table : 7. Floor Covering

Properties	Relative importance
Abrasion Resistance	***
Compressibility and Recovery	***
Rubbing Fastness	**
Dimensional Stability	**
Thikness	*

Fibre : Viscose Rayon

Generic Class	:	Rayon (A manufactured fibre composed of regenerated cellulose)
Dry tenacity	:	2.3-2.4 g/d
Wet tenacity	:	1.17-1.27 g/d
Condition extention	:	18.5%
Wet extention	:	13.0%
Moisture regain	:	12-13% (65% R.H & 70°F)
Creep	:	Elasticity of viscose rayon is not high
Specific gravity	:	1.48-1.52
Electrical property	:	Owing to its high moisture absorption, viscose rayon does not lend itself particularly well to insulation purposes.
Birefringence	:	.022
Resistance to light	:	On exposure to light, photocellulose is formed and weakening takes place. Effect of heat : Does not melt, looses strength at 300F and begins to decompose at about 325F.
Chemical properties	:	Acids attack viscose rayon more quickly than they do cotton. At high temperatures acids carbonize viscose.
Biological ressistance	:	Moulds and mildews discolor and weaken viscose rayon.
Susceptibility to bleach	:	(a) Sodium hypochlorite, neutral is the most satisfactory bleach for viscose rayon. (b) Hydrogen peroxide can be used at temperature not exceeding 55°F.
Morphology	:	(a) longitudinal : striated cylinder (b) cross section : serrated
Affinity of dyes	:	direct, reactive, vat, sulphue etc.

Indian Manufacturer

(a) Baroda rayon corp.

(b) Grasim industries ltd.

(c) Century rayon

(d) Indian rayon and industries ltd.

(e) Shriram rayon

Fibre : Ramie

Ramie fibre is obtained from the stem of the plant Boehmeria nivea guad. There are two forms of the ramie plant—the green or Indian ramie and the white or Chinese ramie.

Fibre Morphology : Ramie is an unicellular fibre. The shape of the fibre ultimates as obtained after complete degumming is mainly flat—ribbon like with occasional twists. The shape of the cross-section of ramie fibre is mostly elongated polygonal often with rounded corners.

Tenacity	: 40-50g/tex
Extension at break	: 3-4%
Specific gravity	: 1.51-1.56
Moisture regain at 65% r.h and 70^{o}F	: 12.0%
Degree of crystallinity	: Very high
Orientation angle	: 7^{o} - 8^{o}
Degrading temperature	: 500^{o}F
Discolour temperature	: 250^{o}F
Dye affinity	: Direct, Reactive, Vat, Sulphur.

Fibre : Polypropylene

Generic class : Olefin

A manufactured fibre in which the fibre forming substance is any long chain synthetic polymer composed of atleast 85% by weight of ethylene, propylene or other olefin units.

Tenacity	: 8.5 - 9.0 g/d
Extension at break	: 17 - 20%
Specific gravity	: 0.90 - 0.92

Moisture regain : < 0.05%

Static electricity : Develops static charges

Chemical resistance : Excellent.

Acids and alkalis have very little effect.

Polypropylene is insoluble in cold organic solvents, but will dissolve in hot decaline and tetraline or in boiling tetrachloro-ethane. Trichloroethylene at the boil causes heavy shrinkage.

Abrasion : Resistance to abrasion is good.

Effect of heat : (i) Tg :

(ii) Tm : 165°F

(iii) Ts : 155°F (softening temperature)

Effect of light : Sensitive to oxidation initiated by the action of light.

Affinity to dyestuffs : Pigment

Indian Manufacturer

Alembic chemical works and Co. Ltd.

Gujrat Filaments Ltd.

Rajasthan Petrosynthetics Ltd.

Fibre : Silk

Composition of cultivated raw silk :

Fibroin : 70 - 80%

Sericin : 20 - 30%

Waxy Matter : 0.4 - 0.8%

Carbohydrate : 1.2 - 1.6%

Inorganic Matter : 0.7%

Pigments : 0.2%

Tenacity : 3.5 - 4.5 g/d

Elongation : 18 - 20%

Specific gravity	: 1.33
Moisture regain	: 11.0%
Birefringence	: 0.053
Degrading temperature	: 338°F
Safe Ironing temperature	: 250°F
Degree of crystallinity	: 45 - 50%
Effect of heat	:
Effect of acid and alkali	:
Effect of bleaches and solvent	:
Resistance to mildew aging and sunlight	:
Morphology	: Filaments of silk appears as solid rods with traingular cross-section.
Dye affinity	: Acid, Metal-complex, Reactive, Basic, Natural dyes.

Fibre : Acrylic

A manufactured fibre in which the fibre forming substance is any long chain synthetic polymer composed of atleast 85% by weight of acrylonitrile units.

$(—CH_2—CH_2—)_n$

Breaking tenacity	: 2.2 - 2.3 g/d (std.)
Beaking tenacity	: 1.8 - 2.4 g/d (wet)
Density	: 1.14 - 1.17 g/cc
Birefringenece	: –0.004
Moisture regain	: 1.5% (at 65% r.h and 70°F)
Melting point	: Does not melt, decomposes with discoloration
Breaking elongation	: 40 - 55% (std.)
	: 40 - 60% (wet)
Elastic recovery	: 99 at 2%
	: 89 at 5%
Average stiffness	: 5 - 7 g/d
Average toughness	: 0.4 - 0.5 g-cm.

Effect of acids and alkalis	:	Good to excellent resistance to mineral acids. Fair to good resistance to weak alkalis.
Effect of bleaches and solvents	:	Good resistance to bleaches and common solvents.
Resistance to mildew, aging, sunlight, abrasion	:	Excellent resistance to mildew, aging and sunlight. Good resistance to abrasion.
Dye affinity	:	Disperse and Cationic
Cross-sectional shape	:	(i) nearly round (ii) dumbbell or lima been-shaped (iii) elongated dumbells or wavy ribbons

Textile designers generally create print designs for fabrics or suggest styling ideas for a weave or knitt. They work hand in hand with textile engineers and have to understand textile processes to know if their ideas will work. Textile designers must consider the essential elements of colour, texture, line, shape and space. The primerily coucerned is a two diamentional surface i.e. flat fabric rather than with the three diamention human form. They may use CAD systems to help them experiment with visual rerpesentations of weave and pattern designs when designing a collection of fabrics to present to their customers.

Textile fabrics can be made from yarns/fibres by the following routes:

a) From Yarns:
   - Woven
   - Knits
   - Braids
   - Open-work
   - Stitched

b) From Fibres
   - Nonwovens

     (felted, needled, adhesive bonded)

c) From combinations of fibres and yarns

- Stitch-bonded
- Laminated

Woven fabrics are made by the interlacing of two sets of yarns, disposed at right angles.

Knitted fabrics are made by the interlocking of loops of yarn (s). In weft knitted fabrics, the loops are formed by yarns traversing across the fabric width. In warp knitted fabrics, the loops are formed by a set of yarns disposed along the fabric length.

Open-work fabrics such as lace and net can be made by various techniques such as leno, bobbinet, and warp knitting.

Braid is made by the interlacing of at least three yarns in a diagonal pattern.

Nonwoven fabrics are made directly from fibres, with no intermediate stages. Webs, or batts are given strength by mechanical entanglement or adhesive bonding of the fibres.

Wool felts are made by entanglement of wool or other animal hairs by the felting action of hear, moisture, and agitation.

Stitch bonding can be used to make fabrics from several types of fidre assembly, including webs, silvers, rovings or yarns.

Laminate fabrics are made by the adhesive bonding of two or more fabrics, or by bonding fabrics to foam, film, or paper.

1.7 Summary

Fibres are the smallest part of the fabric. They are fine, hair-like substances, categorized as either natural or manufactured. Cotton, which grows on a plant, and wool, which is shorn from a sheep, are examples of natural fibres. Manufactured fibres are created from chemicals and include acrylic, nylon and polyester. Chemical companies produce them. Textile fibres can also be classified into Coarse, Fine, and Microfibres. Apparel fabrics are usually made from fine and microfibres. Finer fibres make softer, denser and more comfortable fabrics, with better drape.

Textile yarns are, by definition, groups of fibres twisted together to form a continuous strand. All textile fabrics, except for a few, such as felt and nonwoven

fabrics, are produced from yarns. The yarns are interlace(woven), interloped (knitting) or combined in other ways tofrom a textile fabric. There are many types of yarns, some lustrous, some dull, some smooth, some rough, some thinner than human hair, some thick and bulky, etc.. Two fabrics each made from the same fibre(e.g. cotton) and each woven in the same weave (twill weave) may be substantially different from one another in appearance, durability, and cleanability due to the yarn difference in each of the fibres.

Woven fabrics are made by interlacing two sets of yarns at right angles to each other. The length-wise yarns are known as warp yarns or ends, and the width-wise yarns are known as Weft (filling yarns, or picks). The length-wise edges of the fabric are the selvedges. The selvedge is easily distinguishable from the rest of the material.

1.8 Reference Book

Handbook of textile fibres – J Gordon Cook, Merrow

1.9 Assessment

1. How fibres can be identified?
2. Classify textile fibres according to end uses.
3. What is yarn? Classify yarn types.
4. What is weaving?
5. Compare different types of fabrics made from different manufacturing processes in terms of production.

Unit 2 ❑ Introduction to Apparel

Structure

2.0 Objectives

- Getting introduced cultural history
- Studying design
- Emphasising on research

Learning outcome :

After learning this lesson we know the cultural history of few countries and their types of garments.

2.1 Introduction

One of the basic needs of civilized mankind is clothes. The garment industry caters to the need of clothing while textile refers to the production of intermediate products like fabric and yarn etc which are used to make the final product *i.e.* garment. The textile trade around the world has expanded at rapid speed than the GDP growth and trade in international textile and clothing has grown at higher rate than world trade. World textile and clothing industry would be the fourth industry to cross trillion dollar mark after Auto, Computer and Pharmaceutical sector. There is immense potential of growth with changing fashion and rising standard of living. US and EU would be the major importer countries of textile products.

2.2 Apparel Design

2.2.1 History

Since the beginning of mankind humans have used some kind of garments for their body. The archaeologists and anthropologists say that the earlier clothing was made of fur, leather, leaves or grass. The modern man uses different fabrics to make garments.

2.2.2 Utility

Garment is an article of clothing which covers human body. Wearing garments has become a habit to all of us in today's world. There are different kinds of material available to make a dress, attire, apparel or garments. We wear clothing primarily to protect our body from natural elements. Social reasons and functional reasons are secondary.

2.3 Types of Garments

Man, woman and child use different garments. Usually men wear pants and shirts. Women wear skirts, dresses, or pants and shirts as well. In India women mostly wear sarees or Salwar Kurta.In the old days people used to stitch their cloths in the house, but now we can get readymade cloths. There is a huge market for readymade garments. You get

- Men's wear
- Ladies wear
- Kids wear

2.4 Ancient Egypt (3000 BC – 300BC)

Only light clothing was necessary because of the mild climate. Originally all levels of society dressed the same but later clothing became an indicator of social standing and wealth.

Men and Women wore similar items of clothing. The preferred material was a line white lined. However fabrics with colourful patterns or incorporated with gold thread were also popular. The garments were often transparent and finely pleated

Women's Clothing

Originally the women wore a simple liner cloth which was wrapped around the lower body and knotted together at the waist. The upper body remained uncovered only members of the upper class wore a cape which came down to the elbows and was gathered into crossways folds.

The kalasins appeared later and was worn in many different ways. Worn as a calf or ankle length garment. It was secured by a shoulder broad straps. They were often richly decorated.

The kalasins in shift form came up to the neck or had different necklines. It was either sleeveless or was provided with sleeves. It was worn loose or belted and was usually transparent and finely pleated.

Under the influence or Asia. A sort of coat was developed. A broad piece of fabric double the length of the body had a button hole and side seams from the wast to the hem . a sash was often added.

Men's Clothing

The men wore a loin cloth or hip cloth the shenti. The cloth was wrapped around the lower body and was tied in front or kept up by a belt kings and dignitaries wore cloth which were gathered had many pietas and were decorated several cloths were often worn and on top of the other. The outermost was the longest and was similar to a skirt.

Originally the shenti was the only item of clothing and the upper body remained bare. later men also wore a shift style kalasins usually over seldom under, the loin-cloth.

The wide cloak like drape, which was pulled over the head was held at the waist by a knoll. The haik, a transparent coat wrapped around the body was reserved for the ruler.

2.5 Ancient Greece (1600BC – 100BC)

Clothing was airy and wide. It consisted of pieces of fabric elaborately draped around the body individual gathering and the arrangement of t he bell were the main forms of decoration . men and women wore similar clothes.

The woven fabrics were made of linen and wool. Then out of cotton Rich strong colours and edges decorated with braid trimming were valued highly.

Women's Clothing

The peplos consisted of a rectangular woolen cloth which was laid around the body under the arms and then lifted over the shoulders where it w as secured by brooches clasps (fibula) buttons or knots. The upper edge or the fabric was folded over down to the waist or the hips the right side remained open . this long straight garment was often worn unbelted although sometimes it was belled at the waist either under or over the folded down material.

The lighter chiton made from linen was usually sewn up at the sides. The narrow design reaching from elbow to elbow with outstretched arms was simply placed on the shoulders and consequently was sleeveless. The wide chiton stretched from fingertip to fingertip and had sleeves of a sort. They resulted from gaps in the sides (arm holes) of the uppermost edges and were knotted over the arms. The top drape could be greatly varied for example cut unevenly of round. The typical chiton was arranged with a multiplicity of pleats and folds produced by one or several belts at the waist or the hips.

In later times, both types of garments were combined, they were also worn together the chiton as an under garment, the peplos as an outer garment.

The himation a large rectangular woolen cloth wrapped around the body. Was worn as a coat sometimes it also covered the head.

Men's Clothing

The men's chlaina corresponded to the women's peplos . the rectangular woolen cloth was placed ever the back and shoulders and held together at the front or on the right shoulder by a clasp.

The men's chiton ended , like the chlaina above the knee and was belted under the chest and was only put on for festive occasions and was reserved for high-ranking men and priests .

The short garment which left one shoulder bare was called the exotnis is gave more freedom of movement.

The himation was elaborately draped around the body and sometimes was the only item of clothing

Horsemen travelers and soldiers preferred to wear the chlamys as a coat. This short woolen drape was put over the left shoulder and pinned over the right shoulder so that the right arm was tree.

2.6 Germanic Prehistory and Early Times (2000AD– 600AD)

Clothing from the Bronze Age (about 1800 BC) with its own distinctive (about 800 BC to 600 AD) and ancient influence was evident, particularly in women's clothing as indicated by relics recovered from peat bogs.

The clothing of the feutonic peoples was suited to the cold northern climate wool men and especially animal skins were used woven patterns coloured borders and edgings as wall as fringes enlivened the simple garments.

Women's Clothing

Women's garments during the Bronze Age consisted of a skirt and blouse. The wide skirt was ankle length. The skirt was gathered at the waist secured by a braided fringed belt or cord and decorated with an ornamental belt disc. The blouse had kimono like sleeves, was made out of one piece of material and had an opening for head and neck. It was worn inside the skirt and fastened with a decorated brooch.

Young girls wore a knee length cord skirt which consisted of numerous. Closely packed cords suspended from a waistband.

The iron Age brought the tunic dress which was out on over the head, held together on the shoulders by pins or clasps and betted once or twice. It draped in many folds and was sleeveless but was often worn under or over a blouse with sleeves. Later, it was provided with short or long sleeves.

Chest, leg and thigh bindings were worn under the dress. A large cloth served as an outer garment. It was wrapped around like a cloak covered the head, and was held together by pins or clasps (fibula).

Men's Clothing

During the Bronze Age the men wore a tunic wrapped around the body and belled at the waist . it reached from the armpits to the knee and was held by a strap which ran over the shoulder and was secured at the back by a button. Under the tunic, a rectangular belted loincloth was commonly worn.

Trousers were developed in the iron Age. Short trousers were extended by leg pieces of bindings. The trousers were held up by a belt which ran through loops.

A knee length smock which was put on over the head was worn with the trousers. It was originally sleeveless. It was usually belted and occasionally had a hood.

2.7 Byzantine Middle Ages (300AD – 1400AD)

Clothing developed into a sumptuous formal costume which enveloped the body completely. Covering its natural shape. The ruling class preferred heavily coloured silk fabrics and brocades, richly embroidered with precious stones and pearls, insignia were important. The ordinary people, however, wore unobtrusive wool and linen materials.

Even today, the vestments of the church are based on Byzantine clothing. For a long time, the coronation robes of emperors and kings also followed the Byzantine model.

Women's Clothing

A white ankle length tunic served as an under garment. This was belted, had long sleeves and was often made of silk.

The outer garment, the long or short sleeved stone, originally reached to the floor but was later shortened to show the under garment. It was worn either belted or loose, depending on the weight of the material.

The paenula served as a top garment. The front edge of the circular cut, closed robe was often lifted up and placed over the shoulder.

Members of the ruling house wore a shoulder cloak which was secured on the right shoulder by a decorated clasp.

Men's Clothing

The long sleeved tunic was either knee or ankle length and usually belted length, with colour and material revealed rank and status. The tunic was normally worn over tight leg wear.

The daimatic a long unbelted robe with wide sleeves was reserved as an outer garment for rulers and high ranking dignitaries . colourful lengthways stripes, called clavi, decorated the front and back as well as the hem of the sleeves.

The cloak was either rectangular or rounded and was fastened with a clasp on the right shoulder . a fabric appliqué the tablion was sewn on at chest height to show rank. For the ruler a was gold and richly decorated. For high tanking officials.

2.8 Romanesque (700AD – 1250AD)

The clothing of the courts was colourful. Delicate linen fine cotton velvet silk and brocade were value. The borders of the garments were decorated with expensive trimmings. However, the clothing of the ordinary people was prescribed by decree . only coarse fabrics in dark colours were to be used trimmings and jewellery were to be avoided.

Women's Clothing

Until 11th century the women's dress had tunic like cut and was generally long sleeved belted and richly decorated with trimmings. The shift like pleated under garment was often visible at the neckline and sleeves. It reached the floor and had long narrow sleeves. In time the outer dress was shortened and made narrower which emphasized the female figure. The sleeves however, became very wide at the wrists.

A piece of material placed around the shoulders and fastened at the side or front with a clasp served as a cloak.

In the 12th century the top part of the dress called the cotte was made to fit closely to the body. This was achieved by the shaped out of front and back sections and by lacing on the side or back. The skirt trailed and an inserted gusset maintained a wide hem. A belt accentuated the low waist.

Noblewomen often wore a luxurious outer garment over the cotte called a surcot. This was usually unbelted and sleeveless.

In the thirteenth century if was excessively long and was held up when walking, the catte also became very long. And less closely fitted and them also worn without a belt.

The shoulder cloak, cut in a semi circle was fastened a me front with a clasp or with a cord or chain between two decorative discs (tassels).

Men's Clothing

The Frankish costume for men consisted of a shirt hose tunic and cloak. The knee length tunic had long straight sleeves and a round or square neckline. The shirt worn underneath was wide and long. The hose consisted of two long legs over which the bindings were wrapped around the lower leg short hose were also common. The legs were secured onto a belt.

The rectangular shaped and usually long cloak was placed round the left shoulder and pinned on the right with a clasp.

During the age of chivalry from the 11th until the 13th century men's clothing differed very little from courtly women's clothing. It simply had fewer folds and was always above the feet. The shorter and sleeveless surcot was worn over the cotte. The long sleeved and belted shift like dress. The surcol was slit at the front or at the side was often lined with fur or had for trimming around the neck. The light, stocking like hose or nether stocks served only as under clothes. The cord and tassel cloak were also worn by men as an outer garment.

2.9 Gothic (1250AD – 1500AD)

Clothing was graceful and elegant, but also complicated and lavish. it was then made by Garment Tailors. Typical characteristics of long slender designs with an emphasis on the waist and bright colours.

The 14th century saw the emergence of relatively rapid changes in fashion. Fashion was spread by travelling bards and traders.

Around 1450 a peculiar exaggerated fashion emerged from the court of the wealthy dukedom of Burgundy.

Apart from exaggerated designs of head wear and shoes, the most conspicuous features of Burgundian fashion were deeply serrated garment borders, called degges, decorations of small bells and diamonds, padding and quilting. The mi-parti or parti coloured fashion was also very popular different coloured legs. Or garments in which differently coloured fabrics were joined together.

Women's Clothing

In the 13th century the women's cotte was still close fitting and was worn either loose or belted. The skirt was very long with many gathers and folds. The sleeves were narrow for the full length or became very wide at the wrists.

In the 14th century the top of the dress became tightly laced with a very wide neckline and button fastenings. The skirt widened from the hops, which were often accentuated by a belt. Short sleeves which had long trailing steps of material secured at the back called hanging sleeves also came into fashion.

The garment was gradually divided into a skirt and top or bodice. The bodice could then be made very tight fitting. The join with the long trailing skirt was covered by a belt. The sleeveless surcot was popular as an outer garment. Sometimes the surcot would be only hip length with fur-trimmed edges

The houppelande a cloak like outer garment also became fashionable. it was open at the front or closed all round and was usually worn belted. It had various styles of sleeves which were often jagged around the edges.

The circular cut clasp cloak was fastened at the front by a decorative clasp.

Women's Clothing at the Time of Burgundian Fashion

In the late Gothic period the silhouette of the women's dress became very slender, the tight bodice had a very deep pointed neckline. The train at the back of the skirt became very long. The front of the bodice was often provided with a shawl collar. Tight fitting pipe sleeves wide at the wrists were popular as were bag sleeves with arm slits very long sleeves and open hanging sleeves.

Men's Clothing

The tunic became narrow and short and was provided with a fastener at the front the front and back sections the skirt part descending from the waist and also title long narrow sleeves were tailored to fit.

The outer garment which was originally calf length developed into a jacket, the doublers, and only came down to the hips. The doublet was narrow at the waist tight fitting at the front. Buttoned up or deeply cut. The back and skirt sections were gathered in folds. The chest section and the upper sleeves were well padded. The collar came up to the chin. Open sleeves often had long falling folds of cloth whilst the closed sleeves were often widened at the wrist. The belt sat on the hips and became in item of decoration.

The stocking like hose made of leather or stretchy fabrics were often coloured. These were fastened behind the skirt of the doublet. Towards the end of the 14th century they w ere joined at the top so they created trousers which now covered the stomach, the codpiece was developed both for projection and for emphasis

Over time, the doublet became very short. However older men preferred long over garments, especially for formal occasions. The houppelande was gathered into the waist and was belted. It was often stashed at the sides and usually had a stand up collar. The long wide conical sleeves and also the puffed sleeves were often provided with additional arm slashes. The long or knee length tabard (a rectangular garment adapted from crusader knight armour covering) was worn draped loosely back and front over the tunic.

Cloaks of various lengths were worn, sometimes long and trailing sometimes only hip length.

2.10 Renaissance (1500AD – 1640AD)

Clothing of the early Renaissance or Reformation period reflected the individual taste of the newly influential, self aware and prosperous bourgeoisie, the colourful garments made from expensive maternal. Such as to code, damask and velvet were richly patterned and lavishly decorated with ribbons, braids timings, embroidery and facet. The striking costume of the landsknecht (mercenaries) with puffs and colour contrasting stashes had a strong influence.

Around the middle of the 16th century Spain rose as a strong political power after the discovery of America and the establishment of a colorial empire consequently the Spanish court also set the trend for styles of clothing.

Spanish fashion expressed the austere spirituality of the counter reformation and dilated colours, designs and details quite precisely. Although the clothes were sometimes elegant and showy they were also stiff, uncomfortable and often in somber colours.

2.10.1 Women's clothing during the reformation period

The tight bodice was separate from the skirt, often laced up at the front. The round or square neckline was broadened and was usually filled with a fine pleated undershirt with a ruche close to the neck. The sumptuous sleeves were tied on and were therefore interchangeable. By using draw strings and inserting strips numerous subdivisions and puffs were obtained. They were also often provided with stashes which were lined with differently coloured fabric. The cuffs and ruched edges often covered half of the hand.

The wide trailing skirt was gathered in folds and was accentuated crossways by braid and other trimmings. Whilst waking the skirt was held up to reveal the pleated underskirt occasionally a long and richly embroidered apron was worn which later also server as a replacement for the outer skirt

The partlet, a round shoulder collar was placed on top of the low cut bodice. It usually had a stand up collar. Was make out of velvet or silk and was often decorated with embroidery

Laced bodices partlets and aprons are still seen today in traditional rural costumes the long wide chamarre with a broad collar and arm slits was worn as coat.

2.10.2 Men's clothing during the Reformation period

The tight fitting doublet reached just to the tips. A shirt with finely pleated neckline and cuffs was worn underneath. A knee length coat with a gathered and pleated lower section was worn over or instead of the doublet. It could either be open to the belt or high necked . the doublet and shirt had broad bulging sleeves which could be exchanged had stasnes with coloured linings. And were bound many times in order to create puffs.

The legs were clothed in wide knee breeches and stockings which were either fastened or sewn on . often, the tight hose were secured to a belt. Many of them were differently coloured or parti coloured. Later, baggy breeches with puffs and stashes, called stops or pluder hose or trunk hose were borrowed from the Landsknecht mercenaries costume.

The typical outer garment of the Reformation was the chamarre, a decorative

coal with shawl collars, it was open at the front and usually unbelled. It was often lined or trimmed with fur. Sometimes it was ankle length, sometimes just above the knee. The wide sleeves often had additional openings for inserting the arms. The chamarre is worn today as a robe or gown by judges and protestant priests.

2.10.3 The Spanish fashion in women's clothing

The tight bodice was always high necked and reinforced by bone and wire to press the upper body flat. At the front it had a painted or rounded lengthening. The stomacher. The waist was faced very narrow by a corset worn underneath. The stuart collar or collet mounte made from stiffened lace surrounding the head in a fan shape. Also became fashionable.

A white ruff was also formed at the ends of the long sleeves. Wide over sleeves and emphasis of the upper arms by puffs and rolls were popular.

The floor length underskirt was stretched over a conical frame. The first hoop skirt of fashion history was called a Farthingale.

The top skirt lost all its folds was usually open at the front and decorated with inmmings on the edges. The hips were broadened by means of padding which was tied on.

Occasionally, a coat like over dress with a straight cut, the ropa was also worn

2.10.4 The Spanish fashion in men's clothing

The doublet was kept very short, was tight fitting and deeply padded. The padding on the chest created a ridge running all down the middle of the chest, called a peasecod belly . the high necked doublet had a long, stiff stand up collar over which projected the shirt ruff . the neck ruff grew increasingly target and stiffer and eventually became a separate item of clothing. The long sleeves were padded putted and slashed and were provided with shoulder pads, they also had stiff ruts at t he ends.

Sleeveless doublets were often provided with loose decorative sleeves

The full, well padded breeches, which sometimes had stashes, were short and extended only to the middle of the thighs. They had tight banks at the waist and on the legs. The front flap or codpiece was also padded . below these trunk hose tight fitting nether stocks or leggings fastened with ribbons were warn.

The very short bell shaped cape of velvet or silk the Spanish cape was only placed around the shoulders. It had a high standing collar and occasionally a hood.

2.11 The Thirties (1930 - 1939)

Women's Clothing

Dresses were made of flowing fabrics, were calf length, accented at the waist, narrow at the hips and had a flared hem. Biased cuts, draping and the wrap over effect emphasiged the elegant line . the shoulders ware accentuated by pads and strongly gathered sleeve settings . formal evening dresses were low cut and often had a train.

Jackets and coats were also slim-fitting by the end of the decade shoulders had become heavily padded. Skirts just covered the knee. Coats were often 7/8 length, details from uniforms such as a paulettes, large sewn on pockets and broad lappets were typical .

Men's Clothing

The fitted jacket lay on the hips, had emphasiged shoulders and short broad lapels. The straight trousers with turn ups had comfortable width. The double breasted suit was popular for special occasions during the day

The Norfolk jacket and knickerbockers or blazer and belted slacks were popular casual combinations. Beside the fitted Chesterfield and the straight great coat. Trench coats and raincoats were worn.

2.12 The Forties (1940 – 1949)

Women's Clothing

Narrow designs with emphasised shoulders and knee length skirts were typical during the war, the dresses stressed the waist jackets and coats had details of uniforms.

In contrast, the new look brought calf length wide flared skirts and tops with rounded shoulders which flattered the figure. An alternative to this youthful, bouncy style was provided by the pencil line with its elegant and feminine tightly fitted top and long narrow skirts.

Formal evening dress acquired drapings, tunic and peplum effects and a stylish décolletage. The tight waistline brought a revival of the corset and stiffening of the bodies

Jackets and coats were tailored to fit the figure or had a flared back

Men's Clothing

Men's fashion changed very little and remained conservative in colours and patterns. The standard suit was double breasted which made the waistcoat unnecessary

In the post war years, the suit jacket become longer and broader on the shoulders but remained narrow at the hips. Trousers were given a wide cut and turn – ups. The casual duffle coat appeared.

2.13 The Fifties (1950 – 1959)

Women's Clothing

Slim skirts, narrow waists and styled hips were the elegant feminine fashions. Typical examples were the pencil line, tulip line, Y line and Empire line. The youthful swinging styles were typified by the X line with a princess cut. Cupola and balloon lines with bouncing skirts and petticoats and also the flared trapeze and A lines. Emphasis on the hips, a flub waist line and blouse like top were features of the H line and wave line, the sack line was a completely loose cut which concealed the figure and later developed into the barrel line.

Men's Clothing

Jackets and coats had a wide cut broad padded shoulders and no waist, the trousers were comfortably wide at the top and became narrower towards the bottom.

Around 1955 the suit jacket became more fitted and acquired more rounded shoulders. The single breasted jacket with a short broad lapel and the elegant double breasted jacket were both popular.

2.14 The Sixties (1960 – 1969)

Women's Clothing

The sporty casual style of loose jumpers and shirt dresses was popular, alongside feminine and figure flattening lines such as the decorative princess and fitted styles. Blousons, long waistcoats and pinafore dresses also were popular, the cannel suit miniskirt and trousers to women became accepted once and for all.

Trousers with extremely wide flares appeared. Hot pants maxicoats and the transparent look were unusual variants.

Men's Clothing

All first, suit jackets and coats had a straight and comfortable cut, however after 1965 the silhouette became more tailored . occasionally, the suit jacket was even very strongly waisted, narrow trousers without turn ups and knee length cats were preferred leisure jackets and pullovers were combined with tight fitting belted trousers.

2.15 The Seventies (1970 – 1979)

Women's Clothing

Day wear was dominated by mini length pleated skirts and shirt dresses, trousers with wide flares blousons and fitted blazers. Many different styles of blouses, trousers and jackets appeared with the fashion for combinations skirt hemlines fell to below the knee.

For the new feminine line dresses of flowing fabrics had fitted tops longer skirts and a belt to emphasis' the waist.

Frills, flounces and embroidery characterized the traditional and romantic look. There was a strong exotic influence in evening wear.

Finally a more business like style arose with the T line, which had a straight cut and emphasized shoulders over size styles were a clear reflection of the trend towards more casual fashions.

Men's Clothing

For a while men's fashion was exemplified by the closely fitted suit with narrow shoulders and broad together with trousers that were close fitting to the thighs but with board flares. Later came a new style which though it looked very slim was more comfortable typical features were broad shoulders long impels and narrow trousers.

2.16 The Eighties (1980 – Present)

Women's Clothing

Daytime clothing is predominantly casual with a simple, comfortable cut. The swirling slim silhouette and the voluminous. Very wide layered look compete with each other . the casual, elegant city style with masculine shape and details has also been retained for suits and coats.

Evening wear is feminine and elegant softly flowing or figure fitting with a tight or flared or full skirt.

The waist is accented or may be raised or lowered Sleeves are cut generously for freedom of movement. The shoulders are very often emphasized and the combination of very different lengths and widths has given rise to new proportions.

Men's Clothing

The suit jacket has changed very little. The waist is slightly fitted, shoulders are lightly padded, and lapels are not very broad. Belted pleated trousers are the most common Quilted and light shell coats are popular. Evening wear is a broad and lively mixture of party fashions.

2.17 Summary

For the Egyptians, only light clothing was necessary because of the mild climate in the case of Greeks, clothing was airy wide. It consisted of pieces of fabric elaborately draped around the body. Individual gathering and the arrangement of the belt were the main forms of decoration. Men and women wear similar type of clothes.

The ancient Germanic (Teutonic) tribes had their clothing made with the aid of flint and bone tools.

For Byzantines, clothing developed into a sumptuous formal costume which enveloped the body completely covering its natural shape.

During the Romanesque period, the clothing of the coat was colourful.

Clothing during the Gothic period was graceful and elegant, but also complicated and lavish.

Clothing of the early Renaissance or reformation period reflected the individual taste of the newly influential, self-aware and prosperous bourgeoisis.

The French fashion of the High Baroque period was once again very elegant and luxurious after the bourgeois Netherlands fashions of the early Baroque.

During the Rococo period, clothing moved away from the still showy Baroque fashion to a lighter, graceful and occasionally frivolous style.

2.18 References

Costume and Fashion – A consist History – James Laver, Thames & Hudson

2.19 Assessment

1) Is there any evidence to show that Indian textiles were popular in the ancient world?

2) Match the following types of clothing with their respective countries / periods of origin.

Types of garments	Respective countries
1) Skirt and blouse	1) Renaissance
2) Pleated neckline Shirt and knee length coat	2) Romanesque
3) Tunic which richly decorated with trimmings	3) Germanic

Unit 3 ❑ The Sewing Machines

Structure

3.0 Objectives

After going through this unit you shall be able to know—

- The different parts of a sewing machine.
- The different types of needles.
- The different types of stitch and sewing threads.

3.1 Introduction

At present it is known to all that people of ancient period used to wear clothes that were not stitched together at all.

Gradually after a long time in Aryan period women wore the sari with a blouse or choli under the sari but such blouses were not stitched as the art of sewing was unknown at that time and also men wore dhoti with turbans.

Ultimately after a long period, the concept and ideas of people were gradually changed through the knowledge of hand embroideries and discovery of looms and sewing machines in developed countries.

The designers, manufacturers and retailers improved their views and knowledge through attending in the international trade fairs, Exhibition and fabric stalls of various countries like France, Italy, West Germany, China etc. They tried to manufacture ready to wear garments for mens, womens and children and also arranged to sale their products in retail stores of big cities. Now, the garments of Asian, Europian countries and Indian dresses like Dhoti, Sari, Scraf, blouse and turban have never been disappeared and peoples are still using but the main point is that due to change of outlook, the styles and quality of the product has been improved through research and development and introduction of synthetic fibres as well as blending system with natural fibres in international level.

In India, garment markets gradually tried to improve after 1960 and onwards through technological development like introduction of Dobby and jacquard looms, high speed power looms, spinning frames and introduction of various types of sewing machines, embroidary machines, etc.

So, inthe very beginning to study the subject and also to clear the views practically we should learn about sewing room technology and all the allied terms including necessary equipments used to fullfill the purposes.

3.2 Sewing

In clothing manufacture, the important process in garment assembly is sewing. It is the best way to impart strength and flexibility in the seam itself as well as for smooth functioning the manufacturing processes.

So purposes of sewing are the construction of seam for the appearence and better performance with the limited cost of production.

A seem of good appearance means smooth fabric joins having no uncomfortable ridges and missed or uneven stitches to the material being sewn.

In garment manufacturing, the sewing room technology deals with the following :

1. The stitch type
2. The seam type
3. The stitching machine
4. The choice of needle i.e. selection of needle
5. The choice of thread.

3.3 The Stitch and its types

Stitch types and classification is based on structure of the stitch and the process of interloking.

Stitch quality depends on end use. To satisfy the consumers desire for performance and aesthetics, stitch quality must be good.

Defination of Stitch : According to ASTM D6193 the term defines that A stitch is the configuration of the interlacing of sewing thread in a specific repeated unit.

A stitching consist of a series of stitches embodied in a material for oranmental purposes or finishing an edge or both.

Kind of Stitch : Stitchs can be done both in hand like manually or in sewing machine.

The first sewing machine was brought into market in 1889 by Singer and Co.

It offers both hand, treadle (foot operated) and electrically operated machines for sale and supply in apparel industry.

Sewing machines can make a variety of plain or decorative stitches.

Among all, plain stitches fall into three categories like chain stitch, lock stitch, overlock stitch.

Again decorative stitches are the categories used in embroidery work for decoration and surface ornamentation.

Embroidary is one of the ancient technique of textile decoration as well as surface ornamentation. India carries a tradition of decorative and colourful hand embroidary stitches throughout its various states as the over all effect and beauty of art and craft enlighten people from the very beginning.

At present, the embroidery stitches can be ornamented in embroidery machines also.

Among the well known decorative stitches some of them are used in various embroidery works like

Applique in Orrisa, Kantha in West Bengal, Phulkari in Punjab, Chikankari in U.P., Ari in Rajasthan, Kutchi in Gujrat etc.

The overall decorative stitches can be classified into the following categories like

Outline stitches : The type of stitches are used in this case are Run, Chain, Back, Cross, Stem, Button hole and Dul stitch.

Filling stitches : The type of stitches are used in the filling purposes as, Satin, Herring bone, Fishbone, Button hole, Kashmiri, Gujrati etc.

Knot stitches : French knot, Button knot.

3.3.1 The lock stitch

It sews a straight seam on the same principle as in home sewing machine.

The machine makes it possible for the top thread to go under the bottom thread around a boblin creating a lock. The main advantage is that this is the most secure stitch possible but it leaves an unfinished seam, this is the main disadvantage of this machine.

Another drawback in that time wastage frequently to rewind the bobbin as it contains a limited length of thread. Lock stitch which is important in top stitching as well as seam joining of facings, collars, pockets and many other similar type of garment parts.

3.3.2 The chain stitch

It makes a series of loops pulled through one another. It works on the same principle similar to crocheting.

The top needle goes in and out of the fabric making loops underneath that catch into one another.

The chain stitch is not so secure like lock stitch. Here, the operator does not need to stop the machine dining the operation to rewind the boblin as the machine does not have a bobbin.

3.3.3 The overlock (or serging) stitch

It runs on the same principle as the chain stitch and is not secure as lock stitch.

In an operation its sews the fabric together and cut off the fabric end to make a smooth edge and overlocks around the edge. It is based on one needle and two loopers with three spools or cones of thread.

This type of stitch is fit and ideal for the knitted garments as it imparts stretch of the fabric.

Inspite of the above three types, there are another two types like

3.3.4 Safety overlock stitch

It is the combination of the chain stitch and the overlock. It provides straight chain stitch plus an edge finish. So, it has dual functions in one.

3.3.5 The blind stitch

It is based on the principle of chain stitch.

3.4 Seam and the purpose of seam finishes

A seam is a line of stitching of joing together two or more pieces of fabric. The purpose and function of seam is very important in garments construction. The main role of seam is to hold two pieces fabric together as it gives shape and structure of the garment.

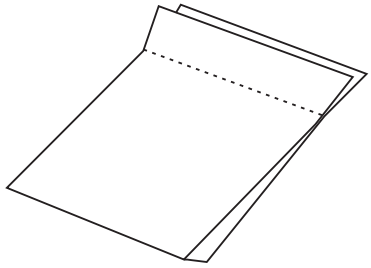
As per ASTM D6193 classification, a seam is a line where two or more pieces of fabric are joined by stitches.

Seam can be classified as

1. **Conspicuous seam :** In Conspicuoys seam, the stitches can easily be seen from the right side of the garment. It gives extra strength as well as used for decoration. Example : Lapped seam, Lapped felled seam, etc.
2. **Inconspicuous seam :** In this case stitches can not be seen from the right side of the garment. Example : French seam, Plain seam etc.

So, the purpose of seam is purely functional and used for decorative purposes & garment design. Among the various types of seams the following are mostly used : Plain/Flat seam, Lapped seam, French seam, Bound seam, Channel seam, Lapped falled seam.

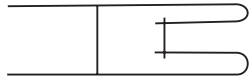
Plain seam/Flat seam : Plain seam is most widely used for the joining fabrics of average weight.



At plain seam should be used on all woven fabrics and mainly used for side seam.

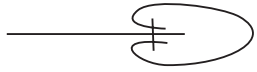
Lapped seam : It is the simplest type of seam and formed by lapping two pieces of fabric in garments. It is used in the sleeve of shirt, punjabi, jeans etc.

French seam : The importance of French seam is that it binds the raw edges as fraying does not occur. It is a type of narrow seam.



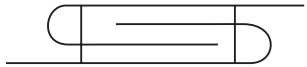
This type of seam is used on medium weight of fabric for the production of childrens clothes and lingeries.

Bound seam : Bound seam is formed by folding a separate binding strip over two or more prices of fabric through one or two rows of stitches. Bound seam generally used as an edge finish like Hem, Necklines, Sleeves, Plackets etc.



Lapped felled seam : It is most commonly used on garments like jeans and in

the armhole of shirt. It sewn two rows of stitches on a twin needle machine and that provides a strong seam.



Purpose of Seam finishes : Seam finishes are made as it encloses the raw edges of the fabric to prevent fraying and also to make the seams more durable as well as for the neat appearance of the garment.

3.5 Sewing Machine

Two types of sewing machines aregenerally used as home and traditional factories as follows :

(1) Domestic type of sewing machine, which is either operated by hand or foot.

(2) Power sewing machines.

Three main types of power sewing machine are used in traditional factory, which depends on type of stitch and belongs to

(1) The lock stitch machine, (2) The chain stitch machine, (3) The over lock or serging machine.

A sewing machine is no more than a power operated needle, with other mechanism in synchronization. Here, the operator controls the size of the stitch, the tension of the sewing threads and the rate of stitch formation. The operator also controls the shape of the sewing line and hence the shape of the finished garment part.

The choice between a portable and a table model is a matter of space available in the house. Portable power sewing machine found very effective and simple to use.

There are many machine manufacturers like USHA, SINGER, BROTHER, JUKI, DARKOP-ADLER, Tazima, Shima/Seiki, PAFF etc. of which JUKI, BROTHER, PAFF etc. modern sewing machines are mostly used in garment manufacturing industry.

A modern power sewing machine is of such type that not only performs its plain sewing but also does piping, binding, Ruffles, pleats, even making button holes and attaching fustener etc.

3.5.1 Different Models of Sewing Machine

In fashion garment manufacture and for more specialised garment production in large volume, which depends on variation in machine shape that enable easier movement of the flow of materials movement around the machine.

The machine shape means the shape of the bed of the machine that is the part on which the material rest.

There are various models of sewing machine like Flat bed, Cylinder bed, Post bed and Feed off the arm.

The most popular is the Flat bed as it is used in the majority of sewing where a large and open garment part can easily be handled around the needle and much flat surface for sewing.

Cylinder and post bed are used where the parts to be sewn are small, curved in shape.

3.5.2 Different manufacturing companies of Sewing Machine

(1) JUKI, (2) Brother, (3) Darkop-Adler, (4), Pegasus, (5) Tazima, (6) Union Special, (7) Eastman special, (8) Summit, (9) Paff, (10) ZSK, (11) Matsuga, (12) Shima/Seiki.

3.5.3 Basic features of an ordinary domestic Sewing Machine

- In ordinary domestic (hand/foot operated) sewing machine stitching rate about 800 stitches/min.Whereas a modern sewing machine stitching rate of 9000 stitches/min.
- It is generally single needle machine.
- Only lock stitching.
- In this case no button hole making or button stitching facilities in corporated.
- In this case stitch control is not possible.
- Manual lubrication.
- Here, no provision of bare tack stitches.

3.6 Different equipments used in clothing construction room

[1] **Seissors :** There are various types & sizes of scissors including embroidery scissors and button hole scissors for cutting different length of button holes. Scissors of 5"—6" long are used for light cutting, trimming etc.

[2] **Shears :** It is used for giving knotch marks. In pinking shears, it is designed with blade and notched edges of 8"—10" long.

[3] **Measuring tape/Tailors tape :** For measuring length and width in cm., inch or metre.

[4] **Ruler :**

[5] **Hem marker :**

[6] **French curve :** It is used to measure armhole and necklines.

[7] **Tailor's square :** For 90º and 45º Angles.

[8] **Tracing wheel :** A small serrated hand wheel used to copy a pattern piece and also to mark.

[9] **Hip curve :** It is a tool used to measure the hip portion.

[10] **Pin and Pin cushions :**

[11] **Needles :**

[12] **Tailors chalk :**

[13] **Seam Ripper :** It is used for ripping seams easily and safely.

[14] **Thimble :** It is safety aid used at the time of hand sewing for directing the needle through the fabric with the protection of finger. A hard material for properly fit in the finger.

3.6.1 Different parts of a High speed single needle lock stitch industrial Sewing machine.

Different parts of a sweing machine are noted below as shown in Fig. No. 1(a) and the view of JUKI (SNLS) as shown in Fig. No. 1(b).

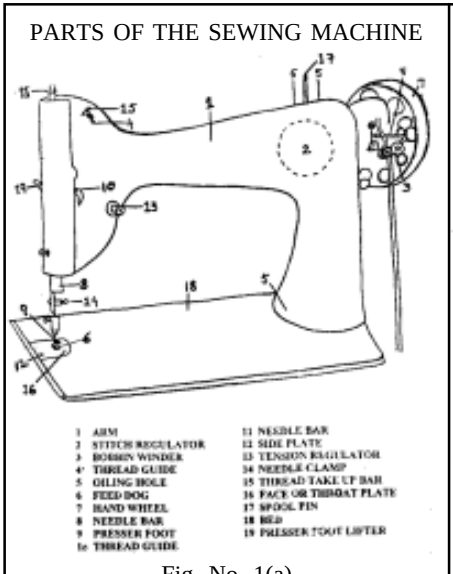


Fig. No. 1(a)

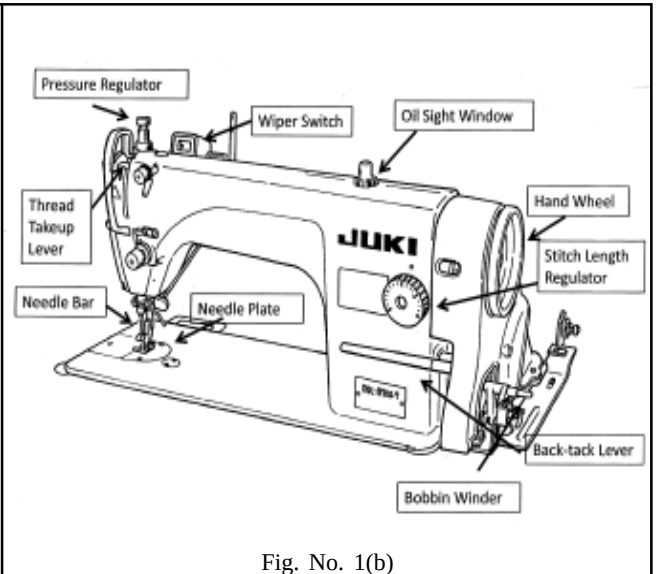


Fig. No. 1(b)

Head : The complete sewing machine without cabinet or stand.

Arm : The curved part of the head containing the mechanism for driving the needle and handling the upper thread.

Spool pin : It is the upright metal rod fitted on the top of the arm to hold the cotton thread reel.

Oiling Hole : It is the holes over the surface of the top arm for pouring oil to the inner machine parts as per schedule/necessity.

Stitch regulator : The regulator fixed on the machine through which stitch density is regulated according to the type of the cloth. Hence, the length of stitches is determined by the graduation marks.

Bobbin winder : The mechanism through which the thread is wound in bobbin just for quick filling the bobbin.

Hand wheel : The wheel at the right of the head driven by a belt or handle.

Thread guide : The thread passed over the guide.

Thread cutter : It is the blade fastened to the side of the presser foot bar.

Thread take up bar : It is a lever fitted to the body of the arm located above the tension regulator. At the outside end of the lever there is a small hole through which the thread passes.

There are two functions of the lever.

(i) To feed the thread to the needle. (ii) to lighten the loop formed by the shuttle.

As the lever moves down it releases the thread to interlock with the bobbin thread then as it rises it lightens the thread to form a firm stitch.

Tension regulator : It is the mechanism fixed to the body for controlling the pressure of the thread as it passes between the discs and the pressure of the thread is adjusted by a spring and a nut.

Needle bar : It is the upright bar at the lower end of which the needle is attached.

Feed dog or feed : It is a small metal device with teeth which carries the material i.e. the fabric as it is stitched. When the machine is in motion the feed dog moves upwards thus advancing the material as each stitch is made.

Presser foot : It is a detachable device for holding the material in place on the feed while stitching. This device is not used when attachments such as tucker, ruffler or binder are used.

The Face or Throat plate : This is a semicircular disc with a highly polished surface and a hole in it to allow the needle to pass through it.

The fundamental purpose of this plate is to provide a levelled surface for the cloth/material and to prevent dust.

The Treadle : It is the foot operated device fitted in the lower part of sewing machine for running the machine through foots.

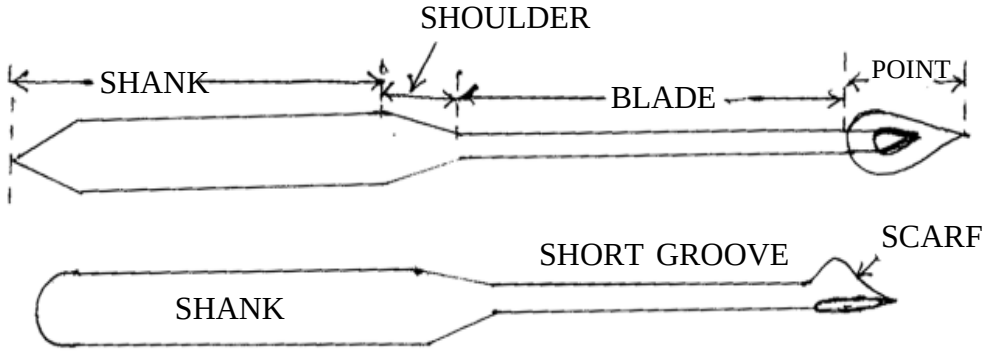
3.6.2 Different parts of a sewing machine needle

Sewing needle : Needles come in packages of branded company of different sizes as well as different needle no's.

Selection/choosing needles based on (a) Type of fabric that is light or coarse, (b) Thread size is count of sewing thread, (c) The type of stitch.

Sharp needles have small round eyes ; crewel needles have long eyes which are easily threaded.

Long needles are convenient for long stitches small/jine needles are better than the larger needles and used in case of hems, hand gathering etc.



Different parts of a sewing machine needle
Fig. No. 2

Shank : It is the upper part of needle which is located within the needle bar for support.

Long groove : A protected channel in which thread is drawn down the material.

Eye : Hole extending through the blade from long groove on oneside to short groove on the other.

Point : It is shaped for the penetration through the material.

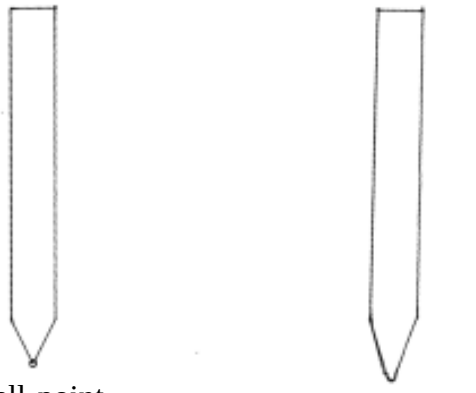
Blade :

Short groove : It assists in forming the loop in the needle thread.

Scarf :

3.6.3 Types of Needl of a sewing machine

Round point for woven garments, Ball point for light weight and knitted garments as shown in **Fig. No. 3.**



Sewing machine needles
Fig. No. 3

3.6.4 Size of a sewing needle/needle numbers

Sewing needles are classified according to numbers. The higher number specified coarser needle. The needle number ranges 4 to 28.

Numbering System : Higher the number thicker the needle.

DB × 1 for lock stitch m/c.

DP × 5 for Button hole m/c.

TQ × 1 for Button Stitch m/c.

TV × 1 for feed off the arm.

3.6.5 Sewing Defects

Defects that may occur during stitching/sewing are listed below :

(i) **Feed damage :** This type of defect which mainly occurs in thick and sheer fabric.

(ii) **Ruptured thread :** This is caused due to bad quality and wrong size of needle.

(iii) **Skipped stitches :** The stitch line deviates from the original position due to irregular pick up by the hook of the thread loop from the needle eye.

(iv) **Thread breaks :** This type of faults may occur at the time of stitching due to following reasons :

(a) If the upper thread being incorrectly set.

(b) If the upper thread and bobbin thread tension is too tight.

(c) Bad quality of thread and if the thread count not taken as per quality/ type of material being sewn.

(d) Needle being bent blunt or incorrectly set.

(e) Accumulation of fluffs, dirty in and arround the shuttle or boblin space.

(v) **Staggered stitches :** The effect of faulty feed motion and the wrong needle or machine parts. It also arises due to bad tension in threading.

(vi) **Seam pucker :** This type of defects arrise at the time of stitching due to improper feeding caused by the displacement between top and bottom fabric plies, fabric structure and thread tensions.

In case of coarse fabric the fabric structure becoming jammed due to introduction of sewing needle and thread.

In practical field, we noticed that puckering can be caused due to exessive sewing thread tension. Again we see this problem in case of synthetic yarns more than cotton yarns. So, in case of both needle and under thread tension should be set as low as possible and proper quality of thread should be choosed.

(vii) **Fabric damage :** Fabric damage is the type of sewing faults can be caused by the needles of inappropriate size or needle with worn or bent point.

A fabric which is difficult to feed or which is subjected to high pressure at the time of feeding can damage during sewing.

In high speed sewing machine the heat generated by friction at the needle can be enough to melt a synthetic yarn.

3.7 Sewing Threads

Sewing threads are generally used for stitching purposes.

A thread is the common term used in the textile industry is a special type of yarn usually finer, smooth appearance, stronger and adequate extensibility than what is usually considered a yarn.

So, sewing thread is a type of single, folded or cabled yarn made of natural, manmade fibre or synthetic filament or spum yarns. Sewng thread comes in different sizes from 20 to 100 size, larger the number, the finer is the thread.

The selection of thread depends upon the type of fabric being used, finer fabric require fine thread.

Again thread selection also based on colour of the fabric as light or deepo shade.

Soft cotton thread of different colours are generally used in domestic and in garment industry.

Cotton sewing threads are available in soft, mercerized and glazed form.

Soft cotton thread is usually of 3 ply construction. Again mercerized cotton thread of 3 ply construction is stronger than soft cotton thread of 3 ply construction due to mercerizetion.

Glazed or polished cotton thread has a polished surface and 6 ply thread is much strong usually used for sewing buttons.

Again synthetic sewing thread is of two types, staple spun yarn and filament yarn. Staple spun yarn is either pure yarn, blended yarn like cotton and plolyester core spun yarn.

3.7.1 Essential characteristics of Sewing thread

(a) The sewing thread should be strong and it should have sufficient breaking strength as stitch quality must be good to satisfy the consumers desire for performance and aesthetics.

(b) It should be capable of withstanding the shock of loading.

(c) It should be have abrasion resistance and resistance to higher temperature.

(d) The sewing thread should be soft, polished, smooth and faults fall like knots, neps and hairness.

(e) Thread should have sufficient extensibility and low thermal shrinkage.

(f) Sewing thread should be uniformly dyed and colour fastness.

(g) Sewing thread should have balanced structure i.e. balanced twist. To keep balanced twist thread is given opposite twist in plying.

■ **Hem :** Hem is the finished bottom surface edge of a garment.

The fabric edge is turned up 1/4" and doubled then finished through hem sewn by hand or machine.

Hem stitch should be even in width all around the garment and must be smooth and flat.

Today, in apparel house Hem stitch sewn through hemming machine. Hem is of various types like (i) Narrow hem, (ii) Broad hem, (iii) Rolled hem, (iv) Blind hem/ False hem and (v) Fegotting hem.

■ **Smocking :** Smocking is the decorative addition and an art work made through embroidary stitches over the folds of gather.

Fig. No. 4

Smocking is the stitching effect that makes the work elastic and controls the fullness. It is specially preferred for childrens clothing and also for the surface interest and new look of style to bodywear.

The effect is shown in the **Fig. No. 4.**

3.8 Button Stitching Machine

Through this type of machine 49 different types of button can be stitched.

Two types of machine is available. (a) Chain stitch button stitching machine, (b) Lock stitch button stitching machine.

3.8.1 Button hole stitching and cutting machine

A fully automatic button hole stitching and cutting machine can produce 1800 pcs shirts/8 Hrs.

Manually operated machine can produce 450 shirts/8 Hrs.

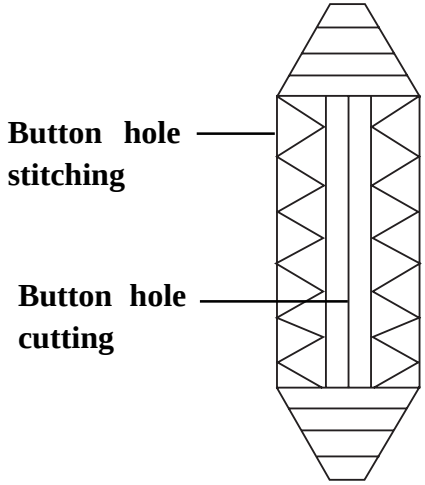


Fig. 5

3.8.2 Reason for Irregular/improper stitching

(a) Blunt or bent needle/needle point.

(b) Upright thread and bobbin thread tension being too tight or too loose.

(c) Accumulation of fluffs in tension disc, throat plate and in the bobble case.

(d) Using too strong thread for stitching finer materials.

(e) If the machine is not regularly cleaned.

3.8.3 For better / Proper stitching

(a) Same count of thread to be used in bobbin and in spool pin.

(b) Sewing machine will run better if it is regularly cleaned/oiling schedule maintained accordingly.

(c) Thread count should be used as per type of fabric.

(d) Degree of thread tension should be perfect in case of bobbin and upright thread.

(e) Quality of needle should be good and needle number choosed as per count of cloth.

3.9 Self Assessment Questions

Q. How fabric damage can be prevented?

Fabric damage can be prevented by the following measures

= Using proper size needle without defect.

= Good fabric quality with fabric finishing.

= Cooling arrangement in the sewing room.

= Proper checking of the sewing machine before use.

Q. Needle breaks frequently why?

This type of problem many arise due to reasons as follows :

= Improper thread count.

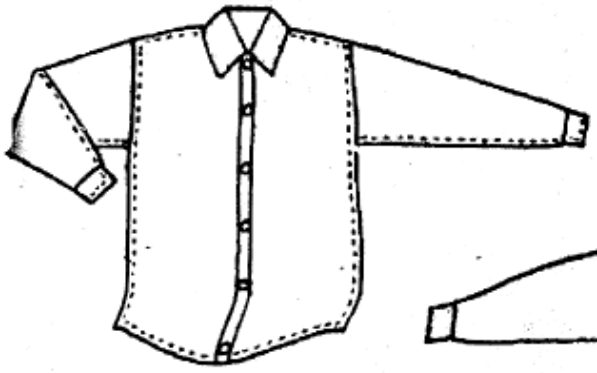
= Bad needle quality

= Bent needle and is caught by the looper

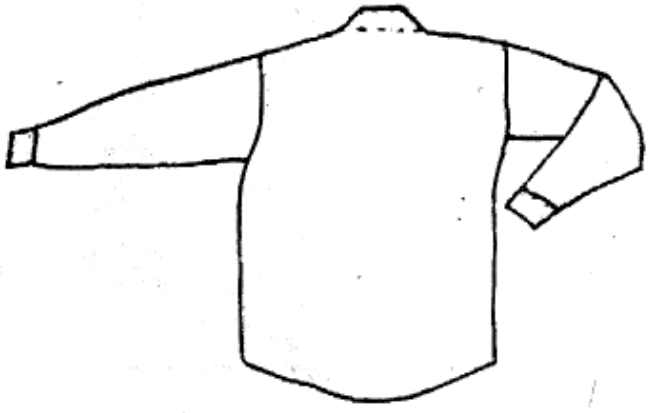
= Needle deflect into the throuat plate due to wrong handing at the time of sewing.

3.10 Assessment

1. How fabric damage can be prevented?
2. Needle breaks frequently why?
3. Why we do wear clothes?
4. What is the purpose of them stitch?
5. What is smocking?
6. Construction of a trouser Fig. 6(ii).
7. Construction of a full sleeve shirt Fig. 6(i).
8. View of different stitches Fig. 7.
9. View of Indian and Western ladies top Fig. 8.
10. View of a shoulder princess line top and box pleated skirt Fig. 9.
11. View of Gathers and Frills Fig. 10.

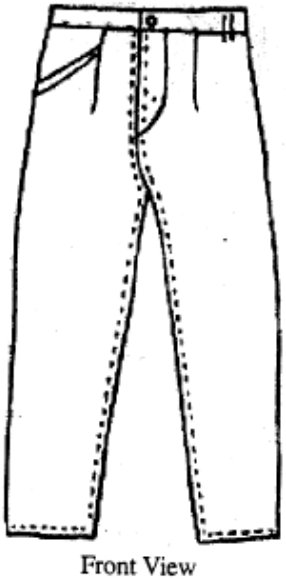


Front View

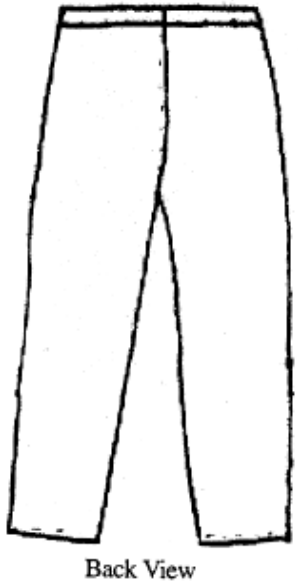


Back View

Fig. No. 6(i)



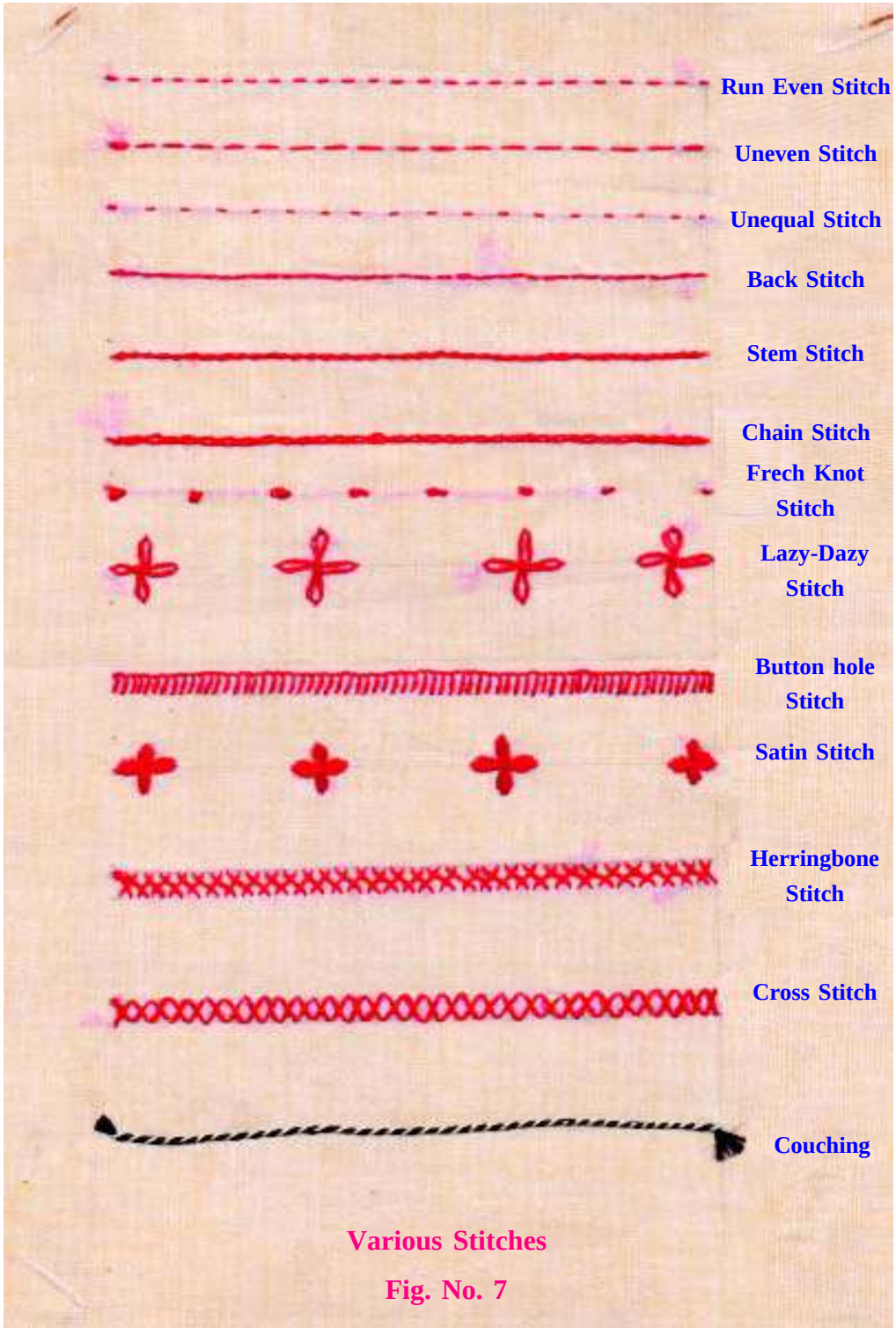
Front View



Back View

Construction of Man's Shirt and Trouser

Fig. No. 6(ii)



Various Stitches

Fig. No. 7

A Shoulder Princess Line Top and Skirt (Box Pleated)

Fig. No. 9

Indian Ladies Top

Fig. No. 8 (i)

Western Ladies Top

Fig. No. 8 (ii)

View of Gathers and Frills
Fig. No. 10

Unit 4 ❑ Basic Idea : Human Figures and Measuring Techniques

Structure

4.1 Introduction

Study of human figures and figure proportions in tailoring and dress designing is necessary and important to us as the construction and designing of the human dress related to size, proportion, balance ultimately fittings completely depend on human body structure, proportions as well as size of the figure.

The silhouette or general outline should follow the lines of the figure but not too closely is to be kept in mind.

All the curved lines of the human figure is the line of balance, force and beauty.

So, human dress should be constructed in such a manner making some degree of curve as the design and construction of the dress made up of parts that show a proper fits to the human figure.

The steps involved in construction and designing of a dress that must be taken into consideration.

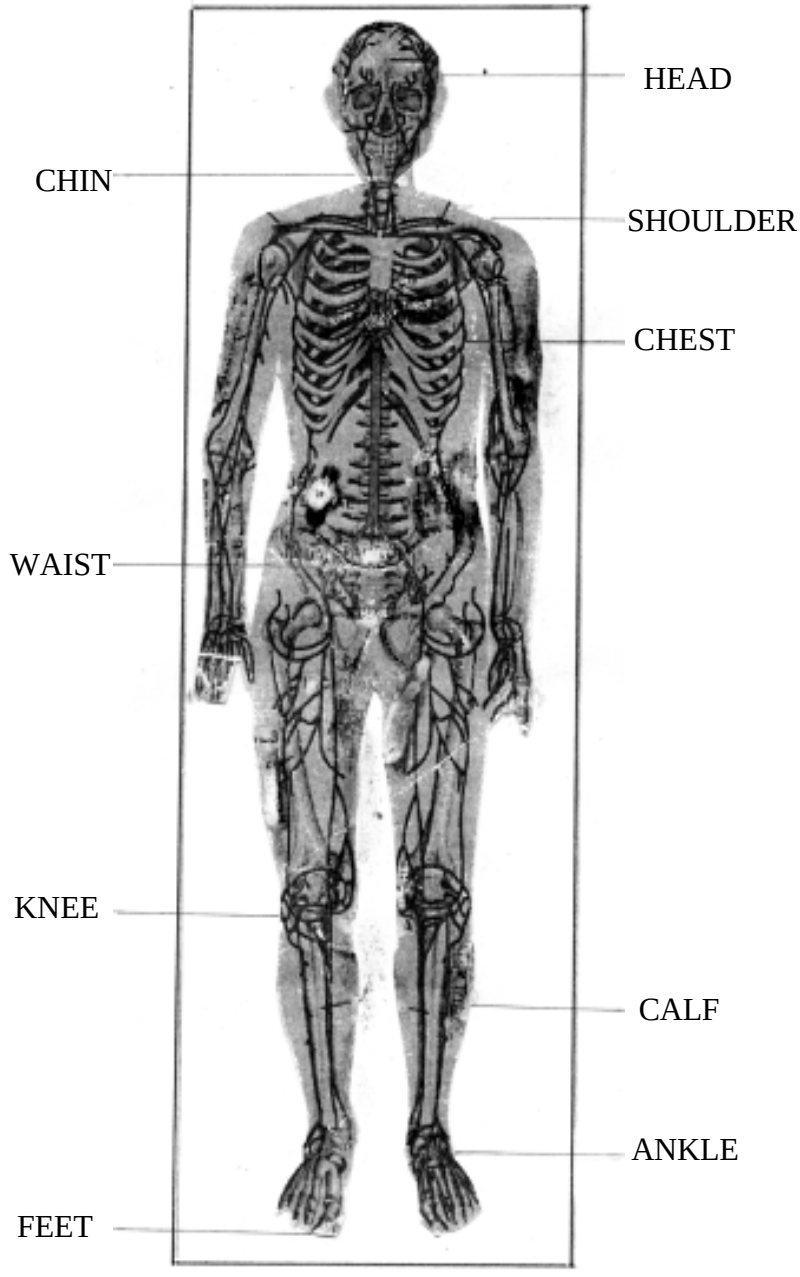
(a) The study of human figure, figure proportion and structural lines.

(b) Measuring technique in different portions of human body as per lengthwise and around.

(c) The selection of materials with reference to quality, colour, Texture and weave etc.

(d) Detailing including ornamentation of the dress.

Now, to understand in a better way, a full flesh human figure and its skeleton system is shown in **figure no.1**—for necessary identifications of different parts including joint portions of the body.



Full Flesh Human figure and its skeleton
Fig. No. 1

With the blessing of god, Human body is the frame structure of Bones and the size of the skeleton varies as per height and shape of the figure.

From the practical point of view, Human body can be divided into various types like.

(1) **Normal figures :** The general human figure found normal as they are under standard size and fit to wear any type of dress, looks better.

(2) **Abnormal figures :** The type of the figures under this category is different from normal human figures as they differentiaties from standard fittings.

(3) **Stooping figures :** The average structure of the figure under this found bent and stooping in front side. The backside vertibrate under the shoulder found excess and size of chest is low that measures across chest large.

(4) **Tall and slim figures :** As the average height found large under this category and they may be thin or fatty. So, the size of the dresses alters from normal sizes and quantity of cloth also large.

(5) **Short and stout figures :** As the figures found short and stout, so the quantity of fabric for their garments required as per body measurements that also differentiate from standard sizes.

4.2 Figure Proportions

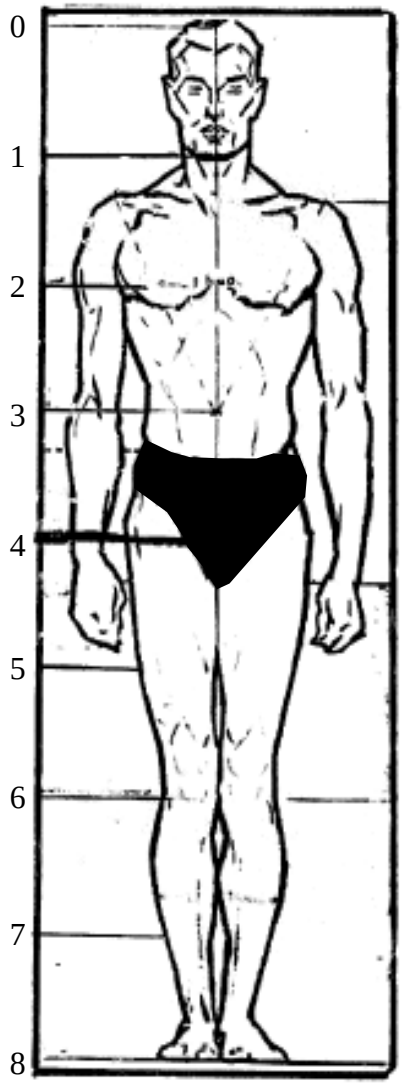
The proportion of the human figure with structural lines based on the head as an unit of measurement.

The height of the human figure helps to estimate the number of heads into the body.

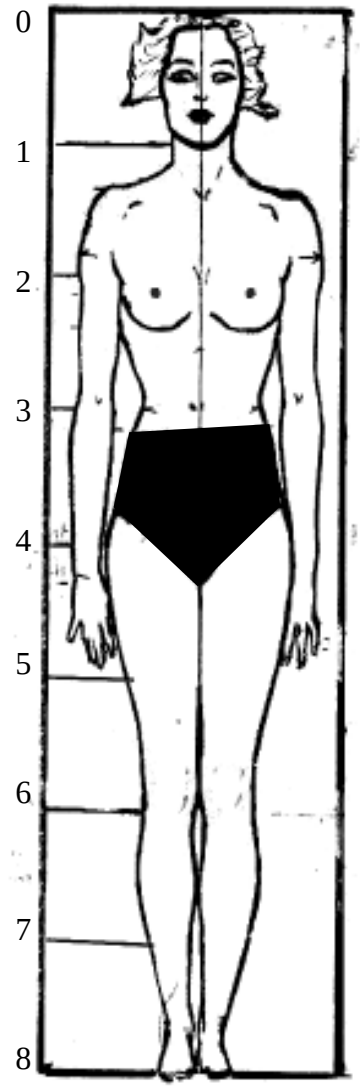
The height of the normal average figure from top of head to feet is of 8 heads (In fashion figures the height is of 9-10 Heads).

The body from the chin to waist line is of 2½ to 3 Heads and across the shoulder is 1½ to 1¾ heads.

In **figure no. 2** the name of the parts of eight divisions are shown and marked for understanding the location and area of measurements as follows :



Male Figure Eight Heads



Female Figure Eight Heads

Fig. No. 2

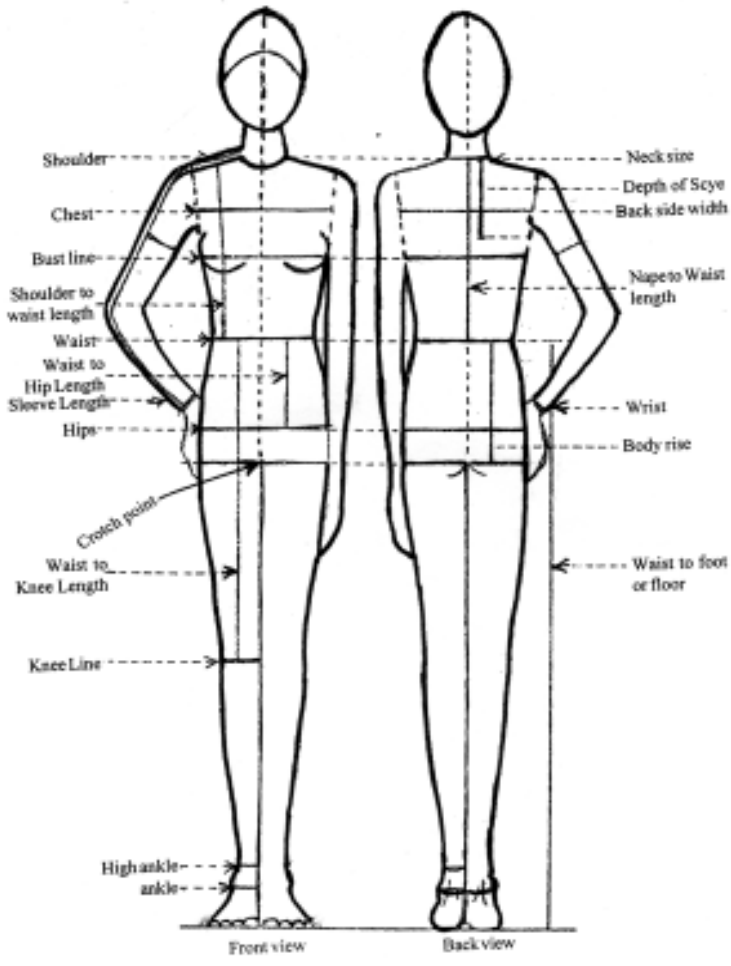
(1) Head to chin
(2) Chin to chest / Bust
(3) Chest to waist
(4) Waist to hip
(5) Hip to knee
(6) Knee to calf
(7) Calf to upper part of heel
(8) Upper part of heel to foot.

4.2.1 Different parts of human body and measuring techniques

Measurements to be taken in different parts of the human body accurately and systematically and also to clear the ideas and conception. Good fittings depends on accurate body measurements and it is important and necessary to get good results in garment constructions, apparel manufacturing and also to purchase readymade garments from Apparel markets.

So, it is necessary for a dress maker as well as a dress designer to gather adequate knowledge and methods of taking measurements in different parts of the human body with proper utilizationof measuring equipments.

A picture of full figure of human body front and back side shown in **figure no. 3** for identification and way of measuring technique in sole areas like neck, chest or full bust, across shoulder, arm length, seat, depth of size etc.



Standard Body Measurment Fig. No. 3

Basic lines of the body are to be taken into consideration while measuring body parts.

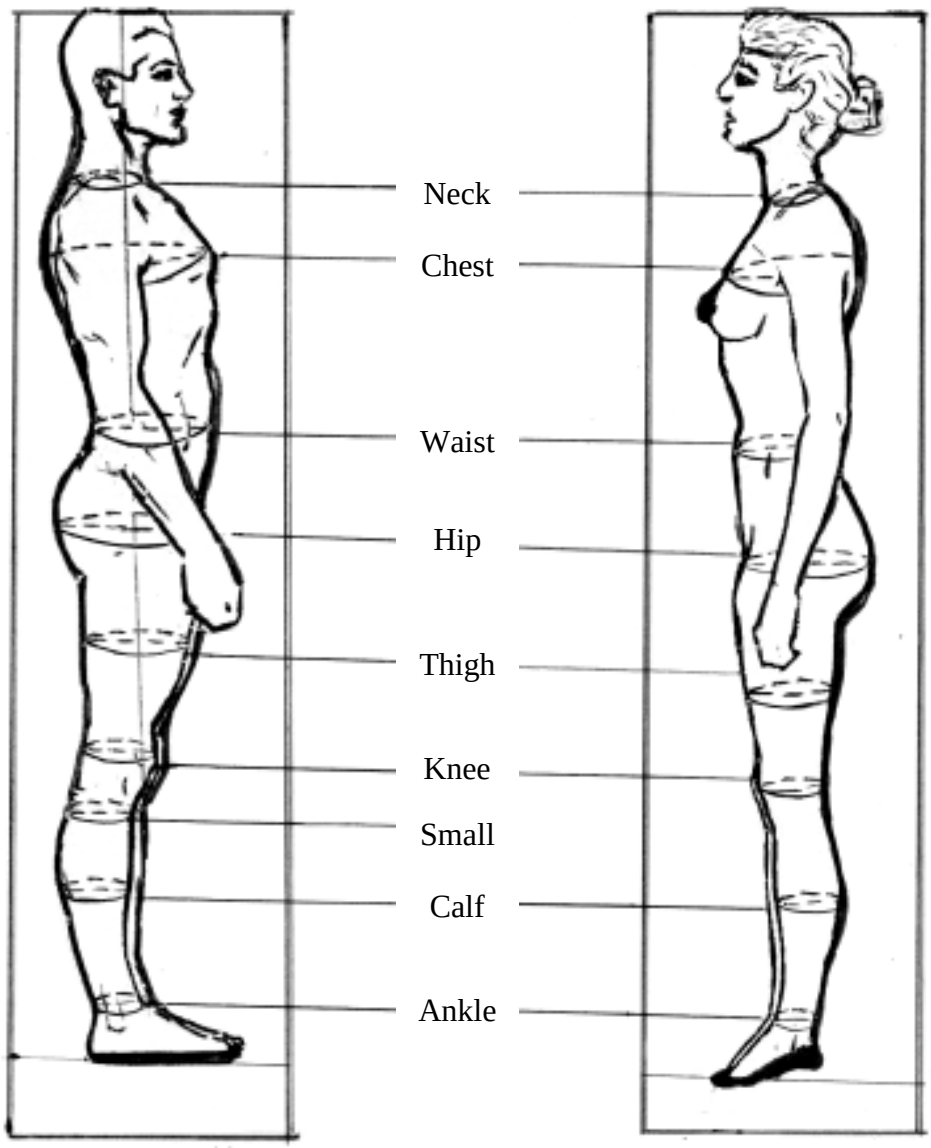
Moreover, The dress designer and the dress maker should have at least minimum knowledge about the type of fabric or fabric quality, either woven on knitted as the amount of ease needed at the time of apparel construction and also should have knowledge that more ease kept for woven fabric than on knitted fabric.

Different parts of human body and technique of measurements taken are noted below :

1. **Neck :** Measurements to be taken with the help of measuring tape around the neck starting at the base of the neck.
2. **Shoulder Length (Half) :** Measurement to be taken from base of neck to armpit socket.
3. **Chest or Full bust :** Measurements to be taken round the fullest part of bust. Here one must make sure that the tape is straight across the back and record the measurement.
4. **Waist :** Measurements to be taken round the waist keeping the tape tight but not too tight.
5. **Arm length :** It is the length from arm socket to wrist bone. The length is to be recorded through measuring tape.
6. **Wrist circumference :** The measurement should be taken by placing a measuring tape around the wrist, just at the end of wrist bone.
7. **Knee round :** The measurement is taken round the knee, using the same procedure as mentioned above.
8. **Body rise :** It is the length of difference between outside and inside leg. The length is measured through a measuring tape.
9. **Hip on Seat :** The measurement to be taken around high hip through circular way over the hip which is below 8"—8.5" below waist line.
10. **Depth of Scye :** The measurement is to be taken round the armpit through a measuring tape with an ease.
11. **Waist to hip :** The length is measured through a measuring tape.
12. **Waist to knee and waist to foot length :** The length is to be taken in a straight way through measuring tape.
13. **Height :** The person should straight way stand against a wall and in stocking feet. Make a mark on the wall over the top of head accurately and record the length from the head mark to feet.

4.3 Relative girth measures for male figures

Human figure is curved in nature. So the measurements of different portions of human figure in different in size. Before taking the measurements it is to be kept in mind that the measuring tape should be in good quality and the tape must be hold parallel to the ground, especially at the time of girth-measurements in some body portions like high bust, chest, waist, seat etc. as shown in **Fig. 4.**



Male Fig. **Female Fig.**

Fig. No. 4

Among all, the measurement of chest is important as the girth measurements in some portions may be derived from the chest size.

The relative girth measurements of a matured male figure are as follows :

[1] **Neck :** $^1/_3$rd of chest plus 6.5 to 7.5cm (2.5" to 3").

[2] **Shoulder (Half) :** $^1/_4$th of chest or less 1.5 to 2 cm (0.5" to 0.75").

[3] **Armhole round (Scye round) :** $^1/_2$ of chest or less 0.25 to 0.5".

[4] **Across chest :** $^1/_4$th of chest minus 2.5 to 4cm. (1" to 1.5").

[5] **Waist :** Chest size minus 10cm to 12.5cm (4"–5").

[6] **Hip girth (Seat) :** Chest size plus 2.5 to 5cm (1" to 2").

[7] **Small round :** $^1/_3$rd of seat (about).

[8] **Knee round :** Small round plus 2.5 to 4cm (1" to 1.5").

[9] **Calf round :** Same as knee round (approx).

[10] **Bottom round :** Knee round minus 2.25 to 2.5cm (0.9" to 1").

[11] **Depth of Scye (from neck) :** $^1/_4$th of chest (For chest size of 28" to 36").

4.4 Relative girth measures for female figure

The detailed study of a female figure and the idea of relative girth measures of a matured female figure **(Fig. No. 4)** is helpful and to extend knowledge for apparel manufacturing and dress designing.

The relative girth measures are as follows :

[1] **Neck :** $^1/_3$rd of Bust length plus 5.5 to 6.5cm (2" to 2.5").

[2] **Shoulder (half) :** $^1/_5$th of Bust length plus 5 to 6cm (2" to 2.5").

[3] **Chest/High bust :** Length taken roundwise through bustline.

[4] **Across Chest :** $^1/_8$th of Bust Length plus 5 to 6cm (2" to 2.5").

[5] **Waist :** Chest length minus 12 to 18cm (5" to 7").

[6] **Seat :** Bust length plus 5 to 10cm (2" to 4").

[7] **Depth of scye :** $^1/_8$th of Bust length plus 5.5 to 6.5cm (2" to 2.5").

[8] **Round upper arm :** $^1/_4$th of Bust length plus 5.5 to 6.5cm (2" to 2.5").

4.5 Different types of Pleats, Darts, Tucks etc.

Fullness : An application of darts, pleats, tucks, gathers and smocking etc. all are art and creative items by the dress designer for apparal designing that provide fittings and fullness. They imparts decorative addition as well as important feature of style in well fitted garment.

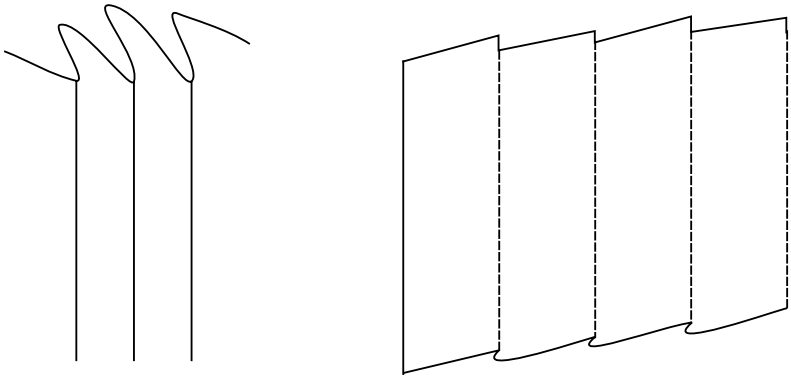
[1] **Pleats :** Pleats are the folds of fabric that add control fullness and give fashion and interest to the garments.

Pleats may be single, groups or all over. They also may be pressed or folded unpressed, stitched or unstitched. The depth of the pleat may be single, double or triple.

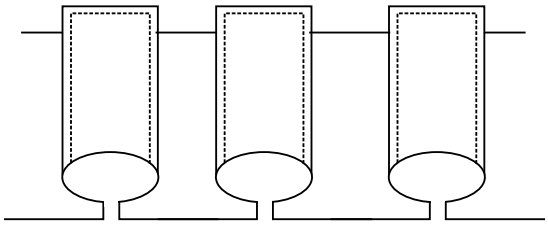
The application of pleats found generally on skirts, Bodice, Sleeves, pockets, jackets and so on.

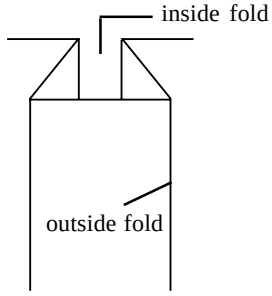
Pleats are of various types but the most commonly known are as follows :—

(a) **Knife Pleats or Side pleats :** They are grouped and faced in one direction.

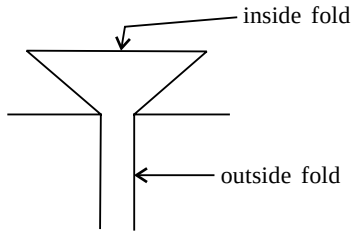


(b) **Box Pleats :** In right side of garments pleats are folded away from each other.

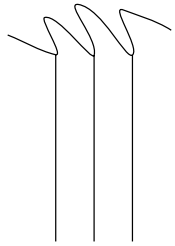




(c) **Inverted box pleat :** In this case pleats are folded to meet each other on right side of garments.

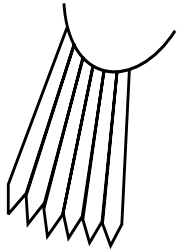


(d) **Accordian pleats :** In this case folds looks like of an accordian.



(e) **Sunburst pleats :** The structure of Sunburst pleats is that it originates from the waist and fall out.

The application of it generally found on circular skirt of female babies and Teenagers.



[2] **Tuck :** A tuck is a fold that stitched on right side of the fabric to provide shaping and good fit for the garment.

Tucks are of various types like pin tucks, space tucks, corded or piped tucks, cross tucks etc. Their application on garments as a design detail and generally found on skirts, Baby dresses, pants, tops and blouses. In some positions like waistlines, yolkes, pockets, cuff of sleeves, their application also noticed.

[3] **Dart :** Dart is the 'V' shaped fold to achive proper fit of a garment by providing fullness in body curves.

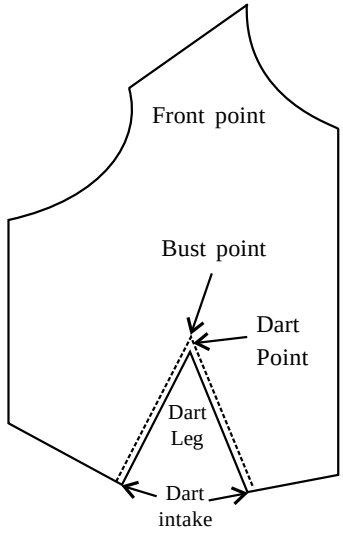
So, to achieve a proper fit, darts must be correctly located, stitched, finished and pressed.

Darts are of various types like 'V' shaped dart, Fish shaped dart or double point dart etc.

In practical application dart also may be placed in different positions like side dart, waist dart, bust dart, shoulder dart etc.

An Application of Darts generally found in Blouses, skirts, pants, coats, jackets etc.

A view of Dart leg, Dart point and dart intake has been shown in the figure.



[4] **Gather :** Gather is the folds of fabric in cloth made by drawing a thread or giving stitch together. It can be made by hand or machine. Elastic attach gathering can be made by attaching a narrow piece of elastic and giving stitch on the part of right side of the garment which is to be gathered.

Application of gathers generally found in few garments like Tops, Skirts, Frocks in Fancy dresses and in bridal gowns also. It can also be seen even in some particular position like sleeve, bust, waist etc.

Different views of gathers has been shown below for understanding and proper application in dress materials.

4.6 Self Assessment Questions

Q. Why we do wear clothes ?

In human life it is necessary to wear clothes as we can not survive without clothes for their importancy like :

(1) They afford protection to the body from natural calamites like extreme temperature.

(2) Clothes protect the body from external injuries.

(3) They assist in the maintainence of body heat.

(4) They provide decency and personal decorum in social life.

(5) It is also used to identify sexual differences.

4.7 Assessment

1. How do you calculate the measurement of a male shirt.
2. What are the different types of measurement technique of a female figure.
3. What are relative grith measares of male and female figures.
4. What is pleat? What are the different types of pleats?
5. What is tuck?
6. What is Dart? Show the view of a dart with names of different points.
7. What is gathers? What role it plays in garments?

Unit 5 ❑ Introduction to Pattern Making

Structure

5.0 Objectives

After going through this unit you will be able to—

- Understand the Pattern Making
- Know about Historical background
- Know about Measurement Technique

Learning outcome

After learning about pattern making, its help to make a proper dress with proper fittings and measuring technic help to take proper measurement.

5.1 Introduction

Pattern making function connects design to production by producing paper templates for all the components, such as cloth, lining and fusible. Which have to be cut for a garment. Pattern making is a highly skilled technique, which calls for technical ability a sensitivity for design interpretation and a practical understanding of the process technology used by the factory industrial pattern making has two basic stages, the block pattern and the garment pattern.

5.2 Pattern Making and Garment Production

Pattern making function connects design to producing paper templates for all the components, such as cloth, lining and fusible, which have to be cut for a garment. Patternmaking is a highly skilled technique, which calls for technical ability, a sensitivity for design interpretation and a practical understanding of the process technology used by the garment pattern.

5.2.1 The Block Pattern

This is a basic pattern without any style features and incorporates the measurements, proportions and posture of the today for which garments, developed from this pattern, are intended. The block pattern can be created by either of the following methods.

a) **Flat Method :** The components of the pattern, usually the body and sleeves, are constructed by a draft (technical drawing), which incorporates the

measurements and proportions of the particular system used by the pattern maker. This type of pattern draft can also be produced by a computer, which has been programmed to construct basic patterns according to given measurements and proportions.

b) **Modeling :** This was the original method of constructing garment patterns before the advent of the flat systems and it is still widely used in the haute couture end of the clothing business. Modeling entails the fitting of the block garment, usually in toll on a workroom stand of the appropriate size, when the fit and balance are satisfactory, the toile is removed from the stand and each component is copied on the pattern paper and the necessary making – up allowances added.

Flat systems owe their origins to modeling because a pattern draft is only a quick and standardized method of reproducing the basic components, which were originally arrived at through modeling.

5.2.2 The Garment Pattern

The styled patterns used for cutting the original sample garments can be developed by a variety of means, including the that method, modeling or a combination of both, when using the flat method the pattern maker superimposes the style lines of the garment on to a copy of the block pattern, performs the necessary manipulations and then adds the requisite sawing and other allowances to each component. Related components are aligned to check their accuracy and nips. Notches are made in the seam lines as guides for alignment and matching during sewing and making up.

The conventional methods of pattern construction are gradually being replaced by computerized systems, which interact with the pattern maker. The essential features of this technology are pattern design and pattern generation systems.

5.2.3 Pattern Design Systems

The pattern maker inputs to the system all the block patterns in current use. With the aid of the computer the pattern maker can construct garment patterns from them . alternatively a previously constructed pattern, stored in the system can be used as the base pattern for a new style. It is also possible to store specific features such as collars, lapels and pockets, provided the pattern maker has inputted matching alignment points. For example, an existing lapel can be literally stuck-on to a different forepart with a minimum of time and effort.

The finalized patterns can be plotted for verification before cutting them out, or

they can be cut out on a regular plotter using a cutting head instead of a pen. Due to the many set routines built into pattern design systems. The productivity of the pattern maker is substantially higher than that achieved when using the traditional methods of tracing, drawing, cutting out and marking by hand. The increased productivity of PDS (Pattern Design System) makes a significant reduction in the throughput time of new samples, and this a one the important factors of quick response technology.

5.2.4 Pattern Generation Systems

When the pattern components for the top cloth have been developed on the computer via PDS, the pattern generation system (PGS) automatically generates the patterns for auxiliary components such as linings and fusible. It operates according to rules specified in advance by the pattern maker on the relationship between top cloth and lining or top cloth and fusible. The playing matrix of the system can also take into account the characteristics of the top cloth to be used , incorporating this information when generating the auxiliary patterns. A typical example of this is the generation of a top collar from the under collar pattern where, if a heavy cloth is to be used. The fullness allowance would be different from that required or a lightweight fabric.

5.3 Historical Background

The art of tailoring can be traced back at least to the fourteenth century . when it because fashionable in Europe to add an under layer of packing in the chest area of men's jackets Rather than taking its from the contours of the wearer's body the garment fabric was cut and carefully shaped in fit over the packed from. Through the ages the packing was extended according to fashion, to the sleeves the shoulders, even to the stomach area. The padded under structure provided what was considered to be the improvements ever the contours of the body it also enabled the garment fabric to lie mealy, relatively unaffected by the body's wrinkle movements.

The construction techniques developed to create these structured garments were quite different from those used to produce shirts and dresses . by the sixteenth century the makers of men's jackets had formed a separate branch of the clothing makers guilt's, complete with precise specifications for the quality and color of packing materials and linings for gentlemen's silk brocade jackets. By the late seventeenth century women's fashion began to be influenced by the man tailored coat, tailors were presented with the new challenger of adapting their craft to feminine from and fancy.

Not unit the early nineteenth century did careful fit become a criterion of well-tailored garments the under structure remained, but the shaping became more subtle, its purpose now being to complement rather than to distort the natural lines of the body . great attention was also given to the flawless lay of the garment fabric over the canvas form. The lapel was to roll gracefully open at the chest, without pulling the garment forward, away from the body all edge of the jacket were to belief the existence of the several layers of fabric beneath, by being flat and sharp, without noticeably bulk. The collar, and all curved edges of the garment were to incline slightly inward toward the body which causes a graceful avoidance of the awkward upward curl of collar tips and pocket flaps pockets were never to gape open when not in use. And vents were expected to lie that and firm. The result was a clean definition of design lines, a controlled yet graceful presentation of the garment fabric, impeccable fit, form and detail.

Today's tailors continue to practice their art almost exactly as it was practiced a century ago. Not because slower is necessarily better, but because these methods produce body and form, detail and durability which newer, faster methods of tailoring are simply unable to equal.

5.4 Measurement Techniques

5.4.1 Measurements

Proper instruments are necessary for making good drillings and proper patterns. A number of measurement charts are available for making paper patterns. They are all based on anthropometric surveys (body measurement surveys). These surveys have been conducted in the advanced countries and not in India.

For making the drafting or pattern making of a particular person, body measurements have to be taken. Points to remember while taking body measurements are.

Correct standing position in erect posture

Persons should be wearing well fitted garments.

Tell the person to take a deep breath to allow some ease

While taking round measurements make sure that the tape is parallel to the and is not sagging down.

The procedure for taking body measurements is as follows.

Waist length : from highest point of shoulder over the bust point to the waist

Round bust : round measurement taken over the fullest part of bust in front and over the lower part of shoulder blacks in back.

Round waist : round measurement taken closely but not tightly around the waist.

Across shoulders : from arms eye to arms eye at the top of the shoulder across the neck.

Pivot point : From highest point of shoulder to the bust point.

Round Hips : Measure around the vides part of hips with two fingers inside the tape

Overarm Length : Bend the arm keeping the hand at the waist and measure by passing through.

Underarm Length : From armpit to wrist, measured on straight arm and not on bent arm.

Round Elbow : Measurement taken round the elbow with arm

Round Wrist : Measurement taken round the wrist

5.4.2 The Concept of Wearing Ease

Fitted garments are not made on exact body measurements. Some amount of wearing ease is essential, it is an allowance that makers a garment comfortable to the wearer. Ease varies according to the looseness desired at different parts of the body.

5.4.3 Tools and Equipment

The following tools and equipments are essential from the pattern making and garment construction point of view.

Working Surface : A flat surface is required. Ideality it should be 90-92 cm. high.

Paper : Strong brown paper is used for patterns. Parchment or win card should be used for blocks that are used frequently

Pencils : use hare pencils for drafting problems (2H), and colored pencils to outlining complicated areas.

Fiber Pens : For writing clear instruments patterns.

Bent Handle Shears : these shears are designed for the most convenient and

careful cutting of fabric in use. The handle bents up and away from the cutting surface while the blade is allowed to slide along the surface without disturbing the layout of the fabric. A 10 (25.4 cm.) to 12 (30.5 cm.) pair will handle most of the tailoring needs . fine shears will give best service if they are oiled and sharpened when necessary, and if they are not used to cut materials other than fabric.

Thread Snips : Small, sharp. Pointed scissors are used for easy access to small areas, and for cutting threads.

Clay Tailor's Chalk : while clay chalk is used for marking pattern information into the garment fabric. The edge of the chalk should be sharpened before use, for a clean, fine line. Clay chalk can be brushed away easily when no longer needed. However, avoid pressing on top of the chafe marks. As this will make removal more difficult, Darker colored chalks are used for markings on interfacings.

Tape measure : Tape measure is necessary for taking body measurements. Available with inches printed on one side and centimeters on the other Special tape measures are also available for taking the inseam measurement for trousers. These tape measures have cardboard stiffening at one end. The cardboard, and not the tailors hand can be placed at the top of the seam for measuring Plastic, rather than cloth tape measures should be purchased since those made of cloth are inclined to shrink.

Ruler : Flexible, plastic see through rulers are very convenient for measuring curved areas on patterns and fabric, as well as for flat surfaces. Do keep them away from the iron.

Hip Curve Ruler : It is a gracefully curved ruler essential for making and adjusting pattern lines

Straight Pins : Either dressmaker pins, which are of medium thickness, or silk pins, which are somewhat thinner are appropriate for tailoring needs.

Basting Thread : while cotton thread #40 - #50, easy to break for removal when necessary

General Sewing Thread : Mercerized cotton thread, slid thread, is suitable for both hand and machine stitching.

Rubber, Metric ruler, Curved ruler, Meter stick

Set Square : A large setsquare with a 45 degree angle is very useful, metric grading squares can be obtained with this equipment.

Metric Tape Measure, Tracing Wheel

Shears : Use separate shears for cutting cloth and paper, as cutting paper will blunt the blades, Sell tape, Pins

One –Quarter and one –fifth Scale Squares : These are essential for students to record pattern blocks and adaptations in their notebooks.

Stanley Knife

Tailor's Fabrics : Calico is used for making toile's for designs in woven fabrics. Make sure the weight of the calico is as close to the weight of the cloth as possible knitted fabric of the same stretch quality must be used for making toile's for designs in jersey fabrics

Metric Square

Calculator : The calculator is now a common tool in all areas of skill ;

French Curves : Plastic shapes and curves ;

Pattern Notched, Pattern Punch, Pattern Hooks, Pattern Weights, Model Strands, Computer Equipment

5.5 Figure Measurement

5.5.1 Direct Measurement

The following are standard measurements taken by tailors, and used by them to draft patterns, while will fit their clients as closely and as comfortable as possible . in conjunction with the measurements, the tailor also notes important information about the client's body : whether her posture is stooped or overly erect. Whether her shoulders are square or sloped, whether her bust and buttocks are full or flat, whether her stomach protrudes. Whether one hip or one shoulder is higher than the other etc.

5.5.2 Taking Measurements

The first five measurements are taken over the best fitting jacket the client has available . don't be concerned if the jacket is not a perfect fit. You will have an opportunity to improve the fit during the measurements and the muslin fatling.

1. **Centre back/Neck to waist :** With the jacket collar up, measure from the collar seam to the waist at centre back.
2. **Centre back Neck to hip :** with the tape measure touching the body at the

waist measure from the collar seam to the hip level . of course the length of your jacket depends on the style you have chosen. Take your measurement to the hip level as a point of reference : for adjustments in the muslin fitting.

3. **Back :** At about centre armhole lever, measure across the back from the armhole seam to the centre back seam.
4. **Shoulder :** Measure the shoulder seam from collar seam to armhole seam.
5. **Sleeve Length :** Measure the sleeve from the shoulder seam to the hem fold taking into consideration the slight rise of the sleeve over the shoulder pad.
6. **Bust Level :** Measure around the body at the fullest part of the bust. This measurement can be taken over a blouse, but not a sweater. Check that the tape measure is at the same level at the back as in the front. The measurement should be comfortable, neither too loose nor too light.
7. **Bust Level :** Measure from the shoulder (about 1* (2.5 cm.) from the base of the neck down to the centre of the bust. Be aware that this measurement can change significantly depending on the bra that is worn. Therefore, the type of bra that will usually be worn under the jacket should be worn for this measurement.
8. **Waist :** The waist measurement can be taken over a blouse but not over a skill waistband or a belt. The measurement should be comfortable but without additional ease .
9. **Hip Level :** Measure down from the waist at the seam, to the level at which the hips are fullest.
10. **Hips :** The hip measurement can be taken over an unbulky straight skirt or trousers. The pockets, if any, should be empty and the clients feet should be together. With two fingers under the tape for ease, measure around the fullest part of the hip,
11. **Skirt Length :** Measure down from the waist at the side seam, to the desired length of the skirt.
12. **The Fly :** Measure the fly from what would be the top of the waist banc, down to the beginning of the curve of the crutch .
13. **Pants Inseam :** With the pants waistline at a comfortable level for the client, measure the pants inseam from the crotch to the middle of the shoe.
14. **Pants Out seam :** With the pants waistline at a comfortable level for the client measure down the out seam from the top of the waistband to the middle of the shoe.

15. **Knee Width :** Measure across the knee of the pants from crease to crease.
16. **Width of Pants at Hem :** Measure across the bottom edge of the pants leg from crease to crease.

5.5.3 Size coded and Associated Body Measurements

Size Codes	Body Measurements From cm.	Hips To cm.	Body Measurements From cm.	Bust To cm.
8	83	87	78	82
10	87	91	82	86
12	91	95	86	90
14	95	99	90	94
16	100	104	95	99
18	105	109	100	104
20	110	114	105	109
22	115	119	110	114
24	120	124	115	119
26	125	129	120	124
28	130	134	125	129
30	135	139	130	134
32	140	144	135	139

5.5.4 Women of Medium Hight 160 cm. - 170 cm. (5Ft $2^{1}/_{2}$in - 6Ft $^{1}/_{2}$ in)

Size Symbol	8	16	24
Bust	80	97	117
Waist	60	77	97
Hips	85	102	122
Back Width	32.4	36.6	41.4
Chest	30	35	41
Shoulder	11.75	12.8	14
Neck Size	35	39.2	44
Dart	5.8	8.2	10.6

Top Arm	26	31	37.8
Wrist	15	17	19
Ankle	23	25.1	27.5
High Ankle	20	22.1	24.5
Nape to Waist	39	41	43
From Shoulder to Waist	39	41.3	44.5
Armhole Depth	20	22	24.2
Waist to Knee	57.5	59.5	61,25
Waist to Hip	20	21.2	22.3
Waist to Floor	102	106	109.5
Body Rice	26.6	29.4	32.5
Sleeve Length	57.2	59.5	61.2
Sleeve Length (Jersey)	51.2	53.5	55.2

The chart is compiled for High Street Fashion garments

Small = approx size 8 – 10

Medium = size 12

Large = approx size 14 – 16

XLarge = size 18

Example 1 :

	SMALL	**MEDIUM**	**LARGE**	**XLARGE**
	92-96	100-104	108-112	116-120
Chest	96	104	112	120

Or,

Example 2 :

	SMALL	**MEDIUM**	**LARGE**	**XLARGE**
	88-92	96-100	104-108	112-116
Chest	92	100	108	116

Body Measurement Chart for Small Medium Large – Xlarge Sizes

The six chart offered below uses the range of Example 2 shown above. It is useful for the younger unisex (athletic) market and has some height

5.5.5 Differential in the larger sizes

Chest Size Between	SMALL	MEDIUM	LARGE	XLARGE
Chest	92	100	108	116
Seat	94	102	110	118
Natural Waist	75	83	91	99
Trouser waist (4cm. below Natural Waist)	78	86	94	102
Half Back	19	20	21	22
Natural Waist Length	44	44.8	45.6	46.4
Scye Depth	23	24.6	26.2	27.8
Neck Size (Easy Fitting)	39	41	43	45
Sleeve Length One Piece Sleeve	64	65	66	67
Sleeve Length Two Piece Sleeve	80	82	84	88
Inside Leg	79	81	83	85
Body Rise	27.5	28.5	29.5	30.5
Close Wrist Measurement	16.8	17.6	18.4	19.2

5.6 Terms of Pattern Making

5.6.1 Pattern Making Terms

The following terms and definitions are related to the workroom

Pattern drafting : A system of pattern making that is depends on measurements takes from a form or model to cleat basic. Foundation, or design patterns. An example is the draft to the basic pattern set

Flat patternmaking : A system of patternmaking that is dependent on previously developed patterns. In flat patternmaking the patterns are manipulated by using a slash or pivotal method to create design patterns.

Basic pattern set : A five piece pattern set, consisting of front and back bodice and skirt and long sleeve, which represents the dimensions of a specific form of figure it is developed without design features. The traced copy is referred to as a working pattern.

Working pattern : Any pattern used as a base for manipulation when generating design patterns.

5.6.2 Pattern Production Terms

First Patterns : The original pattern developed for each design. This pattern is generally made from marking paper and usually requires fitting and adjustments half a pattern is developed unless the design is asymmetrical.

Production Pattern : The production pattern is a pattern set that has been corrected and perfected and contains every pattern piece required to complete the garment it is used by the grader for grading sizes, and by the marker maker for a fabric layout.

Marker maker : The marker makers responsibility is to lay the production pattern on marking paper so that there is little waste of fabric. Pattern sizes are often mixed on the marker to prevent waste. The maker is either pencil marked, photo marked, or marked on a computer system. We have discussed lay plans extensively in block iii unit 1.

Pattern grader : The grader proportionately increases and decreases the size of an original pattern within a size range (referred to as the pattern grade) . the grade is in the length, width, and circumference grading is done using one of the following tools.

Dario Grading Machine : Purchase through Veccharelli Bros. PO Box 15443, Los Angles, CA90015

Computer Accomack 100 and 200 : Offered by Gerber Computer Company

Grading ruler : the grading ruler and text can be purchased by contacting Eleanor Davis, 1128 Lafayette St. San Gabriel, CA 91776 (Convenient for classroom or the designing room)

Pattern marker maker : A marker is a length of paper containing a copy of all pattern pieces to be cut at one time . all patterns are interlocked and aligned on the marker paper so that when cut, the grain lines will be parallel to the selvage of the fabric. The completed marker is placed on top of layers of fabric as a guide for the other. There are three methods for making markers.

1. A pattern marker maker fracas each pattern on marker paper
2. Patterns re photographed (photo marking) on paper as a conveyor belt carries the patterns under a camera.
3. A computer system will miniaturized copies of the original pattern used in

the lay-up process houses the information in its memory bank until needed (AccuMarkTM 200 and 500 systems).

Pattern Cutter : After the marker is made and laid on top of the layers of fabric, the garments are cut by the cutter or by a computer cutting machine.

High – ply cutter : Up to three inches of compressed fabric can be consistently and accurately cut using a high effienciency vacuum hold-down system.

5.6.3 Pattern Development Systems

Design patterns can be generated through pattern manipulation by hand, or with the use of computer systems called PDS (pattern development system) , CAD (computer aided design), and PAD (pattern aided design) . computer companies offer several methods for pattern generation.

Accomack Silhouette is an innovative concept designed to enhance the sills, experience and capabilities of the patternmaker Designed are free to apply their instinctive talents individual techniques and preferred tools to patterns. Excellent for copying ready made designs.

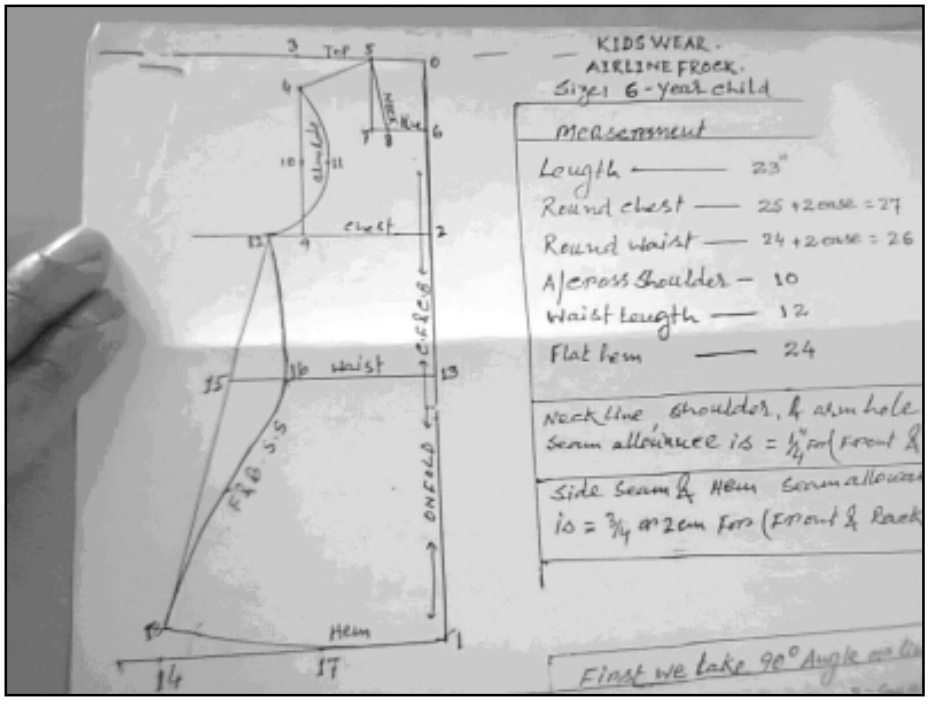
5.6.4 Pattern Design System

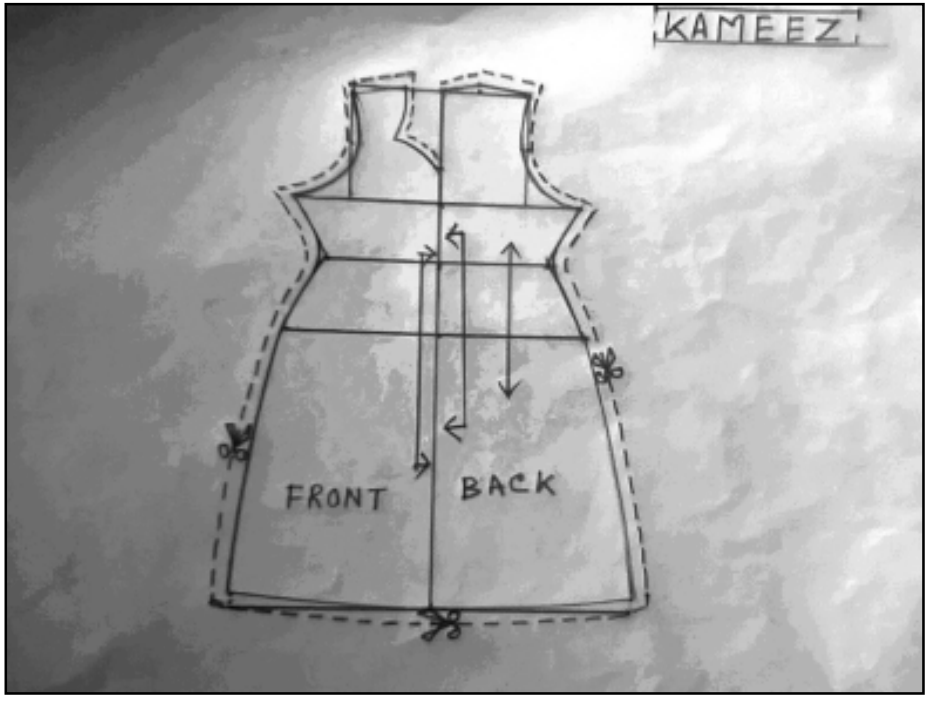
Micro Mark PDS : The system provides the following functions. Pattern drafting and design, pattern modification, style changes and others.

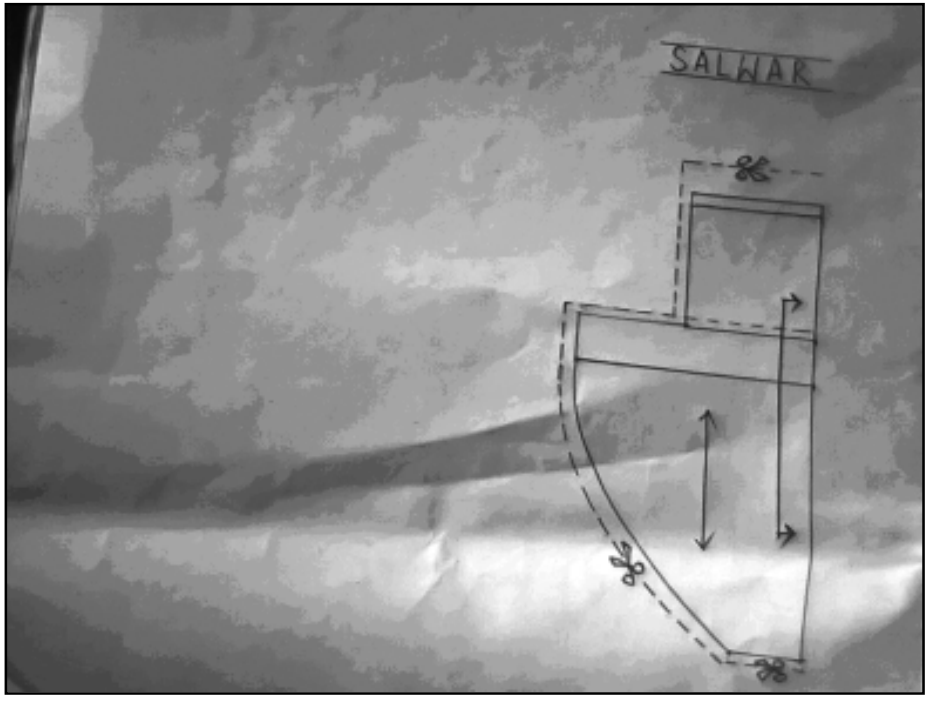
5.7 Cost Sheet

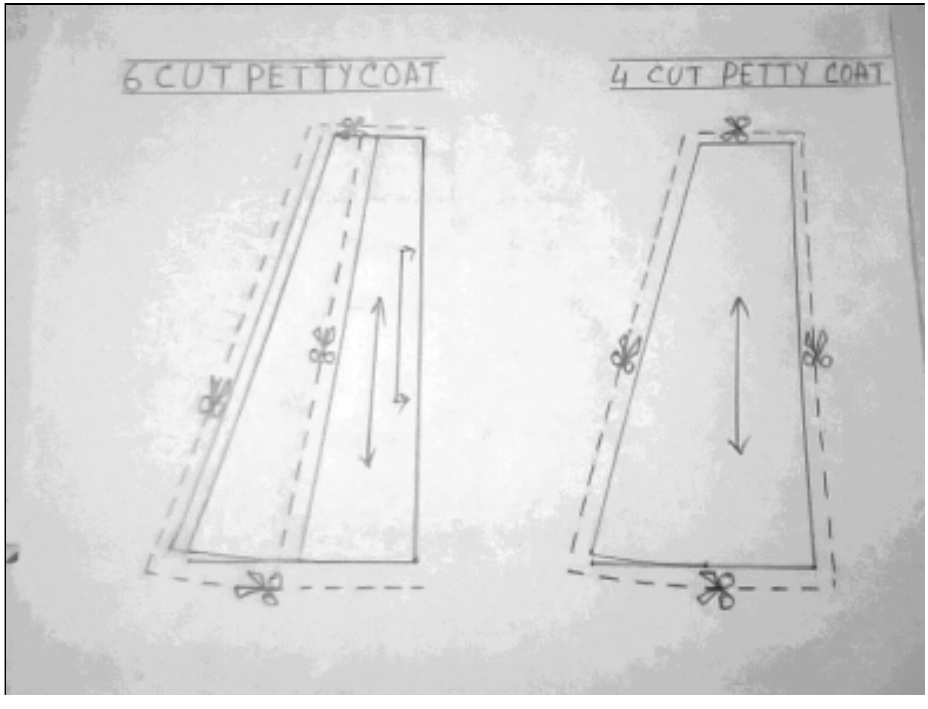
A cost sheet is a complete record to each design and is used to cost the garment and establish the wholesale price. The top part of the form (items 1 and 2) is completed in the design room. It should include the names and telephone numbers of salesperson fabric and from companies. As well as fabric swatches, a sketch and special pattern information or instructions. A blank copy is included in the back of the book for duplicating.

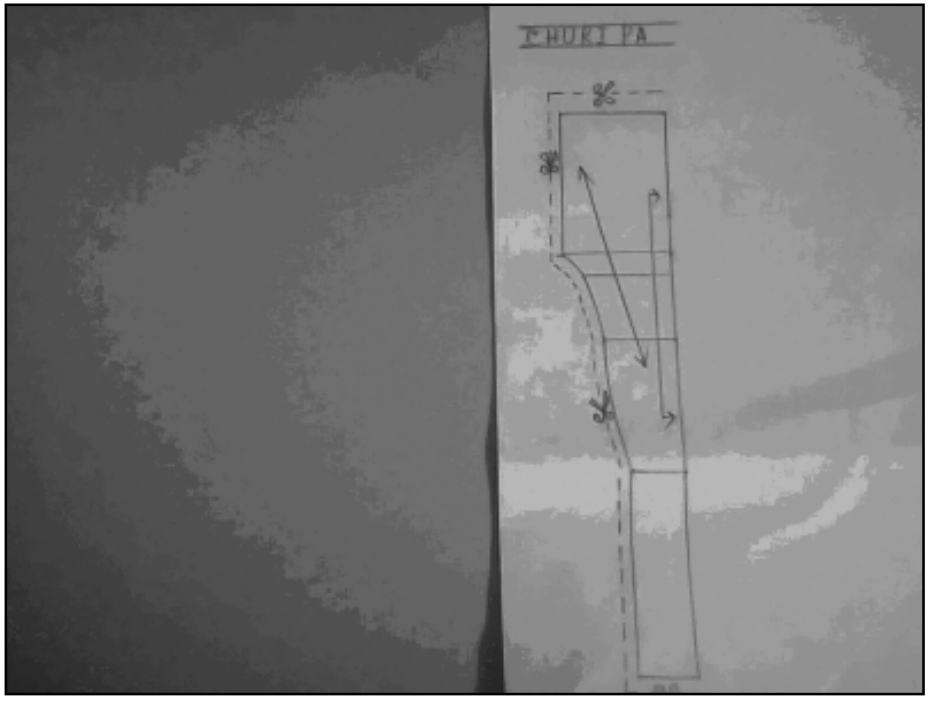
The original copy is for the manufacturer or production person, who completes the lower part (items 3 and 4) and marks yardage. This provides the manufacturer with information required for production. A duplicate kept in the design room for quick reference makes for fewer interruptions in the design department.


KIDS WEAR.
AIRLINE FROCK.
Size: 6-year child
Measurement
Length —— 23"
Round chest —— 25 + 2 ease = 27
Round waist —— 24 + 2 ease = 26
A/cross Shoulder — 10
Waist length —— 12
Flat hem —— 24
Neck line, shoulder, & arm hole
Side seam & Hem
Top
chest
waist
Hem
ONFOLD
14
17


KAMEEZ
FRONT
BACK


SALWAR


6 CUT PETTYCOAT
4 CUT PETTY COAT



5.8 Summary

In this unit, we have learnt about the concept of pattern making and garments production here, we have learnt about the block pattern, garment pattern, pattern design system and patterns generation systems. Then we have learnt about the historical background of the pattern making and garment production. Then we got acquainted with the technical skills required in pattern making and garment construction, where we learnt about the theory of wearing ease. Then we learnt about the technical skills required in making up. Next, we got familiar with the tools and equipments required for pattern making and garment construction. Then we learnt how to measure figures and take measurements. Then we learnt about the sizing systems, standard body measurement, and various sizes of women's garments and fashion information. And finally we discussed about the pattern construction process – where we learnt about the basic blocks, block patterns, seam allowances etc.

5.9 References

An introduction to pattern making – G. Coockiln

5.10 Assessment

1. Briefly discuss about the concept of pattern making and garment production.
2. Write short notes on—

   A) Block pattern

   B) Garment pattern

   C) Pattern design and generation system
3. Discuss about the historical background of the pattern making and garment production.
4. How to measure figure and take measurement?
5. What do you know about the sizing system?

Unit 6 ❑ Principles of Design and Ornamentation

Structure

6.0 Objectives

After going through this unit you shall be able to understand the—

- Concept of design.
- Colour wheel.

- Concept of ornamentation and embellishment.
- Various types of embroideries.

6.1 Introduction

Designers are the prime trend setters and working as a designer usually implies being creative in a perticular domain of expertise. The work area of a designer spreads from interior of a house to retail environment.

Textile and apparel design is highly competitive, but rewarding field for the creative individual. Textile design involves study of fibre characteristics, spining, weaving, knitting, dyeing, printing and finishing techniques of fabrics apart from design concepts i.e. knowledge of colour, pattern, texture etc. Textiles need to fulfill the requirements of function, comfort and aesthatics simultaneously. Designer has to predict consumer reaction and to work within the financial budgets of the production and manufacturing process to design apparel that is both fashioable and functional.

6.2 What is Design?

According to Encyclopedia Britannica, Design is the arrangement of lines or forms which make up the plan of a work of art with special regard to the proportions, structure, movement and beauty of line on the whole. A design may be naturalistic or wholly the abstract conception of an artist. The basic objective of creating a design is that it has to meet its goals being economical user friendly attractive and appealing, convincing, technologically advanced than the previous. Design is a subtle blend of creativity with practical adaptibility having an aesthatic flavour. Design has a more universal meaning than the commercial applications that might first came to mind. In other words when creativity entered the industry it becomes design and when it was pursued by an individual as a means of self expression it became Fine Art.

6.3 Elements of Design

The elements and principles of design are basis to all forms of art. The five essential and inherent elements that go into the composition of all subjects of art and design are : line, shape or form, space, texture and colour.

Line : A line is the recorded movement of a dot on its journey from one point to another. This length of a line is much greater than its width, but beyond that, the qualities of lines vary greatly. Theoratically line consists only the dimension of its length, but interms of art and design it can have varying width as well.

Line can be short or long, straight or curved, round or angular, heavy or thin **(Fig. 1)**. Lines can also relate to one another in a number of ways, they can run parallel to one another or in a convergent pattern ; they can intersect or overlap **(Fig. 2)**.

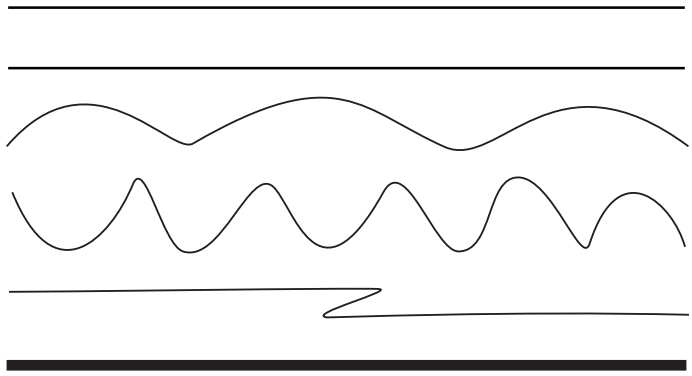


Fig.1

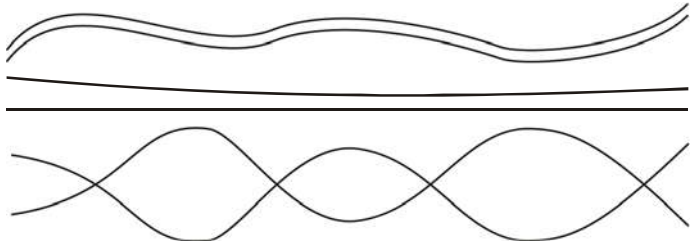


Fig. 2

Actual lines may vary greatly in weight, character and other qualities. It can function in a variety of ways in a design :

(a) as shape maker, (b) representing edge, (c) as direction or movement, (d) for empahsis, (e) as rhythm, (f) as symbol, (g) to create depth, (h) as value-builder, (i) to establish mood, (j) Line as subject.

Two other types of line i.e. implied line and psychic line are also very much important in pictorial composition. An implied line is created by positioning a series of points so that the line is created automatically by connect them. In case of psychic line, there is no real line, but a mental connection between two elements.

Another important characteristics of line is its direction. A horizontal line implies quiet and repose since we associate a horizontal body posture with rest or sleep. A vertical line represents potential of activity. Diagonal line most strongly suggests motion and represents speed, action and diversity.

In case of garment the term line refers to the direction of visual interest created by construction details such as seams, pleats, gathers, tucks etc. Line direction flows from are part of the garment to another. Straight line suggests crispiness whereas curved lines imply buoyancy. Lines have the power to create moods and feelings. Vertical lines remind upright, majestic figures and suggest stability. Whereas horizontal lines denotes rest, quiet and calm. Soft curving lines express grace and diagonal lines imply powerful movement and vitality.

6.3.1Shape

A shape can also be termed as form is a visually perceived area created by an enclosing line or colour. The term shape and forms are synonymous. “Shape” is more precise term because “Form” has other meaning in art. Form may be used in a broader sense to describe the total visual organisation of a work, including colour, texture and compositions. Shape is a two-dimensional area with identifiable boundaries. Its dimensions are height and width. There are three primary shapes : circles, squares and triangle **(Fig. 3)**. All other shapes are alterations and combinations of these three i.e. a rectangle is a square that is extended in one direction, an oval is a circle pulled or stretched in two directions **(Fig. 4)**

Form is a three dimensional area with identifiable boundaries and in addition to dimensions of height and width, form exhibits depth. There are five primary forms: cubes, cones, pyramides, cylinders and spheres. All other forms are alterations, modifications and combinations of these five.

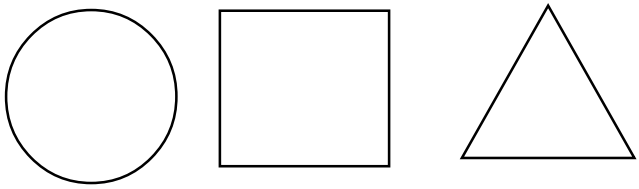


Fig. 3

Fig. 4

Shapes also fall into two general categories i.e. geometric and organic. Geometric shapes belong to the square-circle-triangle family. They are characterised by edges that are straight or perfectly curved. Organic shapes are the opposite based on those found in nature and are most often rounded and irregular. In contrast to geometrics, organic shapes are each one of a kind. Shapes can either be positive or negative. This distinction involves the relationship of a shape to others and to the space it occupies.

In case of garment, shape describes the outline of the whole garment and is responsible for one of our first impression. It relates to body structure.

6.3.2 Factors of Design

Colour : In case of textile products colour is the first elements to which consumers respond, while selecting or rejecting a garment because of its colour appeal.

Warm Colours : Red, yellow, orange are classified as warm colours, because of their association with fire and the sun. Warm colours are stimulating, aggressive and lively. Red is associated with matters of the heart, valantines, love and romance. It is also exciting, fiery and dangerous. Yellow is bright, sunny, chearful, friendly and optimistic but it is difficult colour to wear because in conflicts with many skin tones. Orange combines the sunny feelings of yellow and the warmth of red. It is also often a difficult colour to wear as intense orange can be irritating and over powering.

Cool Colours : Cool colours are refreshing i.e. blue, green and purple. Blue is quiet, restful and reserve whereas green is a refreshing colour suggesting peace, rest, calm and quiet. Purple associated with royalty and it represents wealth, dignity and drama.

Neutrals : Neutral colours such as beige, tan, brown, white, grey and black are more popular in case of sophisticated fashion than those colours as mentioned earlier. White is associated with purity and cleanliness, where as in western culture black is connected with death. However, both black and white have become classics and therefore tend to stay in fashion longer.

Colours must be selected for individuals garments. The selection of colour must reflect seasons, climate and type of garments. Usually designers select some trend colours and combine them with their own colour choices.

Fabric : Fabrics are the desingers artistic medium. Suitability of fabric is determined by fibre, weave, texture, performance, hand, pattern and colour. Texture is the sensuous element of design. It is the surface created by the weave and by light reflection. Performance of a fibre refers to wearing and clearing properties of fibre content, weave and finish. Weight and hand dictate the sithoutte of a garment. Weight refers to heaviness or lightness and thickness or thinness of a fabric. Soft fabrics such as crepe, chiffon etc. are ideal for draped design and additional fluidity can be achieved by cutting the fabric on bias grain. Fabric weight varries with the type of garment to be produced and must be appropriate for a particular season. The weight is determined by the square meter for woven and by linear meter for knits. Heavier and warmer fabrics are needed for winter, whereas light and cooler ones for summer. In general wool is used for fall and winter season, whereas linen and cotton is used in summer. However, there are now seasonless fabrics and fashion.

6.4 Colour

Colour is probably the most complex visual element and is an extremely complex science. Colour has a basic, instinctive, visual appeal. Our experience of colour is entirely depend on light. What we perceive as colour is actually rays of light reflected from the object's surface. Sir Isaac Newton, the father of modern science, in advertently stumbled into the subject of colour and its related theories. Colour is the primary element to which consumers respond, accepting or rejecting a garment because of its colour appeal. People relate personally to colour as it evokes emotional responses based on their culture and events in their lives. Colur evoke emotional associations rooted deep in our cultural psyche. Similarly different seasons, holidays are traditionally identified with different colours. Red and greens are associated with winter holidays, pastels of flowers with spring, refreshing white with summer etc.

A colour wheel begins with the most basic colours, called primary colours. Red, Yellow, and Blue are considered as primary colours because they cannot be created by mixing other colours together. Primary colours are located one-third of the way around the wheel from each other. Secondary colours are made by mixing equal portions of two primary colours. Secondaries come about in the following

combinations: red and yellow make orange, yellow and blue create green, blue and red produce purple. To fill the remaining spaces in the colour wheel, tertiary colour can be created by mixing a primary and an adjacent secondary colours.

The complete colour wheel represents the sequences of colours found in a rainbow. They are the raw colour materials one has to work when designing. Colours located opposite one another as the wheel are referred to as complements. Complementary colour is important for the two reasons : (i) to reduce the intensity of colour add a touch of its complements and (ii) to make a colour look more intense without actually adding another hue. Colours located next to one another on the colour wheel are referred to as adjacents.

Cool and Warm Colour

A colour's temperature has to do with how warm or cold it makes you feel. Warm colours are generally agreed to those in the red-orange-yellow family. They are the colours associated with fire, sun and heat. Warm colours are vibrant, exuberant and aggressive. At the opposite end of the spectrum are the cool colours. The cool colours blue, green and purple are reminscent of the sky and the sea. Warm colours generally have a ‘‘coming forword’’ feeling, whereas cool colour recede in our vision. Designers often take advantages of this advancing-receding aspect of the warm-cool. relationship to create the illusion of depth an a two-dimensional surface or to create a feeling of vibration.

Psychology and Symbolism of colour

Colours carry different emotional connotations, rooted in our cultural part. They also dictate the decorum for events in our lives. The origin of colour symbols may perhaps be attributed to the religious needs of people. Enlisted below are some of the colours and the common symbols attached to them.

The essential fact of colour theory is that colour is a property of light, not an object itself. Objects have no colour of their own but merely the ability to reflect certain rays of white light, which contain all the colours. Blue object absorb all the rays except the blue one and these are reflected to our eyes. Black objects absorb all the rays ; white objects reflects all of them.

6.4.1 Properties of colour

Hue : Hue i.e. the typical characteristics of the visual element by which one can distinguish one colour from another, viz. blue from red, yellow from orange etc. The words “hue” and “colour” are used as synonyms, but there is a distinction between the two. Hue describes the visual sensation in the different parts of the colur spectrum. The three primary colours are red, yellow and blue. All other colours can be created from these three primary colours.

Value : The second property of colour is value, which refers to the lightness and darkness of the hue. In case of pigment, value can be altered by adding white and black to the particular colour. Adding white lightens the colour and produces a tint or high-value colour. Whereas adding black darkens the colour and produces a shade of low-value. A design that contains little or no contrast of hue is referred to as monochromatic. Each colour has a range of values from light to dark and the value of a colour depends on its relative capacity to absorb and reflect light. A colour is light and dark in value when it approaches towards white and black respectively. The lighter values are called tints and the darker are shades.

Chroma : Chroma is the term used to describe the depth of colour i.e. dullness, brightness, saturation, intensity, vividness or purity of the colour. A bright intense colour is said to have high chroma.The brightness or paleness of a hue is called its intensity. The addition of gray to the colours results in varying degree of intensity. Bright colours are considered high intensity and pale ones are low intensity. Saturation is the relative degree of purity a colour exhibits.

6.4.2 Colour Wheel

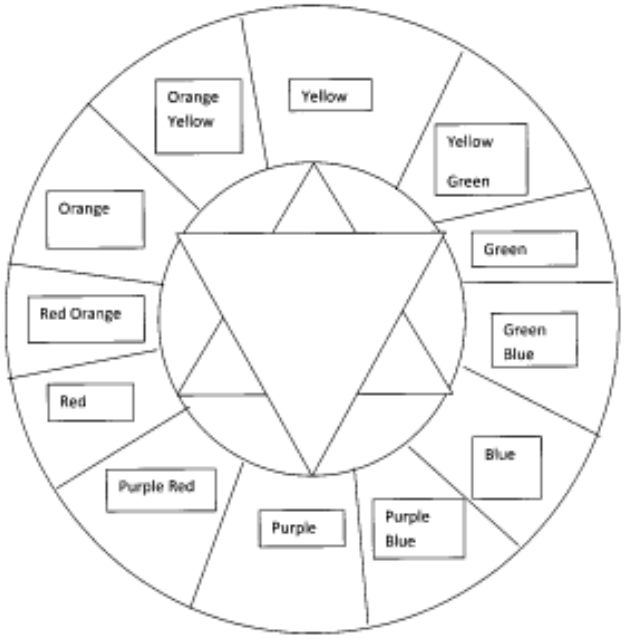
A colour wheel (also referred to as a colour circle) is a visual representation of colours arranged according to their chromatic relationship. Begin a colour wheel by positioning primary hues equidistant from one another, then create a bridge between primaries using secondary and tertiary colours.

Primary Colours : Colours at their basic essence; those colours that cannot be created by mixing others.

Secondary Colours : Those colours achieved by a mixture of two primaries

Tertiary Colours : Those colours achieved by a mixture of primary and secondary hues.

Complementary Colours : Those colours located opposite each other on a colour wheel.



Yellow symbolizes envy or cowardice

Red symbolizes danger or courage

Blue symbolizes authority and people in uniform

White symbolizes purity and innocence

Black symbolizes death and sorrow.

Purple symbolizes royalty, clergy and wealth.

Orange symbolizes sun and joy.

6.4.3 Colour Mixing

Sunlight is generally considered as the source of white light and consists of seven colours of the rainbow i.e. violet, blue, blue-green, green, yellow, orange and red. Sunlight is composed of light of different wave lengths. The wave lengths in the region of 400-700 nm are visible to human eye. Sun is the main and most important source of energy in our solar system. It emits energy in the form of light. Light is

an electromagnetic radiation. The distribution of the wave lengths of the radiation in the visible region of sunlight and their corresponding colours are given in table—

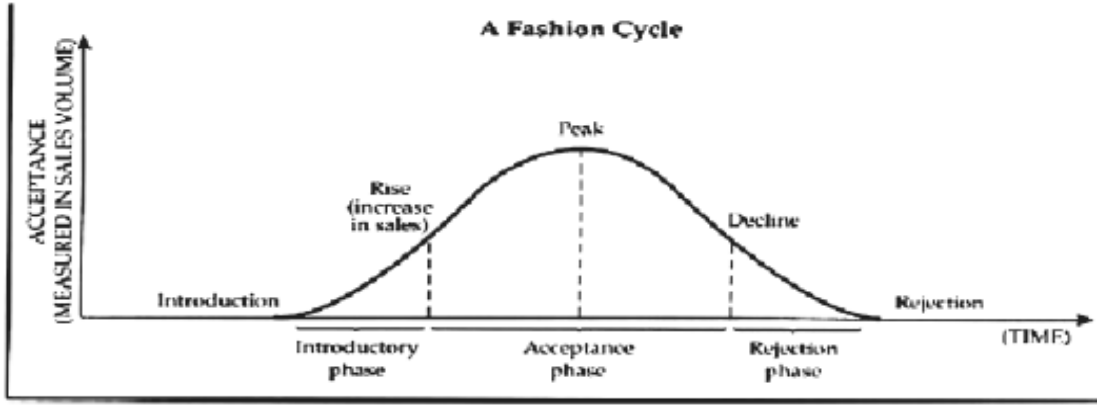
Colour :	Violet	Blue	Blue-green	Green	Yellow	Orange	Red
Wave length (nm) :	390-430	430-460	460-500	500-570	570-590	590-610	610-700

6.5 Fashion

Fashion is the style or styles most popular at a given time. The term implies three components i.e. style, acceptance and timeliness. Style is any particular characteristics or look in apparel or accessories. Style may come and go in fashion but a specific style always remains the same, whether it is in fashion or not. Acceptance implies that consumers must buy and wear a style to make it a fashion. There is no fashion if nobody buys it. Acceptance by a large number of people makes a fashion important. Timeliness indicates change in fashion after a certain period of time.

6.5.1 Fashion Evaluation

Fashion does not change overnight. It is important for designers to understand fashion cycles because it explains the acceptance of fashion and are directly related to buying and selling cycles. Generally fashion cycles evolve gradually, giving consumers time to become accustomed to new combinations and looks. New fashion looks can be created by changing the design elements such as line, shape, colour, fabric and their relationship to one another. Consumers are exposed each season to new styles created by designers and some of them are rejected immidiately by the buyer on the retail level, but others are accepted for a time. The way in which fashion changes is usually described as a fashion cycle **(Fig.5)**.



fashion cycle (Fig.5)

6.6 Principles of Design

The principles of design are the basic guidelines concerning the use of design elements, their appropriate combination and inter relationship in a composition. These principles are based on human psychology; perception and evaluation of our aesthetic sorrounding. These principles are flexible and always relate to the current fashion.

The three basic principles of design are (i) Proportion, (ii) Balance, (iii) Rhythm.

(i) Proportion : "Scale" and "Proportion" are related terms refer to size. Big and small scales are relative terms. The word "Big" is meaningless unless one standard reference. Proportion refers to relative size, and is linked to ratio (Proportion). Proportion is basically the inter relationship of the size of all parts of the garment. Generally, unequal proportions are more visually stimulating the equal ones. Individual sections of a garment, such as sleeves, pockets and collar must relate in size to each other and to the total silhouette as well. Similarly, stitching and design details like trimming, pleats and tuck must be meaningfully spaced in relation to total design. Trimming must not be too heavy or too light, too large or too small but porportionate to the space around them and compatible with the feel of the garment. There are two distinct ways of describing an object as a proportion— (i) by comparison with other similar objects and (ii) by comparison with space they occupy.

(ii) Balance : Balance can be best defined as equilibrium of the elements of design. It refers to visual weight in design. A garment must be balanced to be usually pleasing. The principle of balance can be subdivided in three categories— (a) symmetrical balance, (b) Assynmetrical balance and (c) radial balance.

(a) Symmetrical Balance : It is the simplest type of balance, both to create and to recognize, and also relatively easy to achieve. In symmetrical balance, like shapes are repeated in the same position on either side of a vertical axis, whereas in the metaphor of balance, design elements like colour, texture and line are visual weights and must be equally distributed.

(b) Asymmetrical Balance : Asymmetrical balance is based on equal eye attraction. Black against white gives a stronger contrast them grey against white, therefore a smaller amount of black is needed to visually balance a larger amount of grey.

To achieve a more exciting dramatic effect asymmetrical or informal balance can be used. Asymmetrical design composition is achieved by a balance of visual impact. Technically asymmetrical designs make pattern layout more difficult and therefore more expensive.

(c) Radial Balance : A third variety of balance is called radial balance. Here all the elements radiate or circle out from a common central point. The sun with its emanating rays is a familiar symbol that express the basic idea. Radial balance is not entirely distinct from symmetrical or or asymmetrical balance. Radial patterns are abundant in the natural world. Circular forms abound in craft areas, where the round shapes of ceramics, basuetry and jewellry often make radial balance a natural choice in decorating such objects. Radial balance has been used frequently in architecture.

Repetition or a sense of movement can be achieved by the repetition of lines, shapes and colours. In is necessary to create interest in a design and to carryout the central theme. The use of repetition is one of the most helpful guidelines in designing.

(iii) Rhythm : Rhythm as a design principle in based on repitition. Rhythm is the movement or natural eye flew caused by the regular reoccurance of related elements. Elements are related when they share similarity in colour, texture, line, shape or space. In music rhythm is associated with sence of sound, but in design it appeals to our visual sense. Visual rhythm is created when elements repeat in a sequence in a design.The repeated elements are often shape and colour motif. The usual rhythm is created through three arrangements (a) continuous rhythm, (b) repetitive rhythm, (c) progressive rhythm.

(a) Continuous rhythm : Continuous rhythms are uninterrupted. A composition in which all objects or shapes are uniformly coloured constitutes a continuous rhythm. Continuous vertical lines give the illusion of height, whereas continuous horizontal lines create an illusion of width. A Jacket and skirt having matching vertical stripes would be considered as having continuous rhythm even though they are structurally separate pieces.

(b) Repetitive rhythm : It is a group of like objects or elements in an arrangement set at irregular or random intervals. Despite the unequal spacing of elements, unity is created because the elements are identical or highly similar.

Alternating rhythm : This rhythm consists of successive patterns in which the same elements reappear in a regular order. In a design, this is termed as alternating rhythm, as motifs alternate consistently with one another to produce a regular sequence.

(c) Progressive Rhythm : Another type of rhythm is called progression or progressive rhythm. A composition is said to have progressive rhythm when it employs similar elements that gradually change. A value scale from white to black is a progressive rhythm. Progressive rhythm is not dependent on orderly placement of elements, infact arbitary placement is often more attractive because of its contrast.

(f) Focal Emphasis : Another traditional way of arranging a design is to organise elements in relation to a focal point. A focal point is the place of primary emphasis in a design i.e. the place that exerts the most pressure. A focal point provides the starting point for eye flow.

Emphasis or a centre of interest draws attention to the focal point of a garment. This point is the central theme and the rest of the garment is of secondary importance. A centre of interest must create more visual attraction than any other design element in the garment.

6.7 Ornamentation and Embellishment

Embroidery, that is the embellishment of cloth with design made by needle and thread, is an art that stretches back to hoary antiquity. The word embroidery is a Middle English word derived from the old French bonder meaning edge or border.

Egyptian mummies were wrapped in garments embroidered in gold and robes of king and noblemen were embellished with embroidered designs. The design was made with threads of linen and wool, the hair of goals and camel and exceedingly fine shrikes of gold and silver.

Over the centuries, embroidery has been used to adom everything from the smallest personal possession like handkerchiefs and underwear to the most sumptuous state regalia. Curtains, cushions, wall hangings, state robes, ordinary everyday clothes, bed and table linen have all provided gist to the embroiderer’s mill. The adornment is done on all kinds of pliable material which can be pierced with a needle – linen, cotton, wool . silk and leather. Gold, silver, silk, cotton and wool ahead, animal hair, precious stones, pearls, shells, insects wings, seeds and enamel are all used to produce effects of ravishing simplicity or awesome grandeur.

For centuries India has been renowned for the richness and diversity of its embroidered textiles. Embroidery is part of the Indian way of life, and is evidence everywhere on clothes adorning animals, in temples, homes and other buildings. Gujarat was renowned for the silk embroidery on cotton. This was done in very fine stitch.

6.8 Embroidery Techniques

Indian embroidery is usually worked on a single layer of fabric, but often the amount of stitching on the fabric necessitates another fabric being placed behind the first, this backing fabric is usually of an inferior quality to the one on the surface. Embroidery can be worked on a woven plain fabric, a woven patterned fabric or on pieces of different types of fabric which have first been sewn together.

The stitches used have been determined largely by the fabric available, and have also been dictated by the quality of the woven fabric. Interrelated with this has been the type of design to be worked, whether it is to be geometric and counted or curved and free flowing. The designs themselves are sometimes worked directly on to the fabric form memory or by hooking at another piece of work.

The design is often put on to the fabric, prior to embroidering, by a variety of methods .sometimes an outline design is produced by block printed. The pattern can also be created by tracing with a wooden pen or pencil. Stenciling on to cloth with coal dust (the prick-and pounce method) is also used, in which powdered clay or charcoal is rubbed through perforated strong paper or copper foil.

Most embroideries are worked in the hand. With the worker sitting in a comfortable position on the floor. Some embroidery has to be worked on a tight fabric and if, , this is the case the fabric is stretched on a frame. Which is held off the ground at either end. This enables the embroiderer to sit close to the frame so that oth hands can work above and below the frame with ease.

A wide variety of implements are used to enable these various techniques to be came out. Naturally, there is also a wide variety in the sizes of needles, and some needles are specially made for certain processes .art example of this involves the needles for pulled thread Chikan work, where the needle is fairly wide along its whole length. For some embroidery techniques involving metal threads extra-long needles are used.

The ari is a hooked ari and has been adapted over time is stitch embroidery designs on to leather. Using different sized of stitches and types of thread.

The most commonly used background fabric is woven cotton. Though some silks and wool are also used. Cotton fabric have been woven in India since prehistoric times and occasionally, the weaving has been so fine that it is called woven air. The embroidery on this fabric is of highest quality.

Embroidery threads of cotton, silk, wool, silver and gold are often identical to those used in weaving. In fact, they are sometimes obtained by extricating the threads from an existing woven fabric. The colors used for the fabrics and embroidery are varied. The brightest and most dominant are seen in the arid and desert regions, particularly in the states of Gujarat and Rajasthan.

Traditional and similar patterns, motifs and images are used in many art and craft forms. And similar patterns and imagery are often seen in the textile arts of wearing printing and embroidery.

Sometimes a block printer may print a design on to a cloth for the embroiderer to use as a guide. With typical ingenuity, the same block can be used to produce a printed pattern on its own.

The approach to embroidery stitches in India is rather different from that in other countries. Many different stitches are worked with the back, or reverse. Of the work facing the embroiderer, as the back is often important too, and the embroidery therefore becomes reversible. The embroiderer does not merely think of embellishing the existing fabric, but works more like a weaver, for whom the decorative element is intrinsic to the construction of the piece.

Some of the techniques involve the use of one stitch only for example, the running stitch in kantha work. It is the incentive way in which t he stitch, thread and fabric are used which makes it into such a distinctive technique.

It would therefore seem appropriate that not only are the stitches used in Indian embroidery recognized but also that the following points are observed.

The shapes made by the stitches

The negatives shapes achieved in the un-worked areas of the fabric

The size and spacing of the stitches

The types of fabrics and threads used

The combination of stitches used together in a particular piece

It is the imaginative use and combination of embroidery stitches, which often makes Indian embroideries so remarkable and so worthy of study over a period of

time new stitches and designs have been added to those traditionally used and these have also been adapted and changed. Often, old designs have been augmented and changed and have evolved to a point where they are barely recognizable from the original.

In the past, and in India today, stitches and designs are often passed on from mother to daughter. In this way some of the techniques and designs have remained largely the same, with gradual changes occurring with an embroiderer improvising or adding an individual touch, in recent years, the people of the villages have been encouraged to use their embroidery skills.

Embroidery is still produced by professional embroiderers and, in general. It is the men who are involved in this kind of work. A very rigid method of working and training has evolved. Often a master embroiderer trains others by passing on the process and the manipulative skills for a particular form of work, and this is frequently in a father and son relationship. That controlled quality work is only produced by these professional embroiderers.

6.8.1 Embroidery Stitch

As a result of the differing historical developments in various regions of India, the embroidery stitches used differ between district communities. Stitches introduced from other countries by invaders and settlers have been absorbed into local work and have changed or developed over a period of time. For example, Chain stitch was probably introduced to west Gujarat ((Kutch) from Baluchistan (now in Pakistan) and is thought originally to have come from further west. Chain stitch and Satin stitch may well have come to other parts of India from China.

The stitches are all made by hand with a needle or ari. Chain stitch can also be produced on a Cornely machine and one has to look carefully to see the method of each embroidery.

The stitches fail into the following groups :

Herring bone (and interfaced stitches), Feather stitches, Fly stitches, Cretan, buttonhole chain, straight (including unrelated line) stitches, Couching stem stitches, Running and back stitches, Cross stitches, Single unit stitches, Edging and filling stitches.

With a closely woven fabric, sharp pointed needles are used, with an open weave fabric the needle is usually a blunted one.

It is difficult to isolate embroidery stitches, as they are often used in combination with other techniques.

The square and oblong rumals are embroidered covers and decorative pieces. And are thought to have originated during the 18th century in Chamba (Himachal Pradesh) . they are influenced by the painted miniatures of the Moghal courts. They are often described as paintings translated into embroidery. The rumals vary technically, and some are influenced by phulkari technique. The main stitches are cross stitch, double running stitch, buttonhole stitch, long and short stitch, pattern darning, and herringbone stitch. The designs will have been drawn on to the fabric with fine charcoal by the arts/designer, who probably also decided the colors, with the embroiderer working to the given guidelines.

In Gujarati embroidery work, some pieces of cotton fabric may be sewn together to produce a background fabric of different colours. Another piece of fabric may be placed behind, so that the embroidery is stitched through two layers. The stitches used are mirror work, reverse chain, open chain, double chain, double tied certain, laid work with a couched line or sometimes with a line of reverse chain stitch and Romanian stitch (also known as Indian filling stitch)

In Punjab's one type of phulkari work, stitches are used on both sides. The darning stitch is worked in squares to form a diamond and half diamond border with the reverse side facing the worker. This method makes it much easier for the embroiders to count the warp and weft threads of the base fabric.

In Kashmiri embroidery work, the stitches make motifs, borders and fabrics of solid stitching. The designs were put on to the cloth through perforated parchment (later, thick paper), coal dust was rubbed through the holes and then the outline was heightened with a pen, ready for the embroidery to be worked.

The woven and embroidered shawl technique developed at the end of the 19th century. the embroidery could be stitched so that the shawl was double sided, or stitched through just half of the fabric so that the design was seen only on one side with nothing showing on the reverse. The fabric and thread were usually fine wool, with the stitch making a soft addition to the fabric. The main stitches are split stitch, forms of Romanian stitch buttonhole and stem stitch. Satin stitch, single fly stitch, outline stitch and running stitch.

In Gujarat and Rajasthan embroidery work, herring bone stitches are frequently used.

The finest embroidery was brought to northern Kutch by the Jats of the Banni who had immigrated from Baluchistan generations ago their work still retains the Baluchi techniques and the same preference for small, intricate patterns, which are fundamentally geometric in conception. Mirror discs are cut in the shape of petals and leaves, and blended in designs of shimmering delicacy.

Bhuj, the capital of a small prosperous kingdom in the central provinces of Kutch, was inhabited by mochis-cobblers or leather workers, by trade. It is not known when they began practicing silk, embroidery, but their work shows a maturity of style and technique, indicating a well established craft.

Their designs comprised the traditional floral motils and were executed in wto alternating patterns on the hem of the ghaghrapat (skirt cloth). Though the craft centered primarily around Bhuj some mochis moved to Kathiawar (Saurashtra), in the 14th century and were employed by the Kathis, a land owning class.

Kathi Embroidery

Kathi embroidery, however, shows an entirely separate style from that of Bhuj. While the floral patterns remained, the fillings were often in herringbone stitch (being quicker that the chain stitch). The designs were figures and animal motils adopted from kathi at Dominant motifs of flowers or peacocks were used and the intervening spaces were filled with leaves and buds . mirrors were used for emphasizing the centre of flowers, eyes of the birds and animals.

The Art of Chikankari

Chikankari is a fine and intricate shadow work type of embroidery done by white yam on colourless muslins called tanzeb (tan meaning body and zeb meaning decoration) . the work chikan according to one school of thought appears to have its origin in Persia, being derivative of chakin or chakeen. If may also be a distorled from of the work chikeen or siquin, a coin valued at Rs. 4 for which the embroidery was sold. another explanation ascribes the origin to East Bengal where the word chikan meant fine.

The earliest reference in literature to chikan dates back to the 3rd century B.C. in his records Megesthenes a Greek traveler, had mentioned the use of flowered muslins by the Indians.

Folklore attributes the origin of chikankari to various sources. It is believed by many craftsmen that a traveler while passing through a village near Lucknow asked for water from a poor peasant. Pleased with his hospitality , the traveler taught him the art of chikankari that would never allow him to go hungry . the craftsmen believe a that the traveler was a prophet. Another story imputes its origin to Queen Noor Jehan. Who inspired by Turkish embroidery, introduced this needlework. The origin of this craft is also ascribed to the harem's of Avadh's Nawab where a seamstress from Murshidabad embroidered a cap for the Nawab to please him . jealous of the attention she received from the king, other inmates of the harem followed her and thus the art of chikankari was evolved.

Stitches

Stitches employed in chikankari are unique and can be divided into three categories. Flat stitches, which ar e delicate and subtle and lie close to the surface of the fabric giving it a distinctive textural appearance. Embossed stitches which are highlighted from the fabric surface lending it a characteristic grainy texture and jail work which is the most striking feature of chikan embroidery and which creates a delicate net effect. The fabric is broken into holes by teasing the warp and weft yarns and holding them in position by small stitches.

Process

The chikan industry has five main processes namely cutting, stitching printing, embroidery washing, and finishing Cutting is carried out in the lots of 20-50 garments. The layouts are done to minimize wastage of materials. Stitching, often done by the same person, may be civil, done exclusively for higher priced export orders or commercial, which is done for cheaper goods. Printing is carried out by the use of wooden blocks dipped in dyes like neel and safeda. After this, the fabric is embroidered by women. the last process which is washing and finishing, takes about 10-12 days. This includes bleaching, acid treatment, stiffening and ironing.

The most common motif used is that of a creeper . individual floral motils may embellish the entire garment or just one corner. Among the floral motils embroidered . the jasmine, rose, flowering stems, lotus and the paisley motif are the most popular.

In recent years, the beautiful and wide variety of stitches and designs that were on the decline, have been revived Concerted efforts by government and various

private organizations have paid off and today the art of chikankari is flourishing enriching both the domestic and export market.

Phulkari – Flowering on Cloth

Phulkari is the floral tribute by women of Punjab

Phulkari – The art of growing flowers on fabric

Sitting on the charpoys beds woven with jute strings) pulled into the protective shade of a tree, or ensconced against a wall, women in villages and small towns all over Punjab are often busy creating spectacular flower embroidery on dupattas, shawls or other garments. Called phulkari in local parlance, the origin of this beautiful art can be traced back to the 15th century AD.

The word phulkani literally means flowering . it is a form of craft in which embroidery is done in a simple and sparse design over shawls and dupattas. In some cases where the design is worked over very closely, covering the material entirely, it is called bagh (a garden of flowers).

The embroidery of phulkari and bagh is done in long and short dam stitch which is created into innumerable designs and patterns. It is the skilful manipulation of this single stitch that lends an interesting and characteristic dimension to this needlework. While the stitch itself is uncomplicated. The quality of the phulkari depends upon the size of the stitch. The smaller the stitch, the finer the embroidery.

The threads used were of a silk yam called pat. In the past, the silk threads were brought in from different parts of India. Like Kashmir and Bengal and also from Afghanistan and China.

Bright colors were always preferred and among these, golden yellow red, crimson, orange, green, blue , pink etc. where the popular ones.

For the embroidery only a single strand was used at a time, each part worked in one color, Shading and variation were not done by sing various colours of thread, instead, the effect was obtained by the dexterous use of horizontal, vertical or diagonal stitches. This resulted in giving an illusion of more than one shade when light fell on it and when it was viewed from different angles.

To keep the embroidered part clean while working on the cloth, the finished portion wa s rolled and covered with a muslim cloth. Specially created designs varied from village to village or region to region in Punjab and were given suitable names descriptive of their from. While phulkari was used to ornament cloth, the bagh ensured that not even a square inch of the base cloth was visible.

6.8.2 Appliqué

Appliqué – the art of clothe decoration, is practiced in Orissa and Rajasthan. Appliqué is the collage of fabrics and colors. Appliqué is decorative work in which one piece of cloth is sewn or fixed onto another, or the activity of decorating a cloth using glass pieces. Metals, wood or metal wires. Appliqué work these days can be seen on utilization items such as bags, lampshades, tablemats etc. appliqué embroidery can also be seen on blouses. Petticoats, gowns and other garments.

Applique

Appliqued Saree

Base Cloth

The cloth primarily used and preferred by the women, was the home spun, locally woven and dyed khadi. It was strong long lasting and cheep and served the purpose of keeping the wearer warm during within. Another reason was that the embroidery involved the counting of threads while doing the straight dam stitch. The coarse weave made this task easier. In addition, the thick cloth did not pucker and pull and could be worked upon without a frame. Usually, pieces of small width about 45 to 60 centimeters, were, worked on separately and the two or three strips were joined together to form the required size.

Beginning with geometrical patters, flowers and leaves, the repertoire of motifs was constantly enlarged . birds, animals and human figures and objects of everyday use were inducted, along with vegetables, pots, buildings, rivers, the sun and the moon, scenes of village life, and other imagery. Phulkaris and baghs came to be embroidered in a stunning range of exquisite designs. In dhoop chaon, which literally means sun and shade an amasing interactive display of light and shade was created. The designs remained earthy and true to life . there was dhaniya bagh (coriander garden), motia bagh (jasmine garden) satrange bagh (garden of rainbow) , leheria bagh (garden of waves) and many other depictions. Today the most intricate and sought after phulkaris are the sainchi phulkaris, which bring scenes from rural Punjab to life. An incredible wealth of detail is embroidered onto cloth.

Reflecting Emotions

With time, the phulkaris became closely interwoven with the lives of the women of Punjab. The joys, sorrows, hopes, dreams and yearnings of the young girls and women who embroidered the phulkaris were often transferred onto cloth. Many folk songs grew out of this expressive combination of skills and intense feelings. So, it is that one hears a young woman, whose betrothed has not sent a promised message to her, murmuring sadly softly, as she embroiders peacocks on a phulkari. It was not long before phulkari folk songs became a part of the famous, pulsating folk dances of Punjab – the gidda and the bhangra .

Kimkhab a Febric of Dreams

One of the beautiful examples of the Indian tradition of weaving gold with fabrics is kimkhab. Meaning the fabric of dreams, kimkhab is a heavy brocade woven with silk and gold threads mostily in the only of Banaras. The pattern in kimkhab looks as though embroidered on top of an already rich silk. The silk fabrics have coloured silk or gold threads interwoven to from the most attractive designs. The gold thread is called kalabattu , it is a specially prepared thread of silk with a metallic mounting of gilded silver. A thin bar of silver is beaten and drawn through a succession of holes in an iron plate. Each hole is smaller than the preceding one. This process is followed until a very fine wire is obtained. This wire is slightly flattened and twisted spirally around the silk thread.

Kimkhabs were earlier made entirely from fine gold or silver threads. During the 17th , 16th and 19th centuries. Some were set with precious stones, and were used in making canopies and trappings as seen in the late Mughal paintings.

Gradings

There are various grades for kimkhabs, which are determined by the humber of kalabattu threads repeated in a given space. For example ekpara represents ten kalabattu threads in a running inch, Similarly , there is dopara, tinpara, chaupara and even chhapra.

Other styles

The commercial communities, of the southern and western districts of kathiawar, known as Mahajans also produced a unique style of austere geometric embroidery. It was worked in a monochrome of red or violet, in long darning stitches, which covered the entire cloth. The sheen of silk was enhanced by mirrors at the intersection of the motils and on the main borders. While and cream threads emphasized the velvet like surface that created a double tone effect, Because of the reflection of light by the mirrors, the effect was enriching . bright yellow and orange decoration of the Kanbi community is another well known style. The difference lay in the size of minors. They used large mirrors, almost one inch in diameter, framed in metal, for a bold effect. The work of Ahirs, though not so popular , is finer and more elaborate. The motils are edged with running stitch tanka in white thread. This not only highlights the motil, but also gives it a sense of movement. The flowers surrounded in a circular fashion, by mirrors, are reminiscent of many styles in Kutch incredibly miniscule mirror embroidery was done on heavily encrusted yoke with while thread, miniscule mirror embroidery was done on heavily encrusted yoke with white thread, mingled with red, orange, blue and green by the Garari Jat community. The Tharparkar district was renowned for its bold style. The entire pattern was worked in open chain stitch and richly encrusted with discs of mirror glass, on coarse cotton. It was also worked on printed and tie-dye cloth, forming patterned field. Mirror work, however, was not just confined to Gujarat but also seeped into the neighboring state of Rajasthan. in Rajasthan, the Harijans, originally weavers, use a combination of cross stitch, satin stitch and buttonhole stitch, along with mirrors the cut and placing of cross stitch. Satin stitch and buttonhole stitch, along with mirrors. the out and placing of embroidery and mirrors in a kanjri (a backless upper garment), significantly identities the wearer as married, betrothed or widowed. It is not only popular in the local market, but also forms a bulk of the export to European counties. An interesting school of belief maintains that earlier mica was used instead of mirror . later ornamental mirror shapes were cut out of an urn, blown out by a mouth pipe. with the advent of modern machines, this ancient technique was soon replaced by the manufacture of mirror sheets. Which facilitated the craft to a great extent. Most of

the workers have now resorted to machine embroidery. Though handwork is still done it is increasingly difficult to produce commodities at prices compatible with work done in modern conditions;

Mirror Work

One of the well – known crafts associated with embroidery is Sheeshedar or mirror work, it is a highly intricate form of sewing mirror discs onto the fabric. The art supposed to have originated in Persia, dates back to the early 13th century. But not much is known about it, Marco Polo, who came to India in the same century, commented that the gold and silver embroidery in this region was more skillfully done than anywhere else in the world.

The art of putting mirrors into the garments is usually combined with other forms of embroidery. The communities who were already familiar with art of embroidery incorporated this craft so as to add more effects to their designs.

6.8.3 Zardozi

ZARDOZI is an imperial embellishment. From the medieval times the art of Zardozi has flourished, reaching its zenith under the patronage of Emperor Akbar. this gorgeous embroidery reveals artistic use of laid stitch with golden thread. It can be seen in wail hangings, chain stitch on saris, caps and other articles with heavy embroidery . as the embroidery is densely performed, designs done are extremely intricate.

The gold wire known as zari is the thread used for zardozi embroidery. The making of zari thread is a very tedious job involving winding, twisting, wire drawing and gold plating of thread . the embroidery of zari zardozi is performed in a very interesting manner. Gold wire is carefully revolved around a silver bar tapered at one end. Then they are heated in furnace till gold and silver alloy is formed. The gift wire, when drawn through a series of holes made on steel plates, comes out glittering as gold. The gold coated silver wire is then flattened and twisted around silk thread to obtain zari.

Zardozi has remained as an appliqué method of embroidery. With one hand the craftsman holds a retaining thread below the fabric. In the other he holds a hook or a needle with which he picks up the appliqué materials. Then he passes the needle or hook through the fabric. After hours of painstaking labor. The result is an exquisite gold veined work of art.

The Decline

During the rule of Aurangzeb, the royal patronage extended to craftsmen was stopped many craftsmen left Delhi to seek work in the courts or Rajasthan and Punjab. The onset of industrialization in the 18th and 19th centuries was another setback most of the craftsmen turned to other occupations.

Renaissance of Zardozi

The art of zardozi was revived along with many traditional methods of embroidery in the middle of this century. Zari work was mainly done in Madras and zardozi in Hyderabad until a few decades ago. Today Uttar Pradesh is home to this finest work of gold and silver embroidery . this craft has caught on to a larger region of Bareilly such as Allampur, Faridpur, Biharkala, Nawabgaanj and Chandpur.

The non availability of gold on a large scale became a hurdle in the making of zari threads. The problem was overcome by combining copper wire with a golden sheen and gold colored silk thread.

Another major problems the availability of skilled zardozi crafts men. as the craft was on decline, the number of craftsmen decreased, as they had taken on other jobs. But with the revival of the craft, their number began to increase.

6.9 Innovations and Success

New designs and products have been introduced apart from the traditional ones. Some of the products are cushion and pillow covers, bedspreads, handbags, sandals and buttons. Zardozi on kurta pajamas and chooridar achkans (tight trousers and men's coat) have gained popularity among the men. zardozi embroidered garments have become quite popular with Indians abroad . zardozi is also beginning to attracts the attention of top fashion designers the world over.

6.9.1 Kashmiri Shawls

Kashmiri shawl is an embellishment work, in the 19th century, a change was brought in the weaving of the traditional kani shawls of Kashmir, the demand for which was ever increasing instead of being woven as one piece, now the shawl was woven in long strips on small looms. Due to the large areas of design to be woven, the pattern was broken down into fragmented parts, each woven separately, at times on separate looms, and then all these pieces were put together, and stitched by a rafoogar.

This period also witnessed another far reaching development in Kashmir. It was advent of the amli or embroidered shawl. The kani shawl was further embellished, or in some cases, the plain ones beautifully decorated by a kind of parallel darning stitch.

6.10 Summary

India is very rich in art and craft work and almost all the states of India traditional textiles and various techniques of ornamenting those textiles exists for a long period. Especially, West Bengal is very rich in various traditional art and craft work of textiles and other handicrafts items.

Various textile products will be ornamented by embroidery like Kantha Stitch, Applique, Phulkari, Zari work etc.

6.11 Reference

a) Embroidery design for fashion and furnishing by Moira Thunder

b) White work : Techniques and 188 designs by Carter Houck

6.12 Assessment

1. What do you mean by Embroidery ? Give five examples of Embroidery Stitches, which are very common in Indian Tradition Textiles.
2. What are appliqués? Discuss various types of Appliques techniques.
3. Name and define the three components of fashion.
4. Describe the phases of a typical fashion cycle.
5. Name the elements of design. Discuss briefly why it is important for these elements to be represented in a design.
6. What are the principles of design. How do they help a designer analyse the effectiveness of a designs.

Unit 7 ❑ Entrepreneurship Development

Structure

7.0 Objectives

After going through this unit you shall be able to know the—

- Concept of entrepreneuship.
- Qualities of an entrepreneur.
- Goal setting and entrepreneurial development.
- Concept of finance.
- Preparation of a project.

Learning outcome

After learning about Entrepreneurship development: we may say that entrepreneurs are not born, they are developed.

The popular belief that entrepreneurs are born has changed today. Experiments and studies have revealed that entrepreneurship is not the monopoly of any caste or race ; through conscious efforts and training, entrepreneurial qualities can be developed. Individual thinking and behavior processes can be channelized for doing something new and unique. An individual can be motivated to accept challenges and to strive for achieving and establishing one's own identity.

7.1 Introduction

Entrepreneurs are people with high drives and high activity level, constantly struggling for achieving something which they could call as their own accomplishments. They are different from others and strive to accomplish goals which are not otherwise very easy to achieve. Again they don't strive for something unachievable. To reach the goal, entrepreneurs work hard fo a long period, develop an awareness of their strengths and weaknesses. Facilitating factors and constraints in the environment. They also take external help whenever needed.

7.2 Entrepreneurship

The word entrepreneurs is derived from the French word *entreprendre* which means individuals who undertake the risk of new enterprise. Entrepreneursip is a process of giving birth to a new business in which the entrepreneur has to take the risk to turn opportunities into economic realities. Entrepreneurship is the ability to multiply capital. It is the creative ability through which something new is intoduced to the economy.

Joseph A. Schumpeter defines entrepreneurship as a process of creative destruction through new combinations of resources and new methods of commerce.

J. E. Stepanek observes that entrepreneurship is the capacity to take the risk, ability to organise, and desire to diversity and make innovations in the enterprise.

According to **B. Higgin,** ''Entrepreneurship is the function of seeking investment and production opportunity, organising and enterprise to undertake a new production

process, rasing capital, hiring labour, arranging the supply of raw materials, finding site, intoducing a new technique and commodities, discovering new sources of raw materials and selecting top managers for day to day operations of the enterprise.''

7.3 Characteristics of Entrepreneurship

Entrepreneurship can be treated as the residual factor in the process of economic growth. Entrepreneurship is characterised by innovation. Entrepreneurship depends on the personal qualities. Socio-economic variables and psychological factors are also responsible for the growth and development of entrepreneurship.

The important Characteristics of entrepreneurship are as follows :

1. ***Individual or Group efforts :*** Entrepreneurship is an individual or group efforts. An individual can form an entrepreneurship through his own effort. Again it can be formed by a group of individuals with their combined efforts.
2. ***Creativity and innovation :*** Creativity and Innovation is essential for the formation and development of entrepreneurship. Creativity is the ability to innovate something new in the economy to determine new mode of adaptation with the problem-solving situation. Innovation is the process of doing new things in a newer way with the help of new and newer technology.
3. ***Novelty :*** Entrepreneurship establishes a new business. It introduces new products, new market, new techniques of production, new raw materials and new organisational set up to create new type of utility.
4. ***Dynamic process :*** Entrepreneurship is a dynamic process by which new wealth is created and business activities are performed. New production is made by establishing new entrepreneurship. Entrepreneurship strives continuously utilising the innovative abilities of the entrepreneurs, unused resources and new technologies to produce new products and services and to create utilities.
5. ***Creative destruction :*** Entrepreneurship produces new products and services through innovation and establishment of new entrepreneurship destroying or leaving old techniques of production and old type of products.
6. ***Organisation creating combination :*** Entrepreneurship is the combination of different factors; such as, individual or group environment, social and

cultural elements and support system. Entrepreneurship is formed by individual and government initiatives. It combines raw materials, production process, product, organisation structure etc.

7. ***Creation of wealth and value :*** Entrepreneurship creates wealth. It has some quantitative and qualitative aspects. It creates wealth through innovation of new products and new raw materials. It creates special value to the business. It strives to create personal and social values through creative activities.

7.4 Process of Entrepreunership Development

An individual can be motivated for taking up challenging tasks and for launching calculated risk bearing economic ventures.

Broadly entrepreneurship development process consists of three distinct phases a) Initiation b) Development c) Support

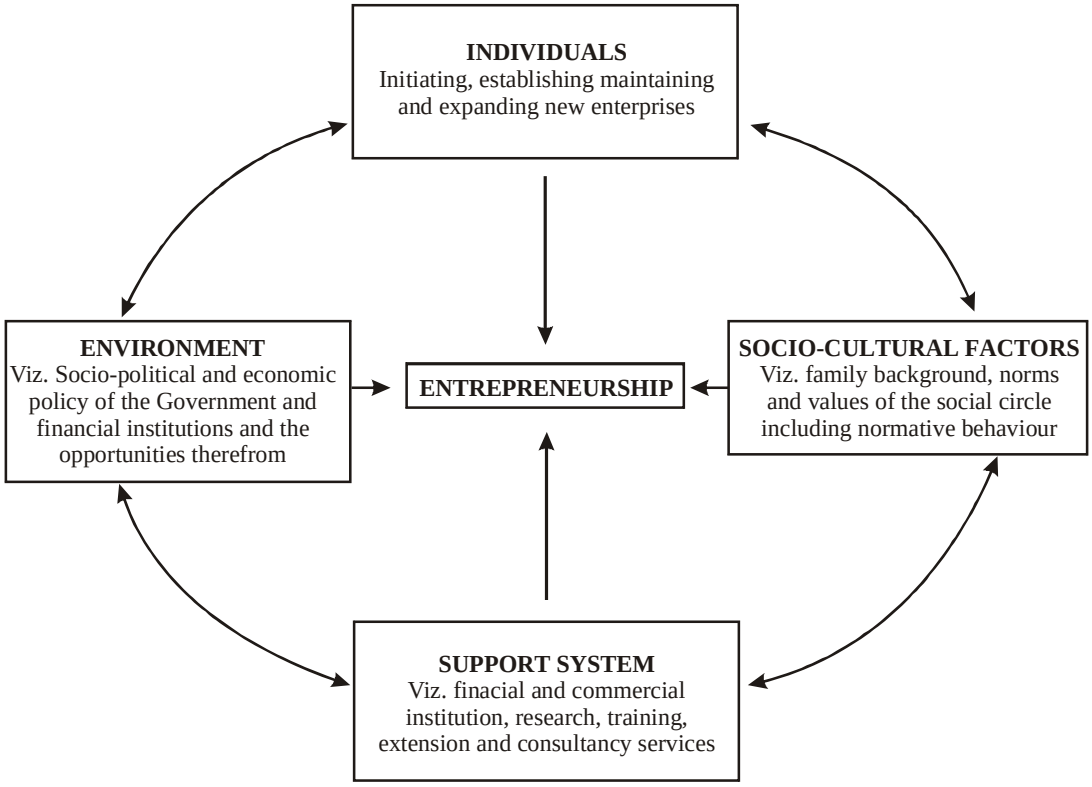
For initiation the latest entrepreneurial traits/potentials are indentified and these qualities are developed and channelized for achieving the desired results. Individuals can be motivated towards starting calculated risk bearing independent ventures, motivation enkindles an intense desire to excel in performance. Creates an awareness of individual potentials accelerates the search for identity and propels one's entrepreneurial journey for achieving the set goal i.e. the independent economic venture. Thus the development process aims at developing an awareness in finding out one's abilities and strengths for reaching one's own objective.

The help given by different agencies and organizations can make the Cheam of an entrepreneur a success. The positive help and support given/rendered by these organizations can make entrepreneurs successful in their ventures. An enterprise be it an industrial venture or a business activity, is run by an individual. The entrepreneur is the key person for successful running of an enterprise. The person runs the project and as such the motivations i.e. the inner urge of the entrepreneur ushers in the success of an enterprise .self growth and efficient management skills are integral parts of success of any industrial business enterprise.

An entrepreneur is in search of an identity and goes through a process of identity formation.

Stages	Behaviour
Identity search	
1. Identity Crisis	Experiences dissatisfaction with present identity.
2. Exploration	Looks for ways of reducing the dissatisfaction
3. Transitional Stress	Experiences, conflicts and apprehensions about the new identity.
4. Search	Searches entrepreneurial opportunities.
5. Deliberation	Weights pros and cons of each alternative.
6. Choice	Makes a tentative choice from amongst the alternatives
7. Pre-enterprise preparation	Makes a preparation after acquiring relevant knowledge, skills etc.
8. Enterprise Building	Takes steps forward towards establishment of an enterprise.
9. Long Term Involvement	Works hard till the enterprise i.e. the goal is built/achieved.
10. New Identity	Acquires new identity with the establishment of the enterprise.
Identity Establishment :	
1. Enterprise Management	Begins of manage the enterprise
2. Role Stress	Experiences entrepreneurial conflicts and stresses.
3. Identity Integration	Identifies with other entrepreneurs
4. Linkage Building	Establishes linkages with other entrepreneurs and support systems for effective functioning.

The process of the development of entrepreneurship may be depicted as follows:



7.5 Qualities of Entrepreneurs

An entrepreneur for successful running of an enterprise, has to possess some qualities. These traits help an entrepreneur in her / his entrepreneurial journey. Some of the traits are listed below. An entrepreneur need not to have all the qualities. An awareness may be helpful in our understanding.

1. Need for achievement.
2. Drawing something new or unique.
3. Need to influence others.
4. Desire to initiate.
5. Acceptance of challenge.
6. Hope of success.

7. Calculated risk taking.
8. Openness to feedback.
9. Learning from experience.
10. Positive self concept.
11. Problem solving attitude.
12. Proactive.
13. Belief that environment can be changed.
14. Seeking help.
15. Keen for result.
16. Creative.
17. Dissatisfaction with old things.
18. Time orientation.
19. Independent in thought and actions.
20. Hard worker.
21. Concern for improving performance.
22. Concern for doing better than others.
23. High level of aspirations and emotional commitments.
24. Takes personal responsibility and does not name others.
25. Awareness of one's own ability.
26. No complacent attitude.
27. Success oriented.
28. Self starter.
29. Profit oriented.
30. Good communication with people.
31. Individualistic.
32. Higher energy level.

For successful implementation of a project or an enterprise, an entrepreneur is to plan and work hard. An entrepreneur examines various aspects before selection of a project. Plans the activity and initiates action for setting up a successfully run enterprise. Thus for successful implementation of a project self growth of a person and development of management skills are essential.

DEVELOPMENT PROCESS	PROCESS	OBJECTIVE
Entrepreneur	Self Growth	Self Development
Project	Development of Enterprise Building	Management Skills.

Self growth and enterprise building are linked. Self growth paves the way for successful management of an enterprise.

Self growth	Enterprise building
1. Intense desire to do something new	1. Development of Management skills
2. Self motivation and awareness	2. Product Selection.
3. Finding out entrepreneurial	3. Material Management.
4. Development of entrepreneurial	4. Assessment of plant Capacity and Qualities Production planning
5. Changes in perceptions for	5. Financial Management, costing Positive thinking pricing and cash flow.
6. Art of perceptions for	6. Marketing and sales planning
7. Development of communication	7. Knowledge of available incentives Skills & facilities, income tax, excise and sales tax rules.
8. Keenness for results	8. Rules and regulation for setting up an industry.
9. Proactive thinking	9. Awareness of roles of different Agencies/organizations
10. Creativity	
11. Development of Self-confidence.	

Self-motivation sparks off an intense desire to be independent and skills for management bring success to an enterprise.

For an entrepreneur, goal setting is important. An analysis of own ability skill and risk bearing capacity helps one in setting the goal. If the vision of the goal is not clear, destructions will have a degenerating effect in the entrepreneurial journey.

7.6 Role of Entrepreneurs

Entrepreneurs play a vital role in the economic development of any country. Entrepreneur has an important role to play in the process of development and important position to fill between environment and its operating economic units. Entrepreneurs accelerate the economic development of any country with special reference to underdeveloped countries and simultaneously affect the environment in a way which produces favourable climate for its growth. Entrepreneurs exert the following roles in the development of any economy :

1. ***Entrepreneur as an owner :*** The entrepreneur is the owner of any enterprise. He is to take all the steps for the development of the enterprise which induce the economic development.
2. ***Entrepreneur as an employer :*** As an employer, he creates the employment opportunities whereby he hires the labour from the labour market in order to grow and develop his enterprise. By the way he enhances the scope for employment.
3. ***Entrepreneur as the producer :*** The entrepreneur is the producer of all kinds of products. He is involved in the production process. He tries to maximise the production by reallocating the resources.
4. ***Entrepreneur as the co-ordinator :*** The entrepreneur is the person who co-ordinates all the functions of the enterprise. Co-ordination, thus aimed at, is not only ushered through the co-ordination of the growth factors but also achieved through the endeavour to induce new changes.
5. ***Entrepreneur as the market-maker :*** The entrepreneur creates the market of his own. He innovates new market for his products.
6. ***Entrepreneur as the decision-maker :*** The entrepreneur is the person who takes the decision regarding the future course of actions. He also takes decision about the profitable allocation of resources and proper combination of them.

7. ***Entrepreneur as the risk-taker :*** The entrepreneur is the risk-taker who usually operates under uncertainty.

8. ***Entrepreneur as an innovator :*** The entrepreneur is a person who innovates. Through innovation, he tries his best level to enhance the economic stability of the enterprise and the economy as a whole. The role of entrepreneur as an innovator is very important in the economic growth of any country.

7.7 Hindrances in Setting a Goal

Fear of failure :

Most people don't like to set a goal as non achievement of the goal will have an advise impact on one's own self esteem and will destroy one's own image. The fear of failure compels one not to use one's own internal strength and refrains one from taking risk bearing activities. This fear of failure makes it difficult to set a goal or totally commit oneself to a goal.

To preserve one's own self image or self esteem, often an entrepreneur sets a high target or a low one. The failure to achieve a high target does not invite criticisms against one's ability. Similarly a low target is too easy and it's real difficult to fail in achieving such a set goal or target.

The lack of confidence on one's own ability creates a situation when an entrepreneur does not like to stretch his ability and they often avoid even a minimum risk.

Lack of Self — Knowledge :

It is difficult to set a goal and make future plans if one is not aware of one's own ability and self confidence level. Lack of one's clear vision and perception creates an unfavorable situation in setting up a goal.

Lack of Awareness of the Environment :

An entrepreneur finds out entrepreneurial opportunities in the environment. Lack of awareness cripples one's thinking process and opportunities are ignored. Researching the environment and finding out the entrepreneurial opportunities can be ensured only when an entrepreneur is eager to learn, ready to scan the environment and willing to accept challenges for setting up new goal is for redefining the goal already set.

Sense of Insecurity and Low Self-Confidence :

If an entrepreneur feels that she/he is a victor of the situation and cannot make any progress due to various problems, future plan of action remains a far cry. To achieve a goal implies a sense of self control and control over one's environment. To become committed to a goal, one must feel as though she/he has the ability to achieve it.

7.8 Continuous Evaluation in Goal-setting

The change in the environment is to be recognized as a reality by an entrepreneur. An entrepreneur cannot take a flight from the situation and dismissal of the changes for reviewing or reassessing the set goals leads to self destruction. An achiever will anticipate the changes and initiate proactive measures for survival in the entrepreneurial journey. The risk of missing unforeseen alternatives can be minimized by reassessment of goals.

Support from others :

For solving various problems an entrepreneur seeks help of others. Commitment of goals is best achieved in a supportive atmosphere. Openness to feedback from others helps one in her/his self growth. One discovers the self through interactions with others.

7.9 Financing a New Business

Financing of new business means provision of finance for the organisation and proper utilisation of the finance collected to fulfil the objectives of the organisation. Finance is the lifeblood of any organisation. So, for the development of any organisation, finance is essential.

Finance may be defined as that administrative area or set of administrative functions in an organisation which relate with the arrangement of cash and credit so that the organisation may have the means to carry out the objectives.

7.9.1 Needs for Finance

Finance is the life-blood of any business enterprise. It is the backbone of any enterprise. Finance is needed to start the business, to operate the day to day activities and for the growth of the business. The success of any organisation depends, to a

large extent, on proper and adequate financing as per the requirements of the organisation.

Financing is genarally required to fulfil the following needs of the business.

1. ***Cost of formation and promotion of the business :*** A lump sum amount of money is required at the time of formation and promotion of the business. The expenses are related to the searching of opportunities, for the legal expenses, expenses of drafting feasibility reports, registration fees, expenses for technical advices, expenses for preparation of different documents required for the formation and promotion of the organisation. These expenses are also known as preliminary expenses.
2. ***Cost of organising :*** A sum of a money is spent for the organisation structure of the business. Organising includes establishment of relationship with different parties related to the venture.
3. ***Cost of purchase of fixed assets :*** Capital is required to purchase fixed assets for the business. The amount of capital required for the purchase of fixed assets depends on the nature and size of the business. Arrangement for finance should be made to purchase land, building, plant & machinery, equipments, furniture etc.
4. ***Requirement of working capital :*** Working capital is the money which is required to maintain day-to-day transaction of any business. Requirement for working capital is estimated from the statement of working capital requirement. It is also determined considering the current asset and current liabilities of the business. Current assets include Stock in Trade, Sundry Debtors. Bills Receivable, Cash in Hand, Cash at Bank, Prepaid Expenses etc. Current liabilities include Sundry Creditors, Bills Payable, Bank Loan, Bank Overdraft, Outstanding Wages etc.

7.9.2 Loan from Banking Institution

The commercial bank provide short-term loans to the business. They provide different types of loans to the organisation to meet the their requirements. The commercial banks grant loans to the entrepreneurs considering the nature of the entrepreneurs, capacity to refund the loan, the nature and the value of collateral

securities and the financial soundness of the entrepreneurs. The role of the commercial banks in providing loans to the business is summarised below :

(a) ***Bank loans and advances :*** Commercial banks grant loans or advances to the organisation taking some mortgages from them. Generally, the banks provide loans and advances against the security of gold, deposit certificates such as NSC etc. The amount of bank loan is generally credied to a loan account of the organisation and the organisation can draw the money from the bank as and when required. The organisation has to pay interest on the loan amount. The commercial banks provide bank loans in the following schemes adopted by the government :

(i) Scheme for Self-employed / unemployed youths.

(ii) Scheme for professional and self-employed persons.

(iii) Scheme for Scheduled Castes / Scheduled Tribes and physically handicapped entrepreneurs.

(iv) Mahila Udyog Vidhi Scheme.

(v) Integrated Rural Development Programme (IRDP) etc.

(b) ***Cash credits :*** Cash credit is the arrangement made by the bank allowing its customers to draw a certain sum of money from the bank against the security of assets. Cash credit is generally granted on the security of goods or commodities. The amount of the sale proceeds of the mortgaged commodities is to be deposited in the bank as and when the goods are sold.

(c) ***Bank overdrafts :*** Overdrafts mean excess amounts drawn from the bank account. The organisation can arrange for payment to creditors in this form of loan. The organisation is allowed to withdraw up to a certain limit, money in excess of his deposits from his current account as per the agreement made with the bank. This facility is grated for a temporary basis. The organisation has to pay interest on the amount drawn in excess of his deposits.

(d) ***Purchasing and discounting of bills :*** The commercial banks purchase the bills and discount the bills without taking collateral security. The entrepreneurial can collect the money from the bank of the bills accepted by the debtors for credit sales. At maturity, the bank collects the money of the bill from the acceptor of the bill.

7.10 Drafting a Project

A project is a course of planned actions intended or considered for implementation. It is a scheme to be performed within a scheduled time and estimated cost. Project requires some specific activities, resources, constraints and interrelationship in the human being appointed to fulfil some pre-determined objectives. Project may also be defined as that investment scheme which fulfils the desired objectives and the scheme is completed with the end of the fulfilment of the objectives.

A project is a group of activities which is prepared to achieve preditermined and expected results.

7.10.1 Contents of the Project

Projects should contain the following particulars relating to the planned activities.

1. ***Capacity :*** The maximum capacity of the project should be mentioned. The operating capacity of the project should be clearly stated in the project.
2. ***Technological process :*** The nature of technology to be adopted should be mentioned in the project. It should be mentioned as to whether the project is capital intensive or labour intensive.
3. ***Management :*** The process of management of the project must be stated. Details of technological, administrative and human activities should be mentioned. The process of control should also be stated.
4. ***Description of location, land & building :*** Details of the location of the project, the land required for the establishment of the project and the size of the building to be built for the purpose of project should be stated in the project.
5. ***Description of the plant & machinery :*** Where the machine should be set up, what plant & machinery has been selected, the amount required for the purchase of plant and machinery, if the machines are purchased from foreign country, whether the permission or licence for such purchase of machinery is obtained etc. should be detailed out in the projcet.
6. ***Description of raw materials :*** The type and quantity of raw materials required for the project and how the materials would be collected should be mentioned.

7. ***Utilities :*** The utilities required for the purpose of production such as power, electricity, water, self-generating power and water supply, replacement etc. should be stated. Besides, the arrangement for transporation, warehousing, communication should also be mentioned.

8. ***Labour :*** All the information relating to the availability of skilled and unskilled labour force, provision for training of the labour force, manpower planning, human resource development programme, division of labour etc. should be clearly stated.

9. ***Schedule of implementation :*** How the project will work in different phases, how and when the project will start functioning and when the project will be completed, the time sheduled of implementation should be stated.

10. ***Cost of the project and means of financing :*** The detailed cost of the project and how the cost will be financed should be clearly stated in the project. The sources of finance of the project should also be mentioned.

7.10.2 Steps for the Preparation of a Project Plan

At the time of preparation of a project plan, the work is divided into different units and the procedure of perfomance of such units is scheduled. Generally, the following steps are followed for the preparation of a project plan :

1. ***Determination of project plan objectives :*** The objectives of the project should be identified and determined in this stage. For the determination of project plan objectives, the following questions are to be answered :

   (a) What is to be done?

   (b) Why to be done?

   (c) How to be done?

   (d) Where to be done?

   (e) When to be done?

   (f) How much to be done?

   (g) Who will do it?

   Considering the answers of the above questions, the objectives of the preparation of the project plan is to be determined. The objectives are

determined by indentifying the demand and supply of the goods for which the plan is to be prepared.

2. ***Programming of project performance :*** After the determination of objectives and mission of the project, the details of the work performance should be scheduled. For this purpose, the work is divided into its major parts and each part is divided into some sub-parts. Responsibility of each work is delegated to some specific employees.

3. ***Scheduling of resoures and time :*** For the preparation of the project plan a schedule of the resources required for the implementation of the project shoud be prepared. The requirement for land, raw materials, power, gas, water supply and human resouces should be determined. A time schedule should be prepared regarding the placement of orders and time for utilisation of the resources.

4. ***Feasibility study :*** The feasibility study is the detailed and complete analysis of the project. The feasibility study includes—thorough and complete analysis of the project, location of the project, pdoduction technology and process of production, estimation of oproject cost, methods of financing, sales revenue and profitability etc.

5. ***Determination of organisation structure :*** For implementation of the objectives of the project, an organisation structure is prepared. For this purpose, a project team is formed for efficient performance of the project work.

6. ***Budgeting :*** Preparation of budget is very important in project planning. Preparation of budget shows the sources of supply of finance, their proper utilisation, determination of requirements of the finance, controlling on the utilisation of the finance etc. A budget includes the following :

   (a) Total requirements of finance of the project;

   (b) Sources and utilisation of finance;

   (c) Own investment.

7. ***Designing of control system :*** Overall controlling system should be introduced to obtain target result from the planned project standard for the time, expenses and quality of the performance and products should be determined

in advance so that effective control may be implemented. Deviations shoud be identified from these standards and corrective measures should be taken to remove the deviations.

7.10.3 Contents of the Project Report

A project report is prepared before the establishment of any entrepreneurship. Generally, a project report is prepared after the preparation of the detailed feasibility report and is submitted at the time of taking loans, government subsidy or grant in aid. A project report contains the following particulars.

1. ***Title of the project :*** The title of the project is to be written at the top of the project report.
2. ***Capacity of the project :*** The productive capacity of the project in terms of week, month or year is to be stated clearly. The installed production capacity is to be mentioned specifically.
3. ***Introducion :*** In the introduction, details about the business and the entrepreneur is to be given. The name, address, objectives, area of operation and the constitution of memorandum of the enterprise is to be stated in brief. The name, address, personal qualification, experience and profession of the entrepreneur is to be stated in detail. The nature of the work of the organisation, the nature of ownership and the nature of transactions, name of the bankers and their addresses are to be clearly stated in the report.
4. ***Technical know-how and manufacturing process :*** Technical know-how and the process of manufacturing to be adopted in the organisation must be clearly stated. A detail description of the technology to be adopted in the manufacturing process is to be included in the report. Technology to be used in the operation is to be incorporated in the report.
5. ***Technical input resources :*** The report should contain details of technical input resources and related infrastructural facilities. The report must include the availability of raw materials, parts of plant and machinery, labour etc.
6. ***Pre-operative steps :*** The report should mention the pre-operative steps to be adopted to start the function of the project. It must include how the licence and permission will be obtained, how the legal formalities are to be fulfilled.

7. ***Information about products and services :*** The report must contain the nature of the products and services, trade marks, copy rights and speciality of the products, if any. The price and quality of the products are to be stated.

8. ***Information regarding marketability of the products and service :*** The project report should convey information regarding the marketability of the products and services. These can be done through market research. The size, nature and the possibility of creating new market and the expansion of existing market are to be stated in the report.

9. ***Information regarding financial viability :*** The project report should include information regarding the financial viability of the project after analysis and evaluation of the financial possibility of the project. It includes amount of capital investment, source of capital, amount of fixed capital and working capital requirements and the total cost of the project.

10. ***Information relating to risk :*** The project report must contain information about the risks involved and their nature and the measures for safeguarding the risks. The risk may be of non-availabilty of raw materials, technological risks, business risks, financial risks, risks arising change in the government policies etc. which are to be incorporated in the report.

11. ***Profitability :*** The report should state the profitability of the project measuring the estimated profitability of the project.

7.11 Summary

Peoples one's entrepreneurial journey for achieving the set goal i.e. the independent economic venture. Thus the development process aims at developing an awareness in finding out one's abilities and strengths for reaching one's own objective.

For successful implementation of a project or an entrepreneur is to plan and work hard. A entrepreneur examines various aspects before selection of a project.

An entrepreneur finds out entrepreneurial opportunities in the environment. Researching the environment and finding out the entrepreneurial opportunities can be ensured only when an entrepreneur is eager to learn.

7.12 References

a) Entrepreneurship Development by S. Anil Kumar

b) Entrepreneurship by Ravindranath V. Badi and Narayansa V. Badi

7.13 Assessment

1. How many phases are there in entrepreneurship development process ?
2. What facilities are given to an entrepreneur ?
3. Which helps one in setting the goal ?
4. What are the different sources of finance?
5. How do you prepare a project report to procure a bank loan?
6. What are the important elements of a project?