

Fashion Design

Level II

Based on June 2021, Curriculum Version



Module Title: - Module Title: - Identifying fibers and fabrics

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Acknowledgment

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Introduction to the Module

In fashion design field; the fiber and fabric types should be distinguished. Because it used to determine qualities of designed garment, used to estimate the material cost and selling prices of garment products.

This module is designed to meet the industry requirement under the fashion design occupational standard, particularly for the unit of competency: Carry out fiber and fabric.

This module covers the units:

- **fibers and fabrics**
- **qualities of fabrics**
- **uses of fabrics**

Learning Objective of the Module

- **Identify fibers and fabrics**
- **Describe qualities of fabrics**
- **Determine uses of fabrics**

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” given at the end of each unit and
5. Read the identified reference book for Examples and exercise

Unit one: fibers and fabrics

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- natural and synthetic fibers used in clothing industry
- methods of identifying fibers
- Fabrics used in clothing industry.

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify natural and synthetic fibers
- Knowing methods of identifying fibers
- Identifying fabrics used in clothing industry.

1.1 Natural and synthetic fibers used in clothing industry

3.1.2 1.1.1 What is fiber

- ✚ A fiber is a very thin, hair-like structure. Actually, your hair is technically a fiber. Fibers are so tiny that we measure them in microns.
- ✚ A micron is equal to one, one-thousandth of a millimeter (1/1,000). They are generally much, much, longer than they are wide.
- ✚ The differences in the fibers chemical composition and, molecular and physical structure, give a fiber its performance characteristics.
- ✚ Fibers are usually twisted together to form yarns and yarns are then woven or knit to form fabrics... But, we are getting ahead of ourselves.

- **Different types of fibers in textiles?**

- ✓ Some textile fibers, like cotton, actually receive lower import taxes than a synthetic fiber like polyester. If you know the rules, and how to optimize fiber blends, you can create a premium product and save your company some serious cash.

- **According to its length fibers can be classified;**

- Filament and staple fiber

Synthetic fibers, such as nylon and polyester are filament fibers, which is why these fabrics tend to be smoother.

Filament fibers refer to fibers of long continuous lengths, while

Staples refer to those of shorter length, about a few inches long.

- ✓ **Staple fiber**? Staple textile fibers are shorter fibers that are measured in inches.
- ✓ **Filament**? Textile fibers are much longer and need larger units of measure to record their length.
- ✓ As a general rule, all natural fibers are staple length. To give you an idea of their size, here are a few natural fiber lengths: cotton = ½” - 2 ½”, flax = 2” - 26”, and wool is about 1” - 18” long.
- ✓ Silk, when unrolled from an unbroken silkworm cocoon, is 1 continuous filament yarn that measures about 4800 feet long.

- ✓ It is possible to create filament fibers of metal and rubber by manufacturing them to form 1 long continuous filament fiber, even though this form is not the organic form they take in nature.
- ✓ Synthetic fibers are all filament fibers originally. A fiber like spandex is always a 1 long filament. But, a synthetic fiber like acrylic can be cut up into staple length fibers before twisting into yarn. By cutting up a synthetic fiber into staple length size, the yarn and final fabric will take on characteristics much closer to those of a natural fiber. Acrylic fibers in an acrylic sweater are cut to about the same staple length as wool fibers, and that is way acrylic sweaters often feel interchangeable with real wool.
- ✓ [caption id="attachment_550" align="alignnone" width="966"]

3.1.3 1.1.2 Classification of fiber

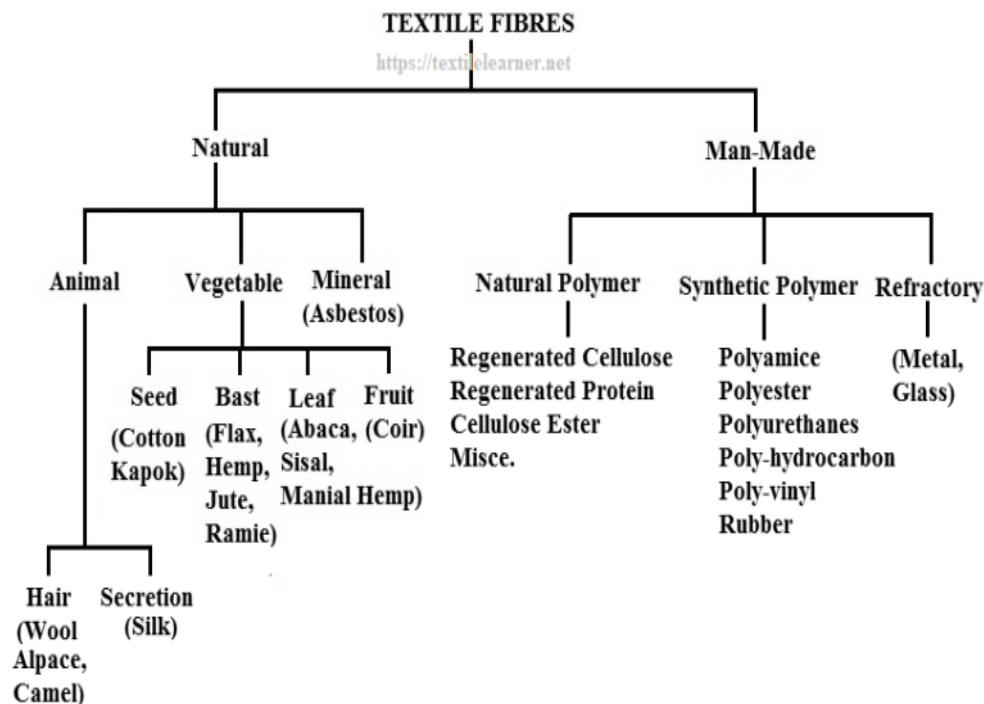


Figure 1.1: Classification of textile fibers based on sources

Vegetable sources:

Major fibers from vegetable sources are discussed below:

- **Cotton:** Cotton is most widely used natural fiber and consists of pure cellulose. It is produced in China, Brazil, India, Pakistan, USA and Uzbekistan.
- **Flax:** Flax is a lignocellulose bast fiber, mostly present in European Union. This fiber is mostly used to make linen.
- **Hemp:** Hemp is also a lignocellulose bast fiber with low quantity of lignin. The world's leading producer of hemp fiber is China.
- **Jute:** Jute is the strongest vegetable fiber from India and Bangladesh. It is also a lignocellulose fiber.
- **Ramie:** Ramie is also a lignocellulose bast fiber mostly available in China and Brazil. It is also known as China grass, with a silky luster and better elasticity.
- **Sisal:** Sisal is a hard and coarser leaf fiber, mostly available in Brazil, Tanzania and Kenya.
- **Abaca:** Abaca is a leaf fiber, also known as manila hemp, extracted from leaf sheath around the trunk of Musa textiles. The world's major fibre producer is Philippines. Lignin content in the fiber is about 15%.
- **Coir:** Coir is a hard, short and coarse fiber extracted from the shells of coconut. It is mostly present in India, Sri Lanka, Philippines, Vietnam, Indonesia and Brazil. This fiber contains highest amount of lignin making it stronger but less flexible.

Animal sources:

Major fibers from animal sources are discussed below:

- **Alpaca:** Alpaca is a hair fiber like wool, comes from the Lama Pocos. This fiber comes in approximately 22 natural colors, produced mostly in Peru, North America, Australia and New Zealand. It is stronger than wool fiber.
- **Angora:** Angora is a rabbit fiber, very soft, fine and silky. 90% of the fiber is produced in China. Angora fabric is very suitable for thermal clothing.
- **Camel hair:** Camel hair is available from the two humped Bactrian camel mostly present with nomadic households in Mongolia and inner Mongolia, China. It is the softest and more premium hair fiber.
- **Cashmere fiber:** Cashmere fiber is available with Kashmir goats, in China, Australia, India, Pakistan, New Zealand, Turkey and USA. It is a luxurious and expensive fiber.

- **Mohair fiber:** Mohair fiber is produced from Angora goat, available in South Africa. It is a smooth and lustrous fiber.
- **Silk:** Silk is the natural filament fiber, with high lustre, mostly produced in China, Brazil, India, Thailand and Vietnam.
- **Wool:** Wool is the most important protein fiber. It is the first domesticated fiber, mostly produced in Australia, New Zealand, China, Iran, Argentina and UK..

1.2 Fiber Identification

Fiber identification each specific type of fiber can be easily and clearly identified by various visual, tactile, physical, and chemical tests. It should be noted, however, that sometimes more than one type of fiber may give the same results when tested using a certain method. Therefore, it may be necessary to conduct two or more different tests to

Burn test A simple method to identify fibers is the burn test. Take a small sample of the fiber and burn it. See how the fiber burns or melts, smell carefully. Take a look at the ash Cellulose smells like burned paper Protein smells like burned hair Synthetics are melting determine the exact identification of the fiber

Microscope Microscope pictures showing cotton, flax, wool and silk fibers. Cotton: looks like a ribbon with twists (convolutions) along the length of the fiber Flax: single fibers (ultimate's) have nodes at intervals along the fiber length, irregular width. Often a bundle of fibers tightly packed in the lengthwise direction, rather than individual fibers. Wool: outer surface and edges rough, due to overlapping surface scales. Animal hair show different surface. Silk: looks like cylindrical, smooth rod with periodic bulges.

Micro-chemical tests Put the Fiber on a slide, one drop of chlorzinciod (zinc chloride and potassium iodide). The fibers will change their color. Cellulose: color changes to violet, lignified parts: color changes to blue or violet.

Solubility of synthetic fibers The identification of synthetic fiber is more complicated, because they often look similar. It is possible to identify them by their solubility in solvents: 1 Acetic acid 2 Concentrated Hydrochloric Acid 3 Cuprammoniumhydroxide The most resistant fiber is Polyester.

1.3 Fabrics used in clothing industry.

3.1.4 1.3.1 What is fabric?

A textile fabric is a cloth that has been woven or non-woven (knitted, tufted, knotted, or bonded together). The components used to make the fabric can be natural or synthetic threads, yarns, or similar materials. The textile industry utilizes many different types of fabric to create unique patterns and feels of goods.

Understanding the differences between fabrics is a necessary part of the textile industry. Certain items are created using certain materials for a specific reason.

For example, bed sheets are typically made out of cotton or polyester and would not make sense crafted out of leather because cotton has a softer feel on the skin and is more comfortable than leather. A few commonly used items made using fabric include clothing, shoes, towels, tablecloths, and backpacks.

5 Different Types of Fabric and How to Use Them

1. Cotton:- A natural fabric made from fibers from the cotton plant, cotton is soft, breathable, and washable. It's a favorite for many items, including clothing and household goods, and is also one of the best sewing materials for beginners. Organic and recycled cotton are more sustainable, environmentally friendly versions of this fabric.

2. Linen:- is another natural fabric, made from the flax plant. It tends to be more expensive than cotton, but it's stronger and likely to last longer. It's also more environmentally sustainable to produce. Linen is often used to make summer clothing and bed sheets.

3 Muslin:- is a type of plain-weave cotton fabric. It's soft and light, so it's often used to make baby blankets as well as summer clothing. It's also sometimes called cheesecloth as it's used in some traditional cheese making.

4. Wool:- is a natural fabric made from animal hairs. Sheep's wool is perhaps the most well-known, but alpaca, yak, and goat wool are also common. Wool is usually warm, strong, breathable, and moisture-wicking, though it can be a bit itchy. You may have also heard of broadcloth. What is broadcloth? It's a thick velvet-like fabric made from wool.

5. Silk: - One of the most luxurious high-fashion fabrics, silk is made from fibers produced by the silkworm. It's relatively expensive as a sewing material, so it's often used to make high-end dresses, skirts, and blouses. It's smooth, shiny, fine, and quite delicate.

6. Satin: - is actually a fabric weave rather than a type of fabric itself; other natural or artificial fibers are spun to produce a very glossy, smooth finish. Satin is often used to make glamorous items like evening gowns, bridal wear, and lingerie or sleepwear.

1. **Canvas.** Canvas is a plain-weave fabric typically made out of heavy cotton yarn and, to a lesser extent, linen yarn. Canvas fabric is known for being durable, sturdy, and heavy duty. By blending cotton with synthetic fibers, canvas can become water resistant or even waterproof, making it a great outdoor fabric.

2. **Cotton.** Cotton is a staple fiber, which means it is composed of different, varying lengths of fibers. Cotton is made from the natural fibers of cotton plants.

✓ Cotton is primarily composed of cellulose, an insoluble organic compound crucial to plant structure, and is a soft and fluffy material. The term cotton refers to the part of the cotton plant that grows in the boll, the encasing for the fluffy cotton fibers. Cotton is spun into yarn that is then woven to create a soft, durable fabric used for everyday garments, like t-shirts, and home items, such as bed sheets. Cotton prints and cotton solids are both available designs.

3. **Jersey.** Jersey is a soft stretchy, knit fabric that was originally made from wool. Today, jersey is also made from cotton, cotton blends, and synthetic fibers.

✓ The right side of jersey knit fabric is smooth with a slight single rib knit, while the backside of jersey is piled with loops.

4. **Polyester.** Polyester is a man-made synthetic fiber created from petrochemicals, like coal and petroleum. Polyester fabric is characterized by its durable nature; however it is not breathable and doesn't absorb liquids, like sweat, well. Polyester blends are also very popular as the durable fiber can add strength to another fabric, while the other fabric makes polyester more breathable.

✓ ND household items, like sweatshirts or bed sheets.

5. **Twill.** Twill is one of the three major types of textile weaves, along with satin and plain weaves. The distinguishing characteristic of the twill weave is a diagonal rib pattern. Twill weaves have a distinct, often darker colored front side (called the wale) with a lighter back. Twill has high thread count. Which means that the fabric is opaque, thick, and durable. Twill fabrics are rarely printed on, though multiple colored yarns can be used to achieve designs like tweed and hounds tooth. The fabric is durable with a beautiful drape, and it is used for denim, chinos, upholstery, and bed linens.

Velvet. Velvet is a soft, luxurious fabric that is characterized by a dense pile of evenly cut fibers that have a smooth nap. Velvet has a beautiful drape and a unique soft and shiny appearance due to the characteristics of the short pile fibers. Velvet fabric is popular for evening wear and dresses for special occasions, as the fabric

Self – check-1

Test-I Matching

Instruction: select the correct answer for the give choice. You have given 1 Minute for each question. Each question carries 2 Point.

A

B

-----1. Silk

A. Is a cloth that has been woven or non-woven (knitted, tufted, knotted, or bonded together).

-----2. Fabric

B. short in length

-----3. Fiber

C. Produced by the silkworm.

-----4. Filament

D. hair like structure

-----5. staple

E. Long fiber

F. wool

Test II: short Answer writing

Instruction: write short answer for the given question. You are provided 3 minute for each question and each point has 5Points.

1. Describe natural fiber?

2. Describe the classification of fiber?

Operation sheet -1

Operation: Burning test of fiber

Test Procedures

- ✓ The burn test is normally made on a small sample of yarns or thread which are twisted together.
- ✓ Since the fiber content of yarns used in one direction of a fabric are not always made up of the same fibers used in the other direction, warp and filling.
- ✓ Yarns should be burned separately to determine the entire fiber content of the fabric.

Steps:

- Unravel a clump of threads from another small swatch of the fabric.
- Hold the clump with tweezers (over your flameproof container)
- Slowly move a small flame towards the clump.
- Cotton fibers ignite as the flame draws near. Synthetic fibers curl away from the heat and tend to melt.

Materials used

- 1 Fiber (cotton, wool, silk, synthetic fiber...)
- 2 Raveling machine

Caution when testing!

Some fibers are slow in igniting, but then burn quickly. Others can burn hot and produce a painful burn if caution is not maintained

- ✓ Be extremely careful to keep your hair out of the flame.
- ✓ Be very certain that you are not wearing flammable materials when testing.
- ✓ Do not stand anywhere near any flammable materials

Lap test

1, Identify the fiber type by using burning test method

Unit Two: Qualities of fabrics

This unit to provide you the necessary information regarding the following content coverage and topics:

- Physical and visual qualities of fabric

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify Physical and visual qualities of fabric

2.1 What are Visual Qualities of a fabric?

- 1 The visual characteristics include **color**, **luster/shine** & **surface design**. Fall/Drape ability can also be defined as a visual quality of the fabric in a certain way.

Color is easier to explain however difficult to understand! (Nina's mom would often request the shopkeeper to take the short listed rolls of fabric outside in natural light for her final selection.

- The wise seamstress was mindful of the fact that same color appears differently in different artificial light sources and natural light was the most widely acceptable standard).

Luster can be defined as the sheen or glow on the fabric. Fabrics like silk and satin are more lustrous than cotton and wool.

- Fabrics with high luster are generally preferred for embellished wear like for parties and performances. Fabrics with low luster are worn for more somber occasions like work and casuals.

Surface design of fabrics is an all-inclusive category which can be explained in different ways. While fabric surface could be plain, printed or shaded. It could also be covered with visible texture like pile in towels and ribs in corduroy (true these are 'touch' features, but they also convey certain visual cues).

Fall or drape ability of the fabric is another characteristic that can be categorized under visual as well as functional characteristics.

If fall or drape ability was not an important visual characteristic, creative enthusiasts would have been free to choose between an organdie or fish-net fabric for a particular outcome.

2.1.1 Physical qualities of fabric

- Fiber or filament: type, size, length.
- Yarn: diameter, twist, weight or size, count, fiber content for mixed yarns, ply.
- Weight: ounces per squared or yards per pound.
- Thickness: vertical depth.
- Fabric structure.

Woven fabrics: weave type, warp and filling yarn count per linear inch<1

Generally Physical and visual qualities of fabric includes;-

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| Page 17 of 28 | Ministry of Labor and Skills Author/Copyright | Measurement and Quantity estimation In irrigation project | Version -1 April, 2022 |
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- 1 Quality of the fabric.
- 2 Type of Fabric.
- 3 Color Fastness.
- 4 Suitability and Location.
- 5 Shrinkage.
- 6 Color.
- 7 Pattern.
- 8 The Fabric Grain.



Figure 2.1: physical qualities of fabric

Self -check-2

Test I: short Answer writing

Instruction: write short answer for the given question. You are provided 3 minute for each question and each point has 5Points.

- 1, Discusses about fabric qualities?
- 2, Compare and contrast physical and visual fabric qualities?

Operation sheet-2

Operation: GSM measurement using GSM Cutter

Weight per area is a basic requirement when describing the properties of a fabric. This cutter is used to obtain an accurate area of fabric. By obtaining the weight of the fabric we can then calculate the weight per unit area in units such as g/m² or oz/yd².

Procedures/Method of operation

1. Place the cutting mat on a flat surface.
2. Place the sample on the cutting mat, making sure that it is flat and smooth. (Do not stretch the sample).
3. Place the cutter over the area tube cut. Pull out the safety catch.
4. While applying pressure, turn the hand wheel 90-100degrees. It is important to only apply sufficient pressure to cut the fabric, because if too much pressure is applied it may lead to the cutting mat or the blades being damaged.
5. Lock the safety catch.
6. Lift the cutter from the sample.

Caution When the cutter is in the working mode, do not insert your finger into the opening side, otherwise injury may occur.

Material used

- Fabric
- Cutting machine
- Balance

LAP TEST

1, measure the GSM of fabric by taking sample and calculate the weight of taken fabric?

Unit three: Uses of fabric

This unit to provide you the necessary information regarding the following content coverage and topics:

- Common uses of fabrics.
- Fabric uses in work place

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify Common uses of fabrics.
- Describing about Common uses of fabrics.

3.1 Common uses of fabrics

3.1.5 3.1.1 Clothing,

- Essentially, fabric is a material made of fibers that is used to make items such as clothing, shoes, bags, and home wares like bed sheets, cushions, and towels. It can be thick or thin, rough or smooth, heavy or lightweight; the qualities of different types of fabric depend on what it's made from.
- The clothes which we wear in our daily lives are not the only basic use of the fabric. Other prominent uses of fabric in our daily life is the bed **linen, upholstery, curtains, cushion covers, dusters, mops, covers and many more**. The quality of fabric is generally depends upon the fiber with which it is made.



Figure 3.1: clothing

3.1.6 Decorative art

Textiles are also used for decorative art. Appliqué work of pupil is decorative art of Odessa, a state in eastern India, used for umbrellas, wall hangings, lamp sheds, and bags. To make a range of decorative products, colored clothes are sewn in the shapes of animals, birds, flowers, and magnificent walls on a base cloth.



Figure 3.2 decorative fabric

Above all, fabric serves a practical function.

- It protects us from **cold** and **heat**, **the rain** and **the bright sun**. We use blankets to cover ourselves as we sleep and woven rugs to cushion our steps as we walk.



Figure 3.3functional purpose of cloth

Self-check-3

Test I: short Answer writing

Instruction: write short answer for the given question. You are provided 3 minute for each question and each point has 5Points.

1, list and explain the common uses of cloth?

2, list down practical functions of fabric?

Reference

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