Advanced Apparel production Level – III

Based on Occupational Standard March, 2011, Version 1

Module Title: Producing Pattern Using CAD System

LG Code: IND AAP3 M06 LO (1-4) LG (23-26)

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LG #23	LO #1- Interpret information

Instruction sheet

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

- Clarifying and interpreting Design sketches or drawings and specifications
- Proposing product which missing dimension.
- Determining through consultation with customer.
- Interpreting and reading workplace procedures

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:

- Clarify and interpret Design sketches or drawings and specifications with designer or customer as required.
- Determine missing dimensions or other unknown features of the proposed product through consultation with customer or enterprise personnel.
- Read and interpret Workplace procedures and instructions

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the "Information Sheets". Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the "Self-checks" which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
5. If you earned a satisfactory evaluation proceed to "Operation sheets
6. Perform "the Learning activity performance test" which is placed following "Operation sheets" ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions or go back to "Operation sheets".

Information Sheet - 1	**Clarifying and interpreting Design sketches or drawings and specifications**

1.1 Design sketches or drawings

Fashion design includes three key parts: style design, construction design and process design. The main work of style design is fashion sketch drawing; the main work of construction design is pattern making; and the main work of process design is process sheet making. Fashion designers draw a fashion sketch according to a design theme; pattern makers make patterns according to a fashion sketch and technologists make production process sheets based on the fashion sketch and pattern. These three basic designs complement each other. Generally, fashion sketch drawing belongs to artistic design; however, pattern and production process design are affiliated to engineering design. This leads to different approaches between fashion sketch drawing and pattern making. Most style designers cannot make garment patterns; likewise, most pattern makers are unable to draw fashion sketches.

A fashion sketch is also known, among others, as a production drawing, technical drawing, or production sketch. A fashion sketch is used to concretely express designers' ideas and garment details to related departments. Fashion sketches are applied in many areas, for example, patternmaking documentation, technology packs, speculations, cost sheets, and 3D virtual garment modeling. In order to avoid misunderstanding in sampling and production, fashion sketches are drawn in detail. Actually, fashion sketches focus on the tangible apparel or the actual garment which is to be produced. It is always about the actual garment, rather than a general idea of a garment. Fashion sketch drawing requires professional knowledge on fashion design; for example, aesthetics, ergonomics, and painting. People without related skills find difficulty drawing fashion sketches. Currently, there are two methods to draw fashion sketches. One is drawing by hand, which leads to what is called ``manually drafted'' fashion sketches. The other method is the use of special design software, like Adobe

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Illustrator and CorelDraw, which is called ``computer aided drafting''. Both types of fashion sketch drawing methods require superior drawing skills.

To avoid distraction, fashion sketch drawing does not require much movement or shading. A neatly detailed fashion sketch simply means how well in detail one can illustrate design requirements to related production departments. Generally, the fashion sketch is drawn on white paper using black lines, because black lines make it easier for people to follow visual guidelines and provide a clearer representation of designers' ideas. However, usually, there are some misunderstandings of styles' details among designers and pattern makers, no matter how accurate fashion sketches are.

A garment pattern is used as a reference for cutting a whole piece of cloth into different pieces, which will be sewed to form a garment. Garment pattern making is also known as garment construction design, pattern cutting, etc.
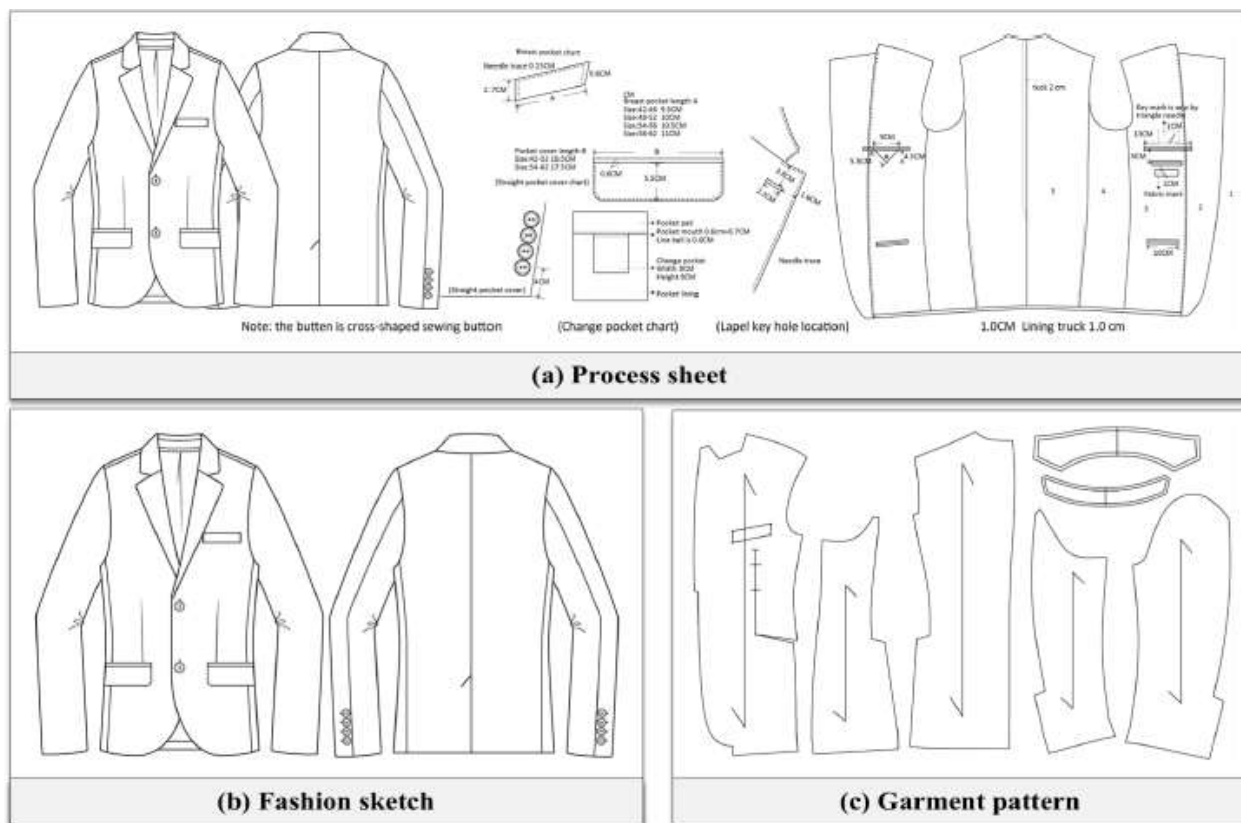

Figure 1.1: Fashion sketch, garment pattern and production sheet.

In the traditional pattern making process, pattern makers draw garment construction lines on a brown paper according to the fashion sketch provided by designers. After

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this, they cut the paper along these construction lines to acquire many paper pieces used for cloth cutting. The work of pattern making can be likened to a bridge to link fashion design and clothing making. Pattern making, relying heavily on pattern makers' experience obtained through many years of related work, is considered as one of the highest technical works in the clothing companies. Currently, there are two methods for making garment patterns: the traditional hands-on approach and the computer-aided process, both requiring sophisticated skills

Fashion designers draw fashion sketches to express their design concepts concretely; and pattern makers make patterns according to customers' body dimensions and fashion sketches drawn by designers. As fashion sketch drawing and pattern making are affiliated to different departments in fashion companies, fashion designers and pattern makers should communicate repeatedly to modify fashion sketches and their corresponding patterns until they are satisfied. This process is time-consuming and prone to inefficiency. Hence, some scholars proposed several new technologies to develop fashion sketches or patterns rapidly. These include 3D-to- 2D flattening technology, 2D-to-3D virtual try-on and modeling technology, 3D-to-3D garment editing, parametric pattern making technology, and rapid fashion sketch generation technology.

1.2 Design specifications

Specifications include one of more of the following:

A. Fabric Types

In today's modern textile sector, various types of fabric produced for woven, knit and non-woven fabric.

Woven fabric: The fabrics which are produced by interlacing two sets of yarn i.e. war yarn and weft yarn by in is termed as woven fabric.

There are various types of woven fabrics produced in textile weaving sector such as Poplin fabric or broad cloth, Denim fabric, Pinpoint oxford fabric, Corduroy fabric, Chambray fabric, Crepe fabric, Oxford fabric, Melange fabric, Flannel fabric, Royal oxford cloth, Dobby fabric, Herringbone fabric Kashmir silk, Khadi fabric, Gabardine fabric.

Woven fabric is used for Jackets, Dress or blouses, Bridal satins, Lining fabrics, Stretch fabrics, Blanket binders, Shower curtain, and Umbrellas.

Knit or Knitted Fabric: The fabrics which are produced by interlacing one set of yarn are known as knit of knitted fabric. It should be noted here that, knit fabric and knitted fabric are same. There are so many knit fabrics produced in today's modern textile knitting sector such as: 100% cotton single jersey fabric, Burn out single jersey fabrics, 100% cotton double jersey fabrics, Lycra or spandex single jersey fabrics, Slub single jersey fabrics, Grey melange slub fabrics, Fleece fabrics, French terry fabrics, French terry slub fabrics, Grey melange fabrics, Micro or baby terry fabrics, Lacoste fabrics, Sequence fabrics, French terry fabrics (inside brushed), Design terry fabrics, Pique fabrics, Pique slub fabrics, 1×1 Rib fabrics, 2×1 Rib fabrics.

- Knit or knitted fabric is used for the following g purposes:
- Jersey fabric used for making T-shirt, Soft jacket and Coats.
- Interlock knits are suitable for evening wear and lingerie.
- Tricot fabric is used for bathing suits.
- Sweater knits can be used to make tops, sweater dresses and skirts.

Non-woven Fabric: This type of fabric is produced by connecting yarn with gummy or bonded materials.

B. width and length of fabric

Fabric width (i.e. the usable width for which the cutting-marker is planned) should be determined in detail prior to planning the cutting-marker. The maximum width of the cutting-marker is constrained by the usable width of the fabric. The usable width is the width of the narrowest place minus the width of any unusable selvedge (i.e. considered to be the fabric's width with selvedge excluded – the net fabric width). Usable width can be equal to the net width of the smaller, for example, where a technological process causes fabric deformations parallel to the selvedge (i.e. resulting from tensile and thermal stresses in the process of heat-setting), producing unsmooth edges or a slightly wavy selvedge. Where the waves are dissipated towards the centre of the fabric width, usable width is smaller than net width, generally by the width of the deformation, which could seriously harm the clothing's appearance if included in the cutting-marker. When,

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for example, a jacket's pattern-pieces are cut near the fabric's selvedge, a wavy selvedge causes a significant difference in the fabric, which is reflected as visible transversal stripes on the back part of the jacket – in the seam of the finished article of clothing.

C. size and garment measurements

D. pattern details with specific measurements for proportion guidelines

E. seam allowance for seams, waist, pocket and hem

F. design and make instructions

G. base size and size range

H. clear, detailed technical drawings

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Define the following words.(**each 2 point**)

    A. Style design,

    B. Construction design

    C. Process design.

2. Write design specifications. (**4 point**)

Note: **Satisfactory rating - 10 points   Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

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Information Sheet-2	Proposing product which missing dimension.

1.2 Proposing product which missing dimension.

Product dimensions means the label states characteristic dimensions of the product. (For example: jeans label stating inner leg length of the jeans in centimetres or inches (not inner leg measurement of the intended wearer))

Dimensions out of tolerance

Dimensional issues can be related to faulty patterns being used, cutting issues, incorrect stitching or inattention to tolerances by the workers. Incorrect dimensions can be particularly problematic because:

1. The garment size could be affected, which means the item won't fit the end-consumer correctly and
2. The entire order quantity of that item is likely to be affected

Unlike the previous two points, garment dimensional problems typically cannot be reworked and need to be remade from scratch.

Developing tolerances and points of measure

Issues related to dimensions can easily cause an entire order of product to fail product inspection. The best way to prevent these is to make sure your supplier has the *correct* tolerances and points of measure.

And if you have someone inspecting your product before shipping, make sure they know both the agreed tolerances and measuring methods.

Although many independent inspection firms with garment experience have developed their own tolerances for dimensions, you may have your own you'd like used for inspection. Similarly, you may have your own measuring method, which your inspector may need to be informed of prior to verifying dimensions.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Why a problematic for incorrect dimensions can be occurred? (**4 point**)

Note: **Satisfactory rating - 4 points**   **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____   Date: _____

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Information Sheet-3	Determining through consultation with customer

1.3 Determining through consultation with customer

Measuring Customer Satisfaction-Approaches for Getting Reliable Information for Textile and Garment Industries

It is a known fact that any business can survive only if their customers are satisfied. The achievement of customer satisfaction is not a one time job. The level of satisfaction cannot remain same all the time; it may either increase or decrease. The business depends on the level of satisfaction at the time of transaction and not on the history. Therefore one should be able to assess the level of customer satisfaction on a continuous basis and take actions to make the customer happy and then approach for a business.

Concept of measuring customer satisfaction

The concept of measuring customer satisfaction was propagated by the business excellence awards criteria. Some companies, who were trying to achieve excellence developed there own methods for keeping a track on changing customer needs and their perceptions. Different agencies started the business of conducting surveys, giving weightage for different criteria and arriving at an index in order to track whether the company is showing a positive improvement or not. As the award criteria insisted on the

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overall results and restricted on the number of pages in the applications, the concept of presenting data of the customer satisfaction index in graphical form became popular. However, these indexes alone are unable to help the organization to take actions for improvements. For taking actions, we need the data of individual customers and the specific events or requirements.

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Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1.

Note: **Satisfactory rating - points   Unsatisfactory - below points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Information Sheet-4	Interpreting and reading workplace procedures

1.4 **Interpreting and reading workplace procedures**

Workplace procedures include one or more of the following

A. Requirements prescribed by legislation, awards, agreements and conditions of employment

Identify WHS legislative requirements in the workplace

Once you understand the full extent of the documents that set out legal WHS requirements in the workplace and their interrelationships, you can more easily determine the particular WHS obligations that apply to your workplace. The range of requirements that need to be addressed include:

• The duties and responsibilities of the PCBU and their officers and workers

• The powers and functions of health and safety committees and health and safety representatives

• Hazard and risk identification

• Strategies to minimize or eliminate risks and hazards

• Strategies to maintain a safe and healthy workplace

• Procedures to address staff illness and workers compensation

• Record keeping.

Keep up-to-date with legislation and relevant publications

It is important to maintain your knowledge of WHS legislative, industry and organizational requirements. By using a range of sources of information, you can remain up-to-date with legislation. This information can then be communicated to others in the workplace so they are aware of and can find out more about legislative changes. In this topic you will learn how to:3AUse relevant sources to keep up-to-date with legislation and publications3BCommunicate information on legislative changes and publications

Awards (modern awards) are legal documents that outline the minimum pay rates and conditions of employment.

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Awards apply to employers and employees depending on the industry they work in and the type of job worked. Every award has information about who it covers.

Agreements

Modern awards cover a whole industry or occupation and provide a safety net of minimum pay rates and employment conditions.

Enterprise agreements can be tailored to meet the needs of particular enterprises. An agreement must leave an employee better off overall when compared to the relevant award or awards.

Enterprise agreements are collective agreements made at an enterprise level between employers and employees about terms and conditions of employment. The Fair Work Commission can provide information on the process of making enterprise agreements, as well as assess and approve agreements. We can also deal with disputes that occur about the terms of agreements.

Conditions of employment

In many organizations an applicant must sign a form titled "Security Conditions of Employment." These conditions are generally aspects of security policy that are highlighted to establish an understanding between the applicant and the organization. Examples of these conditions include the organization's policies on employee identification badges, parking, locker inspections, package inspections, the use of personnel entrances, and others.

In the same programs these security rules and regulations are included in the employee handbook with other general personnel policies. Regardless of the method used to inform employees of an organization's policy, all employees should be required to complete a form that states that they have read and understand what is expected of them during their employment. This form becomes a permanent part of the employee's personnel record.

B. Standard operating procedure (SOP)

Standard operating procedure (SOP) is not a new thing for the garment industry. SOP is well known and is widely used by many organized factories. SOP can be defined as a step-by-step written procedure about how to do a job that gives desired result and

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maintains consistency in results. SOP can also be defined as a checklist for the user (operator) who is going to do a particular job. SOP is a sure success method of doing a job.

More than just written instructions SOP can be also made using illustrations and flow charts. For some processes factory only needs to provide detailed instructions to perform a task, where some processes required instruction as well as decision making based on result of intermediate steps.

C. Work instructions

A Work Instruction is a document that provides specific instructions to carry out an Activity. A Work Instruction is a step by step guide to perform a single instruction. A Work Instruction contains more detail than a Procedure and is only created if detailed step-by-step instructions are needed.

Work Instructions are documents that clearly and precisely describe the correct way to perform certain tasks that may cause inconvenience or damage if not done in the established manner. That is, describe, dictate or stipulate the steps that must be followed to correctly perform any specific activity or work.

The work instructions are mainly focused on explaining how a specific activity is going to be carried out, and they are mandatory. The work instructions are used to describe a specific operation usually associated with a job. If they are not mandatory, we would be talking about a Work Guide.

D. Personal protective equipment (PPE)

Personal protective equipment (PPE) is protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.

E. oral, written and visual communication

Written communication is such communication done through writing. Letters and correspondence , written news and articles from magazines, newspapers and the likes, books and other reading materials, literary pieces such as essays, short stories and the

likes, song and poetries, billboard materials, bulletins and any other written forms comprise this kind.

On the other hand, **oral communication** uses spoken words. Thus, speeches-whether formal or informal, discourses like debate, argumentation and open forum, dialogues and monologues, poetry readings, drama presentation, singing or just common talks, all of these fall under the category of oral communication.

Visual communication is the practice of using visual elements to convey a message, inspire change, or evoke emotion.

It's one part communication design–crafting a message that educates, motivates, and engages – and one part graphic design–using design principles to communicate that message so that it's clear and eye-catching.

Effective visual communication should be equally appealing and informative.
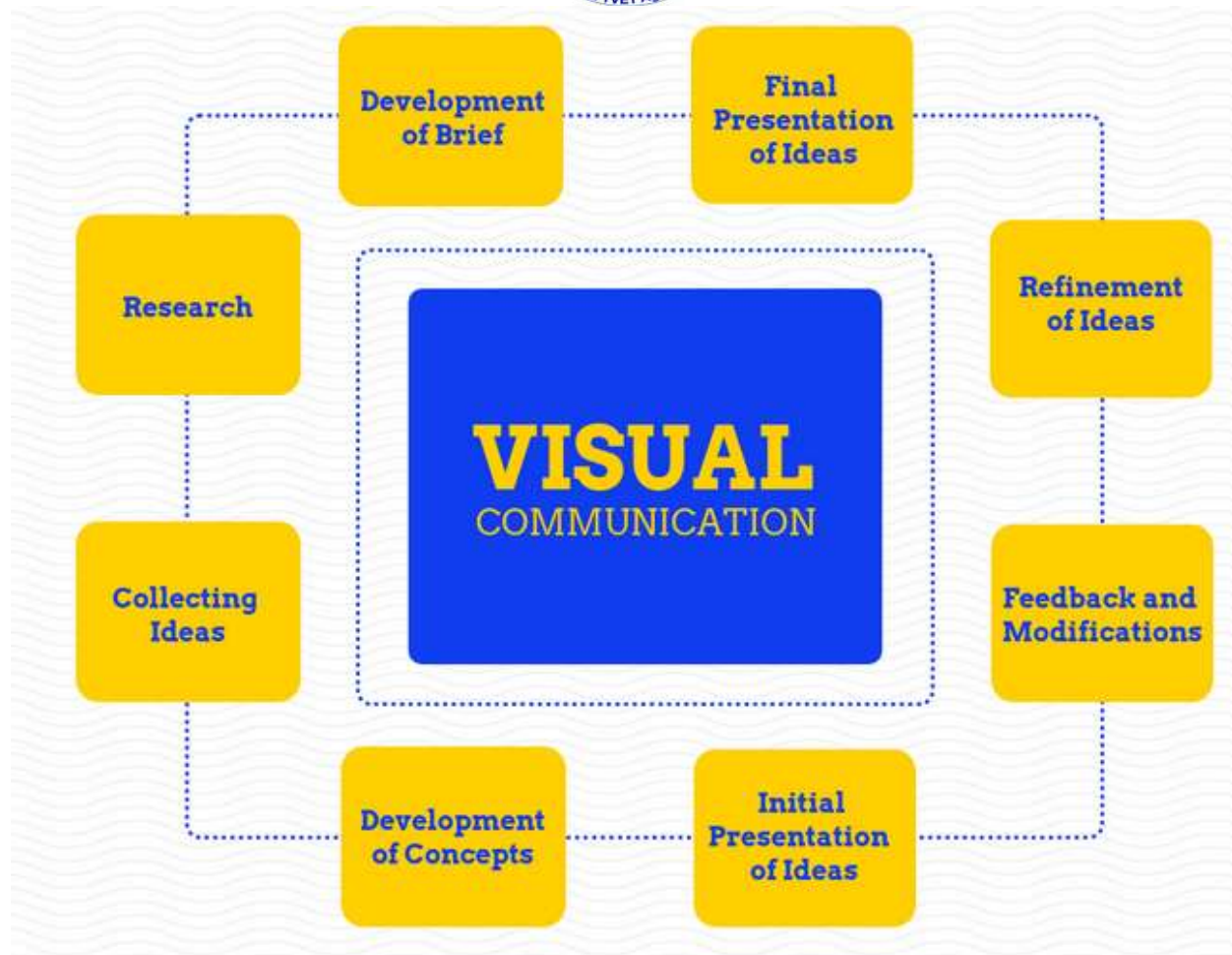
Figure 1.4: visual communication

Visual communication is really about picking the right elements (usually text, icons, shapes, imagery and data visualizations) to create meaning for your audience.

Some common visual communication strategies include:

- Using data visualization to show the impact of your work
- Using shapes and lines to outline relationships, processes, and flows
- Using symbols and icons to make information more memorable
- Using visuals and data to tell stories
- Using color to indicate importance and draw attention

F. quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output

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G. housekeeping

In the occupational setting, housekeeping refers to the routine cleaning and organizing of the workplace. As housekeeping is an ongoing safety practice, orderly conditions in the workplace should be maintained on a consistent basis, not restored after orderliness has been allowed to slip.

Housekeeping operations in the workplace are considered to be a fundamental tenet of occupational safety and are a mandatory workplace safety activity in most jurisdictions.

Improper housekeeping can increase the risk of a variety of accidents. These include slipping accidents if wet or otherwise soiled surfaces are not cleaned, tripping accidents if objects are not cleared from floors, and cuts or other punctures if sharp objects are not stored properly. Removing clutter from the workplace also improves safety by reducing visual distractions and removing objects that could potentially obscure hazards, making it easier to spot hazards in the work environment.

H. tasks related to environmental protection, waste disposal, pollution control and recycling

I. WHS practices

Workplace Health and Safety (WHS) is the discipline concerned with protecting the health and safety of all stakeholders in the workplace from exposure to hazards and risks resulting from work activities.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. _____ refers to the routine cleaning and organizing of the workplace. (**2 points**)

    A. WHS practices

    B. housekeeping

    C. Personal protective equipment (PPE)

    D. Standard operating procedure (SOP)

2. Personal protective equipments used to protect our hand from injury. (**2 points**)

    A. Helmets   B. Goggles   C. Safety shoe   D. Glove

3. List out workplace procedures .(**6 points**)

Note: **Satisfactory rating - 5 points   Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Operation	Clarifying and interpreting Design sketches or drawings
Sheet 1	and specifications

Direction: collect suit garment design sketches or drawings and then interpret using the following steps.

Step 1- Take appropriate suit drawing

Step 2- identify each part of the design

Step 3- interpret each part of the design sketch or drawings

Step 4- Maintaining accurate records.

LAP Test	Practical Demonstration

Name: _____   Date: _____

Time started: _____   Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within required hours.

Task 1: Interpret and clarify design sketches or drawings

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LG #24	LO #2. Access software

Instruction sheet

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

- Preparing computer and work station
- Identifying and opening appropriate applications
- Planning pattern production for the design.
- Transferring required information from other sources.

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:

- prepare Computer and work station
- Identify and open appropriate applications
- Plan pattern production for the design.
- Transfer required information from other sources

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.

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5. If you earned a satisfactory evaluation proceed to "Operation sheets
6. Perform "the Learning activity performance test" which is placed following "Operation sheets" ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions or go back to "Operation sheets".

Information Sheet - 1	Preparing computer and work station

2.1 Preparing computer and work station

2.1.1 Workstation

A work station means any material, equipment, machineries, tools, work surfaces and others that are needed for the intended purpose or to the designated work. So Workstation and seating are set up according to OHS practices and specifications for pattern development using cad. The following Patternmaking tools and equipment are set up ready for use apparel pattern development may include pattern blocks, computer with patternmaking software, plotter and digitizer/scanner.

2.1.2 Computer and its Part

A computer is an electronic device that manipulates information, or data. It has the ability to store, retrieve, and process data. A computer is a machine or device that performs processes, calculations and operations based on instructions provided by a software or hardware program. It is designed to execute applications and provides a variety of solutions by combining integrated hardware and software components.

You may already know that you can use a computer to type documents, send email, play games, and browse the Web. You can also use it to edit or create spreadsheets, presentations, and even videos.
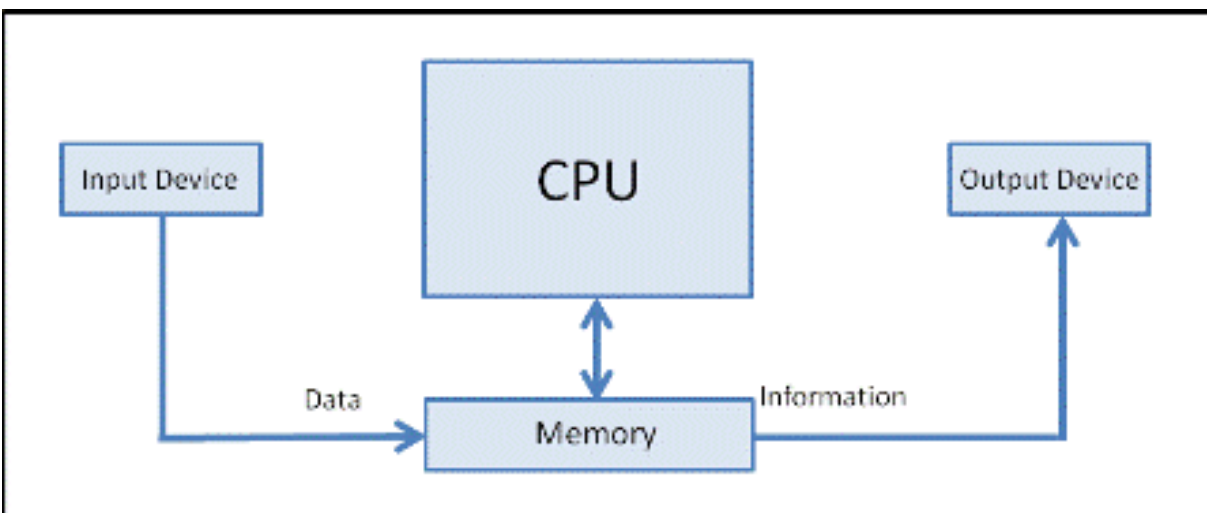
Parts of a computer

A computer system consists of two major elements: hardware and software. Computer hardware is the collection of all the parts you can physically touch. Computer software, on the other hand, is not something you can touch. Software is a set of instructions for a computer to perform specific operations. You need both hardware and software for a computer system to work.

Some hardware components are easy to recognize, such as the computer case, keyboard, and monitor. However, there are many different types of hardware components.

The term "Hardware" refers to the physical elements of a computer; the machinery or the electronics in a computer. A basic computer consists of 4 components:

- Input device (or input unit)
- CPU (Central Processing Unit)
- Memory (or Memory unit)
- Output device (Output unit)

Figure 2.1 parts of computer

Memory Unit

The memory unit is what allows a computer to remember data and information. Similar to human memory, there is short term memory (RAM) and long term memory.

When a computer is turned off, it forgets everything in the RAM (short term memory), while it saves everything it will need later into a disk drive (long term memory).

A storage medium gives your computer a place to store data and information that it might need in order to operate. Some things that could be stored in memory might be: text documents, photos, programs, and the operating system (OS).

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CPU

The CPU (or Central Processing Unit) performs arithmetical and logical operations of the computer system. The central processing unit, or processor, is the component of a computer that performs processes. Examples of other tasks performed by the CPU include: Input/output directions (reading data from an input device/writing information to an output device)

Motherboard

The motherboard is hardware that makes connections between all of the other components in a computer, effectively telling data where it should go.

Input/output device

Input unit sends data to the computer and output unit presents information.

Interactive input devices

Besides the keyboard and mouse, the most common input devices of CAD systems for the technical preparation area of production, would be:

- digitizer
- video camera
- digital scanner

Computer-controlled output devices

Graphics output devices, most frequently used in referred CAD/CAM systems are

- color hardcopy devices
- different types of printers
- different types of plotters
- automated spreading and labeling machines
- Automated cutting machines.

2.1.3 Criteria for selection of suitable computer hardware and software

When deciding about the selection of supplier of CAD/CAM systems, it is very important to define the priorities and contents of selection criteria. If one of the criteria, for example the price, is overestimated; and another criterion, for example, compatibility with other computer systems underestimated, unexpected difficulties could occur during the installation and integration of the system in the production environment. Basically, the following criteria should be considered:

- adaptation to the area of application

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- newest technology and quality of hardware;
- quality of software
- updating of software
- stability and robustness
- compatibility with other computer systems and CAD/CAM modules

✓ references of computer hardware and software producers
✓ Price.

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Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is a workstation? (**2 point**)

2. What is computer? (2 **point**)

3. Write criteria for selection of suitable computer hardware and software.(**8 point**)

Note: **Satisfactory rating – 12 points**   **Unsatisfactory - below 12 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Information Sheet-2	Identifying and open appropriate application

2.2.1 CAD in Clothing industry

In apparel manufacturing sector, CAD stands for computer aided design. Now days, Computer aided design or CAD software becomes one of the most essential tool for pattern making and related jobs in clothing industry. It is used for pattern making, pattern grading and making of marker.

Computer aided design or CAD software has so many advantages in apparel manufacturing. It brings a revolutionary change in today's readymade apparel export business. As its importance, this article has presented some major advantages and uses of computer aided design or CAD in apparel and fashion industry.

Advantages of CAD Drawing or Drafting in Apparel Sector:

There are some key advantages of computer aided design (CAD) in readymade apparel industry which are listed in the below:

- Computer aided design (CAD) system reduces the most valuable times compared to the laborious manual work of designing.
- All the design data can be easily stored, transmitted, and transported through the computer files.
- The design can be done from anywhere and the total process can be easily controlled by the customers.
- Digital swatches can be preserved on zip disks, floppy disks, hard drive or CD-ROM which saves enough space.
- The another major benefits of CAD software in clothing manufacturing industry is the designers do not need to produce different swatches all the time for different colors as they can now see how a particular fabric or apparel looks in different shapes and colors on computer screen itself.

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- The total design can be easily personalized and customized within a short period of time without significant delays or cost increases.

Disadvantages of CAD Drawing or Drafting in Apparel Sector:

Though it's too hard to get negative update about the computer aided design or CAD application in apparel industry. But there are some slight disadvantages of CAD application which comes from the several Cad experts from this industry. Those are in the following:

- Some most popular CAD software has higher price
- CAD operator has to train themselves according to update of CAD software.
- Sometimes, it's too tough to find skilled operator to run CAD software.

The functions of apparel CAD systems

- Making the first patterns
- Digitization of patterns
- Grading of different sizes
- Marker making
- 3-D trials

2.2.2 CAD software for clothing industry

2.2.2.1 2D CAD software for clothing industry

Available 2D CAD software for clothing industry listed in the following:

- GRAFIS from Software Dr. K. Fridrich (Developed by Germany),
- Audaces Apparel Pattern from Audaces (Developed by Brazil),
- COAT from COAT-EDV System (Developed by Germany),
- PAD Pattern design from PAD System Technologies Inc. (Developed by Canada),
- TUKACAD from Tukatech (Developed by USA),
- CAD Assyst from Assyst (Developed by Germany),
- Fashion CAD from CAD CAM Solutions (Developed by Australia),
- Modaris from Lectra (Developed by France),
- Accumark from Gerber Technology (Developed by USA).

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2.2.2.2 3D CAD software for clothing industry

Available 3D CAD software for the clothing manufacturing industry is listed in the below:

- Modaris 3D Fit from Lectra,
- Virtual fashion from Reyes Infografica,
- Vidya from Assyst-Bullmer,
- Accumark Vstitcher from Gerber,
- 3D Runway from Optitex,
- Haute Covture 3D from PAD System,
- Design concept from Lectra,
- Vstitcher from Browzwear,
- EFit Simulator from Tukatech.

2.2.2.3   Some cad systems and their tasks

A. Gerber Technology

- -Sketches, line drawings, color ways, fashion illustrations, draping, textile and knitting design.
- -Pattern making, grading
- -Marker making, automatic marking and plotting
- -Pattern design by draping, or full-scale drafting, grading and marking
- -Design package

B. Lectra

- Design
- -Create technical drawing and design elements.
- -Pattern digitizing, design modification.
- -creation and application of grade rules.
- -3D texture mapping, 3D sample visualization, pattern flattening and pattern development.
- -3D/2D simulation

C. Rich peace

- They have a complete CAD solution for pattern making, pattern treatment, grading, detailing, editing, pattern cutting.

D. Optitex
- It exists 2D and 3D pattern making option with a lot of advanced features.
- Their CAD, pattern, cutting solutions are easy to use for all apparel industries.

E. Assyst
- -Pattern design, digitizing, grading, manual marker making
- -Automatic marking

F. Tuka Cad
- It's appropriate for Pattern-Designing, Grading, and Marker-Making in Garment industry.

G. Scanvec
- -Digitizing
- -Pattern making by digitizing or drafting
- -grading
- -Make custom fit garments by entering
- body measurements for individual customers.
- -Automatic or manual marking, matching
- -Automatically generates and extremely
- an extremely tight marker
- -Pattern layout for stripes and plaids
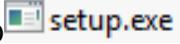
H. Tukatech
- -Pattern drafting and grading
- -Made-to-measure pattern based on a given pattern.
- -Grading and marking
- -Pattern design grading and marking

I. CADCAM solutions
- Pattern creation/ Import
- Pattern creation/ Import
- Grading
- Insert seams, symbols, text
- Manual marker

2.2.3 Reach peace garment CAD software installation and opening process

1. Close the entire run program;

2. Put Rich peace disk to CD-ROM

3. Open disk, double click on the set up **setup.exe** , you can see following dialogue table;
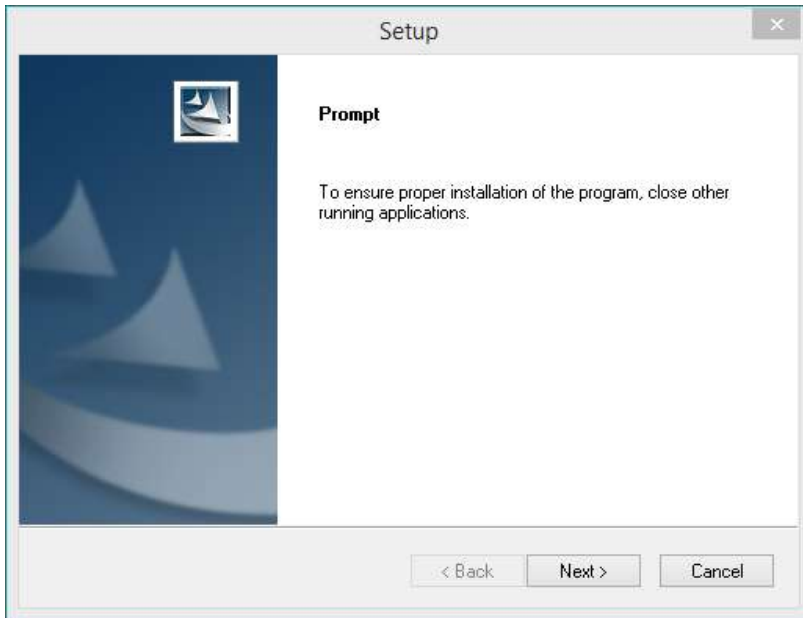
4. Click Next, You can see following dialogue table;
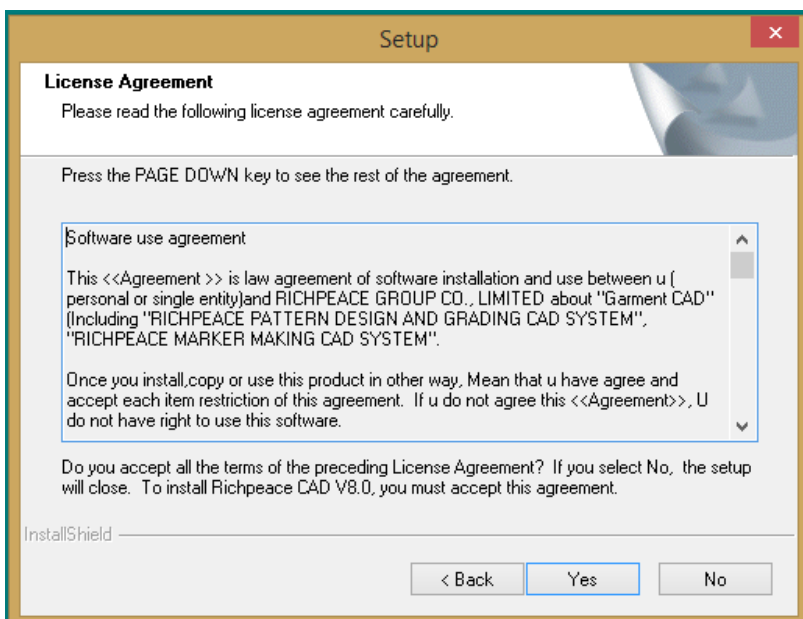
5. You must Click yes, You can see following dialogue table;

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		December, 2020
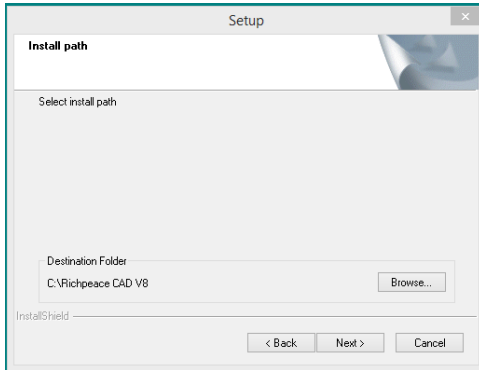
6. Click Next, You can see following dialogue table;
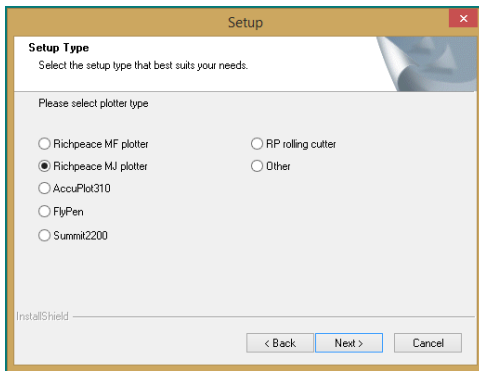
7. Click Next, You can see following dialogue table;
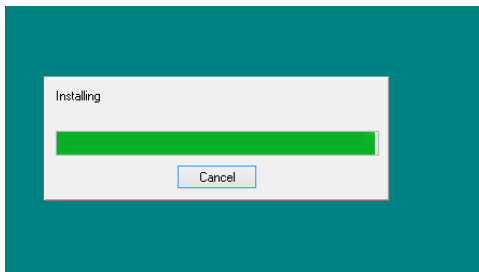
8. Wait until installation is finish, you can see following dialogue table;

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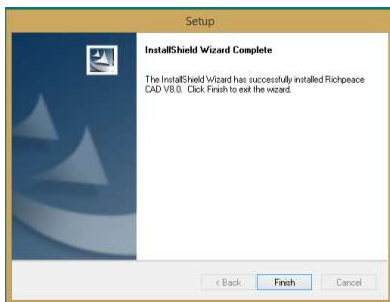
9. Finally click finish you can see the following three alternatives

10. The installation is already finish

11. To open and use the software please double click on RP-PDS or RP-DGS

Note: if you have install once, you don't follow all of the above procedures only you can use step 11.

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Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page. (**5 point each**)

1. What is CAD in Clothing Industry?
2. Write at least five available 3D CAD software for the clothing manufacturing industry.
3. Write at least five available 2D CAD software for the clothing manufacturing industry.

Note: **Satisfactory rating – 15 points**   **Unsatisfactory - below 15 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Information Sheet-3	Plan pattern production for the design

3.3   Planning of pattern making

Planning of pattern making is the first stage in clothing production planning. This stage includes all activities from garment pattern design, grading and preparation of markers to material requirements.

Constructing garment patterns:

Constructing garment patterns is a very complex process that is performed, for particular types of garments, on the basis of

- Additional measurements
- Back and chest widths
- Body measurements
- Body proportions
- Construction measurements and
- Garment-sizing systems and size designation of clothes
- Main body measurements

A pattern is a diagrammatic representation of the way a garment part is constructed, which forms the working plan for its manufacture. As garments are generally composed of the basic fabric, lining, and interlining, they require a pattern for the basic fabric, which will then form the basis of the pattern for the linings. Lining patterns should always include what is known as 'ease'. The lining should never pull the clothing out of shape or cause wrinkles. The ease may have to be increased, depending on the spread or stretch in the clothing fabric.

Industrial pattern making has two basic stages,

- The block pattern. The block pattern can be created by two ways: a) Flat Method b) Modeling
- The garment pattern.

Garment Patterns Constructions are done by ways, Manual or conventional method and by computer (CAD). Basic pattern construction and modeling can be performed either in the conventional manner or by using a computer aided designed (CAD) for the purpose. In the conventional manner, the construction, modeling and modification of garment pattern-pieces are done manually, whilst grading (i.e. stepwise increase or decrease pattern-pieces) can be done manually or using appropriate

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computerized systems. When garment patterns are constructed using a computer (with such systems offering construction, modeling and modifications of the basic pattern, as well as simultaneous grading of individual pattern-pieces into target sizes), it is necessary to do the following:

- Systemize the pattern-pieces and models
- Prepare the pattern-pieces
- Determine the type of material to be used and
- Define the cutting marker parameters.

Contrary to the above, in conventional construction preparation, which includes the construction, modeling, and modifications of garment pattern-pieces manually, it is necessary to prepare the pattern-pieces in advance, which can be used later during computerized processing.

Instruction of garments pattern making:

To enable the garment to be made up correctly, following instruction must be marked on apparel pattern:

- Balance Mark: Used to ensure patterns are sewn together at the correct points.
- Construction Lines: These include button holes, pocket placing etc.
- Grain Line: All patterns must have grain lines. It indicates the length direction of fabrics, i.e. during marker making all patterns must be placed to the length direction.
- Name of the part
- Size (it will show you how to find your size on a pattern finished garment measurements)
- Style Number.

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Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

1. What stages include in pattern making planning? (**3 point**)

2. Define pattern. (**2 point**)

3. Write at least five Instruction of garments pattern making. (**5 point**)

Note: **Satisfactory rating – 10 points   Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

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Operation Sheet 1	Prepare computer and work station for use

Direction: By using the following steps prepare materials and computer needed for CAD.

Step 1- Clean the work station

Step 2- Take desktop or laptop computer

Step 3- Seat the computer on safely manner

Operation Sheet 2	Identify and open appropriate application

Direction: By using the following steps identify and open CAD software needed for garment pattern making.

Step 1- Take all garment CAD software

Step 2- Select suitable garment pattern CAD software for the given work

Step 3- Install the software in to the computer

Step 4- Open appropriate garment pattern CAD software.

LAP Test	**Practical Demonstration**

Name: _____   Date: _____

Time started: _____   Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within required hours.

Task 1: Prepare computer and work station for use

Task 2: Identify and open appropriate application

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LG #25	LO #3- Create pattern

Instruction sheet

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

- Conducting work according OHS practices
- Constructing drawings based on customer information.
- Applying Knowledge of producing patterns processes and calculations
- Marking and cutting out Shapes based on customer or enterprise information
- Checking Finished work
- Exiting software applications
- Shutting down and switching off computer properly

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:

- Construct drawings based on customer information
- Apply knowledge of producing patterns processes and calculations
- Conduct work according to OHS practices.
- Check finished work for accuracy and compliance to design requirements
- Mark and cut out shapes based on customer or enterprise information
- Exit software applications and shut down and switched off computers properly

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.

2. Read the information written in the "Information Sheets". Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

3. Accomplish the "Self-checks" which are placed following all information sheets.

4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished

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answering the Self-checks).

5. If you earned a satisfactory evaluation proceed to "Operation sheets

6. Perform "the Learning activity performance test" which is placed following "Operation sheets" ,

7. If your performance is satisfactory proceed to the next learning guide,

8. If your performance is unsatisfactory, see your trainer for further instructions or go back to "Operation sheets".

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Information Sheet-1	Conducting work according to OHS practices

3.1 Occupational health and safety Practices

The main goal of safety and health programs is to prevent workplace injuries, illnesses, and deaths, as well as the suffering and financial hardship these events can cause for workers, their families, and employers. The recommended practices use a proactive approach to managing workplace safety and health.

A. Hazard identification and control,

Hazard identification is part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm. The term often used to describe the full process is risk assessment:

Identify hazards and risk factors that have the potential to cause harm (hazard identification). Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation). Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control).

Overall, the goal of hazard identification is to find and record possible hazards that may be present in your workplace. It may help to work as a team and include both people familiar with the work area, as well as people who are not - this way you have both the experienced and fresh eye to conduct the inspection.

B. Risk assessment and implementation of risk reduction

Risk assessment is a term used to describe the overall process or method where you:

- Identify hazards and risk factors that have the potential to cause harm (hazard identification).
- Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation).
- Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control).

A risk assessment is a thorough look at your workplace to identify those things, situations, processes, etc. that may cause harm, particularly to people. After identification is made, you analyze and

evaluate how likely and severe the risk is. When this determination is made, you can next, decide what measures should be in place to effectively eliminate or control the harm from happening.

C. Standard operating procedures

A standard operating procedure (SOP) is a set of step-by-step instructions compiled by an organization to help workers carry out complex routine operations. SOPs aim to achieve efficiency, quality output and uniformity of performance, while reducing miscommunication and failure to comply with industry regulations.

D. Personal protective equipment

Personal protective equipment (PPE) is protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.

E. Safe materials handling

Material handling is the movement, protection, storage and control of materials and products throughout manufacturing, warehousing, distribution, consumption and disposal. As a process, material handling incorporates a wide range of manual, semi-automated and automated equipment and systems that support logistics and make the supply chain work. Their application helps with:

A company's material handling system and processes are put in place to improve customer service, reduce inventory, shorten delivery time, and lower overall handling costs in manufacturing, distribution and transportation.

F. Taking of rest breaks

A rest break is an uninterrupted period of at least 20 minutes, during which work should not be undertaken. You should be able to take it away from your workstation. Your employer is not allowed to make the rest break up to 20 minutes by offering several short breaks of under twenty minutes. The break should be continuous.

A period of downtime when you are allowed to stop working but must stay in contact with your employer is not a rest break, even if it turns out at the end of the break that it was uninterrupted. Rest periods include breaks during the working day, breaks between working days, and weekly rest periods.

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G. Ergonomic arrangement of workplaces

Ergonomics is the study of the interaction of workers and their work environment. The word *ergonomics* is derived from two Greek words: ergos and nomos, which translates into "work laws." Ergonomics is an interdisciplinary field integrating the study of human anatomy, psychology, physiology, anthropometry, biomechanics, and industrial engineering. The ergonomist seeks to optimize the relationship between the worker and the work environment, thus improving productivity and the worker's well-being. The work environment includes all factors that affect the workplace and job performance even though they may not be directly involved in the operation.

H. Housekeeping

Housekeeping means general care, cleanliness, orderliness, and maintenance of business or property. Good housekeeping is an important consideration in underwriting of fire hazard and other forms of insurance, as well as in certification by fire, health, and industrial safety agencies.

I. reporting accidents and incidents

Accurate and timely reporting of relevant information related to hazards, incidents, or accidents is a fundamental activity of safety management. You may hear the words accident and incident to refer to events in the news. These words are easy to confuse, but they are not exactly the same! Incident is more general, and accident is more specific.

Incident can refer to any event – big or small, good or bad, intentional or unintentional. A bank robbery a funny or controversial situation, an argument between celebrities, etc.

An accident is a bad event caused by error or by chance. Accidents are always unintentional, and they usually result in some damage or injury. A car crash is one example of an accident. If some equipment malfunctions in a factory and injures the workers, that is also an accident. Examples of very minor accidents are when you step on someone's foot or spill your coffee on someone else. You didn't want or plan to do it.

All accidents can ALSO be described as incidents – but NOT all incidents are accidents.

If a drunk driver runs his car into a group of people, that is an accident (he did not intend to do it; it was caused by alcohol and chance). It could also be described as an incident ("The incident occurred on Main Street at around 2:30 AM"). If three people were arrested after fighting in a bar, that is an incident (but not an accident – because the fight was not by chance; they intended to fight).

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

(**2 point each**)

1. Personal protective equipments used to protect our head from injury.

    B. Helmets B. Goggles C. Safety shoe D. Glove

2. OHS practice Includes

    A. Manual handling techniques

    B. Safe materials handling

    C. Taking of rest breaks

    D. All

3. The study of the interaction of workers & their work environment is known as_____.

Note: **Satisfactory rating – 6 points   Unsatisfactory - below 6 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Information Sheet-2	Conducting work according OHS practices

3.2.1 Rich peace Interface Introduction

Interface is user work house, If you familiar interface, you familiar work environment, Improve work efficiency.
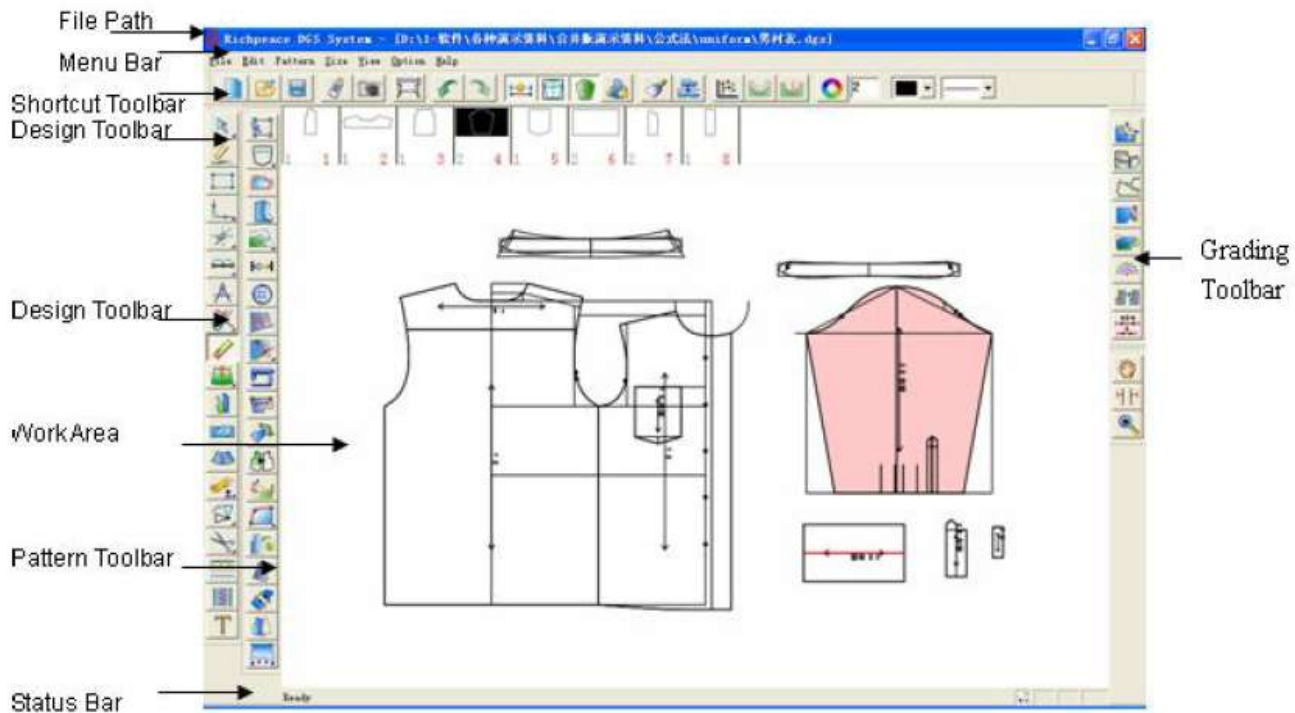
Figure 1.1: Reach peace interface

- ✓ **File Path-** Show current opened file path.
- ✓ **Menu Bar-**It is putting menu command place, and there are various command under each menu. Click menu, you can see a menu list, Click select one command. Also press and hold Alt and press letter behind menu, You Can select Menu, Press direction button to select object.
- ✓ **Shortcut Toolbar-**Some commands in common uses are put here in manner of icon.
- ✓ **Pattern list Box-**It is a pictorial list of pieces within a design file. The Pattern List box shows a small picture of each piece in a design file .You can display the Pattern List box location from 【Option 】--【System Setup】--【UI Setup】--【Piece List box Arrange. By dragging a pattern

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and move, you can adjust its arrangement order of pattern in the Pattern List box. Also you can select pattern with menu, copy or paste pattern.

- ✓ **Ruler Bar-**Show used unit.
- ✓ **Design Toolbar-**Line drawing or modify design line tool is put here.

- ✓ **Pattern Toolbar-**After using the tool of scissor to create a pattern, the tools in this toolbar can be used to adjust the created patterns. Such as adding darts, notches, drills, etc.
- ✓ **Grading Toolbar-**Some tools for grading are put here.
- ✓ **Work Area-**It is seems a paper, you can draw design line; Also you can grade, plot or show paper border.
- ✓ **Status Bar-**The Status Bar is on the bottom of the interface. The status bar displays -information of the current tool and the prompts for its operation.

1.2.1.1   Design toolbar

 Shortcut toolbar A

Function: It is used for adjusting curve shape, Modify control point number, Convert curve point and turn point, Change property of drill, button hole, pleat, dart by click right.

 Intelligent Pen Shortcut toolbar F

Function：

Draw line, Make rectangle, Adjust, Adjust line length, corner, Dart line, Delete, One way extend, two way extend, move (copy)point line, Transfer dart, snip(connect) line, shrink dart Not cross isometry, isometry line, compasses, setsquare, offset point(line), horizontal and vertical line etc.

 Rectangle Shortcut toolbar S

Function: It is used for making rectangle design line, Rectangle assistant in pattern.

 Arc corner

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Function ：Make equal distance or non equal distance Arc corner. Can make bottom of uniform, Pocket etc, Can be used in design line and pattern.

 Angel line

Function: Can make any angel line, Make vertical line, tangent (parallel line) through point out of line, Can be used in design line and pattern.

 Tangent line of ARC

Function：

Make tangent line from point to circle or two circle, Can operate on design line and pattern.

 Divider Shortcut toolbar D

Function: Add equal point on line, Add equal distance point in opposite direction on line, Can operate on design line and pattern.

 Point

Function ：Add point on line or blank place, Can operate on design line and pattern.

 Compasses Shortcut toolbar C

Function：

1. Single compasses: Make fixed length line From key point to line, Usually used in drawing shoulder, straight armhole, Waist, bias line of sleeve Arc.

2. .Double compasses: Through two fixed point, Make two appointed line, usually used in bias line of sleeve arc, peak lape of custom fashion etc, Can operate on design line and pattern.

 Snip curve Shortcut toolbar Z SHIFT+C

Function: Snip line from appointed place, It will turn to two line. Or connect more line to one line, Can operate on pattern and design line.

 Relevant or irrelevant

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Function: When adjust cross line with modify tool, If you use relevant, Line can be adjusted together, If you use irrelevant , Line can not be adjusted together, Can be used both in design line and assistant line, Default cross point is relevant.

Eraser Shortcut toolbar E

Function: Delete point or line or design line, Delete assistant line , Notch, button hole, dart, pleat etc.

Shrink dart

Function: Add dart on design line, and create arrow sign to confirm dart direction, only used in design line.

Dart line

Function: Add dart line to dart, Can be used in design line

Insert dart

Function: Insert dart on pleat on selected line, Can be used in design line and pattern, usually used in making Hubble-Hubble sleeve or three dimensional pockets.

Transfer dart

Function: It is used to transfer dart of pattern, Can Transfer in same circle center, Also not in same circle center, Can transfer part, Also Can transfer all, Also can transfer equally, New dart point can in original place, also can not in original place, Be suitable for design line.

Pleat

Function: It is used to spread pattern, and add pleat mark and pleat adjust amount, Can only used in design line

Cut Apart

Function: It is used to amend, divide pattern or deduct surplus. Can used in design line and pattern, Can make big bottom shirt, eye border.

Flouncing

Function: Make helical flouncing. Only available for design line.

Compare length Shortcut toolbar R

Function: It is used to measure line length, Plus more length value, disperse after more line comparing. Also can measure notch to point length.

Protractor

Function：

1. Can operate on pattern and design line

a. Measure one line horizontal and vertical degree;

b. Measure two line degrees;

c. Measure three point degrees;

d. Measure two point horizontal or vertical degrees

Rotate

Function: It is used for rotating or rotating and copy one group point or line, It is suitable for design line and assistant line.

Move Short cut toolbar G

Function: It is used for coping or moving one group point or line.

Move and rotate

Function: It is used to move and rotate on group line to another group line, For example, Move Back to front, Check following figure.

Forfex Shortcut toolbar W

Function: It is used for picking up pattern from design line or assistant line.

Inside border

Function: Make hollow graph in pattern, Also can pick up on design line, Can hollow assistant line formed area in pattern.

Set curve color and type

Function: It is used to modify design line color, Line type, Assistant line type and output type.

Pic lib

Function:

1. To make the craft picture with (Save to picture lib) under the menu (File);

2. Open and adjust the craft picture.

3. Copy bitmap picture to office.

Text

Function: It is used for adding text, Moving text, modifying or deleting text on design line or pattern, and text on different size can be different.

3.2.1.2 Pattern toolbar

Select pattern control point

Function: It is used to select pattern, Select border point of pattern, Select assistant line point, and modify point parameter

Sew line

Function: Add and modify sew line on pattern border.

Quilted stitching

Function: Add or modify quilted stitching line

Function: It is used for add seam or modify seam and cut corner.

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 Make Interlining

Function: It is used to make interlining

 Notch

Function: Add notch, turn corner notch on pattern, Adjust notch direction, Grade to notch, Modify, Notch position size and property.

 Sleeve crown and armhole notch

Function: It is used for adding notch on armhole and sleeve crown at the same time, Front Armhole and sleeve crown add single notch, Back armhole and back sleeve crown add double notch.

 Assistant curve notch

Function: Add notch on border which assistant line appoint to, When adjust assistant one side direction, Notch situation will change accordingly.

 Button hole

Function: Add button hole on pattern, Modify button hole. On grade pattern, Different size button hole can equal, also can not equal.

 Drill

Function: Add drill (button) on pattern, Modify drill (button) attribute and number. On grade Pattern, Different size drill number can equal also can not equal.

 Pleat

Function: Add or modify box or knife pleat on pattern border, also can change pleat on design line to pleat element. When make whole pleat, add pleat on original pattern, Pattern size will change, If add half pleat, only add pleat sign, did not change pattern size.

 V **dart**

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Function: Add or modify V dart on pattern border, Also can change dart on design line to dart element.

Fastigiate dart

Function: Add fastigiate or rhombus dart.

Compare path work

Function: One pattern border line walk on another pattern border line, Can adjust inner line is smooth or not, also can add notch.

Grain line

Function: It is used for adjust Grain line Direction, located; length and info on weave line.

Pattern rotate

Function: It is used for rotating one or more pattern

Pattern flip: It is used for flip pattern

Horizontal/vertical adjust

Function: Adjust line to horizontal or vertical status

Resmooth curve

Function: It is used for adjusting curve and key point is reserved at original place.

Pattern symmetry

Function: There are relevant and irrelevant two function, After use relevant, When adjust half of pattern, another part also change, Select irrelevant, Adjust half of pattern, another Pattern did no change.

Shrink

Function: Can shrink to whole pattern according to material, Can part shrink selected line.

1.2.1.2 Grading toolbar

Intersection of two parallel

Function: It is used for grading for pattern border, after using this tool, parallel with intersection side, usually used in grading for collar of custom fashion.

Assist curve parallel grading

Function: Grading for inner line of pattern, after using this tool, inner line size will parallel and intersect with border line.

Grading of assistant curve

Function: Assist line side point which intersects on pattern will grade according to border line appointed point length. (Like AB curve length)

Grading by parallel and distance

Function: Make different size shoulder parallel.

Size Align

Function: Align grading value by point or line or restore original align.

Arc Grading

Function: Can grade to angel, radius, and arc length.

Copy grading value

Function: Copy same grading value

Two point proportion grade

Function: Grade another two point proportion according to two point proportion or grade from one point to one line according to one point to one line grading.

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Enable or disable assistant curve auto grading with border

Function:

1. Assistant curve auto grading with border
2. Assistant curve do not auto grading with border

Line grade

Function Grade whole pattern

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Self-Check -2	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid

Some explanations /answers:

I. Match group A with group B? (1 points)

<u>**A**</u>   <u>**B**</u>

1.

                                                A. Eraser

2.

                                                B. Grain line

3.

                                                C. Divider

4.

                                                D. V dart

5.

                                                E. Select pattern control point

6.

                                                F. Intelligent Pen

7.

                                                G. Point

8.

                                                H. Fastigiate dart

9.

                                                I.   Sew line

10.

                                                J. Compare length

K. Text

L. Drill

M. Forfex

N. Button hole

O. Notch

Note: **Satisfactory rating – 15 points**   **Unsatisfactory - below 15 points**

You can ask you teacher for the copy of the correct answers.

                  Answer Sheet

Name_____ Date_____

	Score = _____
	Rating: _____

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Information Sheet-3	Applying knowledge of producing patterns processes and calculations

3.3 Applying knowledge of producing patterns processes and calculations

Pattern makers (of apparel & textiles) create the blueprint or pattern pieces for a particular apparel design. This often involves grading, or adjusting the pieces for different sized garments. Grading once was a time-consuming job, but now it is quickly completed with the aid of a computer. Markers determine the best arrangement of pattern pieces to minimize wasted fabric. Traditionally, markers judged the best arrangement of pieces by eye; today, computers quickly help to determine the best layout. Pattern Makers convert a clothing designer's original model of a garment into a pattern of separate parts that can be laid out on a length of fabric. After discussing the item with the designer, these skilled workers usually use a computer to outline the parts and draw in details to indicate the positions of pleats, buttonholes, and other features. (In the past, patternmakers laid out the parts on paper, using pencils and drafting instruments such as rulers.) Patternmakers then alter the size of the pieces in the pattern to produce garments of various sizes, and they may mark the fabric to show the best layout of pattern pieces to minimize waste of material.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

1. Write the tasks of pattern makers. (**5 point each**)

Note: **Satisfactory rating – 2.5 points**   **Unsatisfactory - below 2.5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Information Sheet-4	Marking and cutting out shapes based on customer or enterprise information

3.4.1 The Fabric Marking Standards in Garment Manufacturing

Marking refers to the process of placing pattern pieces to maximize the number of patterns that can be cut out of a given piece of fabric in order to make garments. Pattern making is a highly skilled technique which calls for technical ability, sensitivity for design interpretation and a practical understanding of the process technology used by the factory.

Once the pattern is graded, the fabric must be prepared for cutting. In order to spread the fabric properly, the spreader must know how the pattern pieces will be placed on the fabric. "Marking" refers to the process of placing pattern pieces to maximize the number of patterns that can be cut out of a given piece of fabric. Firms strive for "tight" markers largely because the fabric is one of a manufacturer's most significant business costs, often exceeding the cost of labor.

Although markers can be made by hand or using CAD software, the computerized method is up to eight times faster. Once a marker is completed, a CAD system can use a plotter to print a full-size layout on a long sheet of paper. This layout becomes the guide for the cutter.

Computer software helps the technicians create the optimum fabric layout to suggest so the fabric can be used efficiently. Markers, made in accordance with the patterns are attached to the fabric with the help of adhesive stripping or staples. Markers are laid in such a way so that minimum possible fabric gets wasted during a cutting operation. After marking the garment manufacturer will get the idea of how much fabric he has to order in advance for the construction of garments. Therefore careful execution is important in this step.

Computer marking is done on specialized software. In computerized marking there is no need for large paper sheets for calculating the yardage, in fact, mathematical calculations are made instead to know how much fabric is required.

Making the marker

Marker making is the creation of cutting temples for the various parts of a garment. This may be done on the cardboard or paper, the former being more durable. In some cases, markers are made on continuous rolls of paper for efficiency. Form all the pattern pieces of varying size, a master marker is

made. The marker is the cutting guide or pattern. Layout made on a sheet or lightweight paper the same width as the fabric. The purpose of the marker is threefold:

- To make a layout for the cutter to allow
- To place pattern pieces close together to avoid fabric waste
- To accommodate the cutting order (ensuring that the correct quantities of each size are cut).

The desire economical use of space is called a tight marker, which utilizes the highest percentage of fabric possible to avoid waste. Patterns are laid out so that each size and color is cut as needed (popular sizes are repeated on the marker). Grain direction, one-way prints, plaids, stripes, and naps are considered in making the marker.

Computerized marker making: Most manufacturers now make their marker on a CAD system or have it made by an outside service. Miniatures of the graded pattern pieces are displayed graphically on the computer screen. The operator can electronically position the pattern pieces into the most efficient arrangement. Once the marker is completed, a full-scale marker is printed by the plotter on a long sheet of paper.

General information on the Pattern marking

- Not every marking is on every pattern because some are specific to a certain style or construction technique.
- Layout and cutting markings don't need to be transferred to the fabric. Construction markings, on the other hand, are very helpful during the sewing process and transferring them to the fabric is a good idea.
- Every pattern piece has general information printed in the center.
- Each piece is numbered and the number indicates the order in which the pieces are sewn together. For example: Skirt Front 1 is joined to Skirt Back 2.

Other helpful information includes:

- Pattern brand and style number
- View letter (if there is more than one view)
- Size
- Name of the piece (skirt front, sleeve, pleat underlay, etc.) and its number
- Cutting information (cut one on the fold, cut two, etc.)
- Lining/interfacing information (if applicable)

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3.4.2 Fabric Cutting in Garment Manufacturing

Cutting is the process which cut out the pattern pieces from specified fabric for making garments. Using the markers made from graded patterns and in accordance with the issue plan, fabrics are cut to prepare garment assembly. This is the major operation of the cutting room, of all of the operations in the cutting room this is the most decisive because once the fabric has been cut, very little can be done to rectify serious mistakes.

Cutting fabrics

What is Fabric Cutting?

The first stage in the manufacturing of garments is the cutting and for that pattern, making is the base. Cutting is separating of the garment into its components and in a general form, it is the production process of separating (sectioning, curving, severing) a spread into garment parts that are the precise size and shape of the pattern pieces on a marker. The cutting process may also involve transferring marks and notches from the garment parts to assist operators in sewing, chopping or sectioning a spread into blocks of pieces goods many precede precision cutting of individual patter shapes. This is done to allow for accurate matching of fabric design or easier manufacturing of a cutting knife.

Once the marker is made, pattern pieces must be cut out of the specified fabric, a process called "cutting." Currently, several cutting techniques exist, ranging from low- to high-tech. Although scissors are used very rarely-only when working with very small batches or sensitive fabrics-cutting continues to be done by hand, particularly in many lower volume establishments. Here, cutters guide electric cutting machines around the perimeter of pattern pieces, cutting through the fabric stack. An electric drill may be used to make pattern notches. The accuracy and efficiency of this system are considerably less than in computerized cutting systems.

Computerized cutting systems are achieving more widespread use as technology costs decrease and labor costs rise. These computer-driven automated cutters utilize vacuum technology to hold stacks of fabric in place while cutting. Cutting blades are sharpened automatically based on the type of fabric being cut. Gerber Garment Technology manufactures one of the most commonly used cutting systems. This technology has the advantage of being highly accurate and fast, but does cost considerably more than other cutting techniques.

- The precision of cut: To ensure the cutting of fabric accurately according to the line drown of the marker plan.

- Clean edge: By avoiding the framing out of yarn from the fabric edge. Cutting edge must be smooth clean. The knife must be sharp for a smooth or clean edge.
- Consistency in cutting: All the sizing safe of the cutting parts should be same of a knife should be operated of the right angle of the fabric layer.

Factors involved in Cutting Fabrics

Factors affect the cutting process for fabrics are as follows:-

- Nature of fabric (grain line shade, twill etc.)
- The thickness of fabric.
- Design characteristics of a finished garment.
- Machines and tables used.

Production process in the cutting room

Irrespective of size; all cutting rooms use the same basic system to produce cutwork, with the raw material going through the same operations in the same sequence. Cutting production starts with the receipt of inspected raw materials, production orders and graded patterns and finishes when bundles of cutwork are issued for sewing.

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Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

1. Define the following words (**2 point each**)

    A. Marking

    B. Fabric cutting

2. Write the advantages of computerized cutting. (**2 point each**)

3. Write factors affect the cutting process for fabrics. (**2 point each**)

Note: **Satisfactory rating – 8 points   Unsatisfactory - below 8 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

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Information Sheet-5	Checking Finished work

4.5 Checking Finished work

Checking of pattern pieces like:

❖ Seam allowances

❖ Ease allowances

❖ Seam match

❖ Hems and functional openings

Information Sheet-6	Exiting software applications

3.6 Exiting software applications

Software applications are properly exited before the computer shut down and switched off.

- Make sure all your work is saved

- You must not exit Open Partner without closing all your software, remember when your software is iconized this does not mean it is closed. Close all the open or iconized software.

- In Open Partner go to FILE and then to QUIT. You will now be at the gray screen where you started.

- Double click on shutdown and wait until you see typing on the screen which has stopped scrolling. Now press Alt and F3 at the same time and wait until you read "the system is halted."

Information Sheet-7	Shutting down and switching off computer properly

3.7.1 Shutting down a computer

Shutting down a computer closes all the programs that are open and exits the operating system safely so hardware isn't damaged and your operating system isn't corrupted. The following article describes how to shut down a computer, with instructions for different operating systems.

Shut down in Windows 10

- Press the Windows key on the keyboard, or click Start. The Start menu opens.
- In the Start menu, click Power, then click Shut down. or
- Press Ctrl+Alt+Del and click the power button in the bottom-right corner of the screen. Or
- From the Windows desktop, press Alt+F4 to get the Shut Down Windows screen shown here.
    Tip
- If you have no mouse, while in the Shut Down window use the Tab key and arrow keys to switch between fields and when selected use the Enter key or the spacebar to select what is highlighted.

Shut down in Windows 8 and 8.1

- Neither of these versions of Windows has the Start menu. However, with the 8.1 update, Microsoft added the power options button to the upper-right corner of the Start screen that allows users to restart their computer quickly. Click the power options icon (squared in red in the image to the right) and select Restart from the drop-down menu that appears. or
- Press Ctrl+Alt+Del and click the power button in the bottom-right corner of the screen. or
- From the desktop, press Alt+F4 to get the Shut Down Windows screen. or
- With Windows 8, Shut down is found in the Settings of the Windows Charms.
    Tip
- If you have no mouse, while in the Shut down window use the Tab key and arrow keys to switch between fields and when selected use the Enter key or the spacebar to select what is highlighted.

Shut down in Windows Vista and Windows 7

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- Press the Windows key on the keyboard or click Start.

- Click the Shut down button. or

- Press Ctrl+Alt+Del and click the power button in the bottom-right corner of the screen. Or

- From the Windows desktop, press Alt+F4 to get the Shut down Windows screen and select Shut down.

   Tip

- If you have no mouse, while in the Shut down window use the Tab key and arrow keys to switch between fields and when selected use the Enter key or the spacebar to select what is highlighted.

Shut down in Microsoft Windows 95, 98, NT, ME, 2000, and XP

All these versions of Microsoft Windows can be shut down through the Start menu.

- Press the Windows key on the keyboard or click Start.

- From the Start menu, click Shut Down...

- MS-DOS and Windows command line

- Press the Windows key, type cmd, and then press Enter to open the command line.

- In the prompt that appears, type shutdown -s and press Enter.

- After a few moments, the computer will shut down.

Self-Check -7	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

1. Write the steps to s**hut down in Windows 10.** (**4 point each**)

Note: **Satisfactory rating – 4 points   Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____   Date: _____

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Operation Sheet 1	Construct garment pattern drawings

Direction: By using the appropriate CAD software construct garment pattern drawing.

Step 1- Open software by double click

Steps 2- By using the design tools make a pattern

Step 3- apply all pattern information

Step 4- Complete accurate pattern drawings of at least three (2) garments. (Suit, shirt and Trouser)

Step 5- Draw lines accurately to represent garment specifications

LAP Test	Practical Demonstration

Name: _____   Date: _____

Time started: _____   Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within required hours.

Task 1: Construct drawings based on customer information

LG #26	LO #4- Document and communicate data

Instruction sheet

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

- Using Spreadsheet or other appropriate software applications
- Saving Data, drawings and other outputs electronically
- Storing Other work related information
- Passing data and associated information

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:

- Use spreadsheet or other appropriate software applications
- Save data, drawings and other outputs electronically and in hard copy form
- Store other work related information
- Pass data and associated information

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the "Information Sheets". Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the "Self-checks" which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
5. If you earned a satisfactory evaluation proceed to "Operation sheets
6. Perform "the Learning activity performance test" which is placed following "Operation sheets" ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions or go back to "Operation sheets".

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Information Sheet-1	Using Spreadsheet or other appropriate software applications

4.1 A spreadsheet or worksheet

A spreadsheet or worksheet is a file made of rows and columns that help sort data, arrange data easily, and calculate numerical data. What makes a spreadsheet software program unique is its ability to calculate values using mathematical formulas and the data in cells. A good example of how a spreadsheet may be utilized is creating an overview of your bank's balance.

Spreadsheet overview

Below is a basic example of what a Microsoft Excel spreadsheet looks like, as well as all the important features of a spreadsheet highlighted?

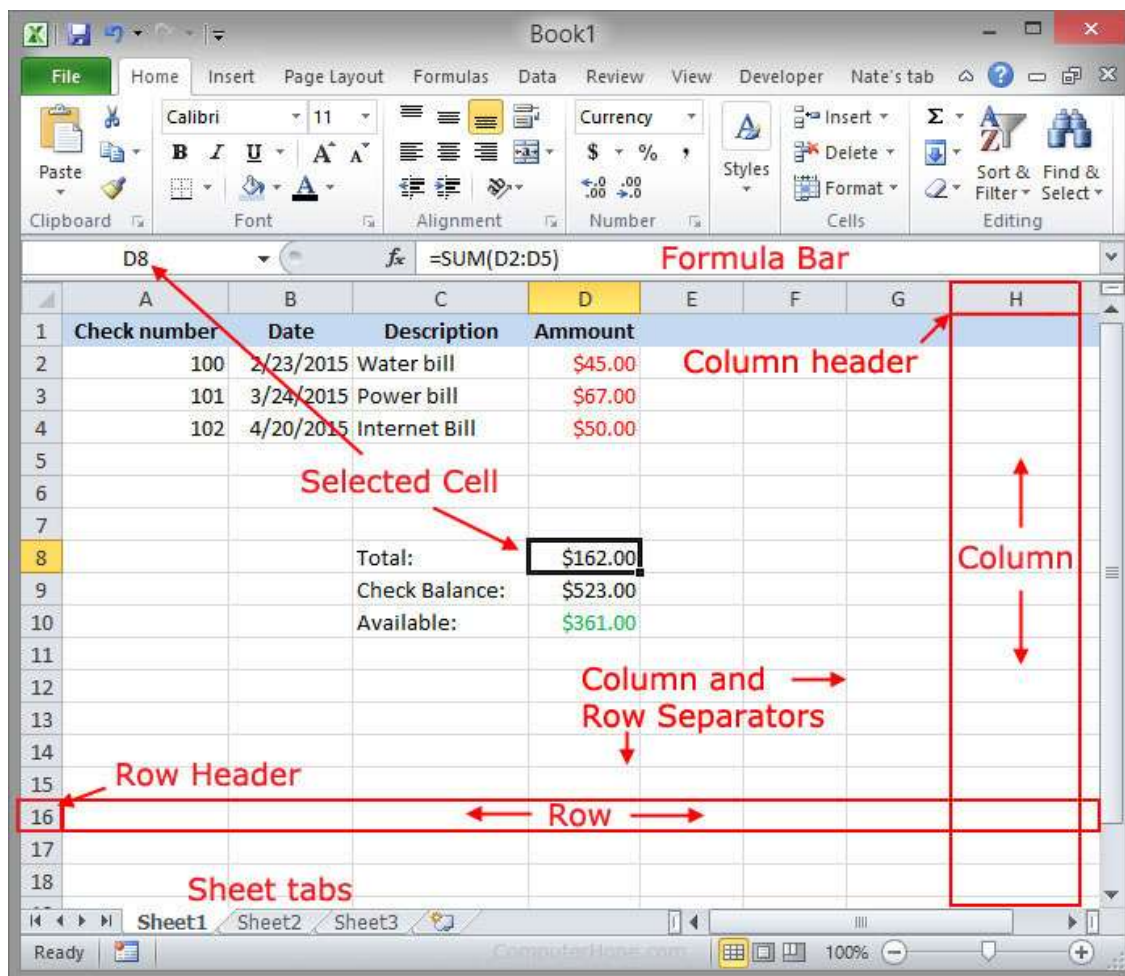| Federal TVET Agency Author/Copyright	TVET program title: Advanced Apparel Production Level II	Version-1
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Figure 1.1: Spreadsheet

In the above example, this spreadsheet is listing three different checks, the date, their description, and the value of each check. These values are then added together to get the total of $162.00 in cell D6. That value is subtracted from the check balance to give an available $361.00 in cell D8.

Difference between a workbook, worksheet, and spreadsheet

Because the terms spreadsheet, workbook, and worksheet are so similar, there can be a lot of confusion when trying to understand their differences. When you open Microsoft Excel (a spreadsheet program), you're opening a workbook. A workbook can contain one or more different worksheets that can be accessed through the tabs at the bottom of the worksheet your currently viewing. What's often most confusing is that a worksheet is synonymous with a spreadsheet. In other words, a spreadsheet and worksheet mean the same thing. However, most people only refer to the program as a spreadsheet program and the files it creates as spreadsheet files. Today, Microsoft Excel is the most popular and widely used spreadsheet program, but there are also many alternatives.

Although spreadsheets are most often used with anything containing numbers, the uses of a spreadsheet are almost endless. Below are some other popular uses of spreadsheets.

Finance

Spreadsheets are ideal for financial data, such as your checking account information, budgets, taxes, transactions, billing, invoices, receipts, forecasts, and any payment system.

Forms

Form templates can be created to handle inventory, evaluations, performance reviews, quizzes, time sheets, patient information, and surveys.

School and Grades

Teachers can use spreadsheets to track students, calculate grades, and identify relevant data, such as high and low scores, missing tests, and students who are struggling.

Lists

Managing a list in a spreadsheet is a great example of data that does not contain numbers, but still can be used in a spreadsheet. Great examples of spreadsheet lists include telephone, to-do, and grocery lists.

Sports

Spreadsheets can keep track of your favorite player stats or stats on the whole team. With the collected data, you can also find averages, high scores, and statistical data. Spreadsheets can even be used to create tournament brackets.

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Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

4. What is a spread sheet? (2.**5 point**)

5. Write the uses of spreadsheet. (2.**5 point**)

Note: **Satisfactory rating – 5 points**   **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____   Date: _____

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References

1. (PDF) Associate Design of Fashion Sketch and Pattern - ResearchGate
   https://www.researchgate.net/.../331946529_Associate_Design_of_Fashion_Sketch_and...

2. MSMWHS100 Follow WHS procedures - Training.gov.au
   https://training.gov.au/TrainingComponentFiles/MSM/MSMWHS100_R1.pdf

3. training.gov.au - MSMWHS100 - Follow WHS procedures
   https://training.gov.au/Training/Details/MSMWHS100

4. https://aspire-solidus-production.s3-ap-southeast
   2.amazonaws.com/assets/BXWHS302/samples/BXWHS302.pdf

5. https://www.sciencedirect.com/topics/social-sciences/conditions-of-employment
   https://www.fwc.gov.au/awards-and-agreements/legislation-regulations

6. The Swedish School of Textiles, University College of Borås, Digital Tools for Product Development and Organizational Management, Md.Ahashan Habib & Lefayet Sultan Lipol Högskolan i Borås, Date: 2010-05-26

7. Assessment Of The Adoption Of Apparel Computer Aided Design Technology Training In Selected Public Universities In Kenya, By Veronica Wambui Kamau (B.Sc), November, 2012

8. Journal of Textile Engineering & Fashion Technology, Research Article, Computer aided cutting in Indian garment industry: a change agent, Volume 5 Issue 1 – 2019

9. Richpeace Garment CAD System manual, Richpeace Group Co., Limited, www.richpeace.com

10. Planning of Garments Pattern Making - Fashion2Apparel
    fashion2apparel.blogspot.com/2018/07/planning-garments-pattern making.html

11. What is a Spreadsheet? - Computer Hope
    https://www.computerhope.com/jargon/s/spreadsheet.htm

12. What is a Spreadsheet? - Definition from Techopedia
    https://www.techopedia.com/definition/4426/spreadsheet

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S.N	Full name	Qual.	Educational background	Region	College	E-mail	Phone No.
1.	Fufa Diriba	A	Garment Technology	Oromia	Adama poly technic college	Fdiriba86@Gmail.com	0912006604
2.	Endriyas Miftah	B	Garment Technology	Oromia	Borayu TVET	Miftahendrias2005@gmail.com	0912636386
3.	Teshome Bikila	B	Garment Technology	Oromia	Hasassa TVET College	Teshe209@Gmail.com	0913485170
4.	Dejene Bifa	A	Garment Technology	Oromia	Athl. Kenenisa poly technic college	Dejene.bifa@yahoo.com	0913647972
5.	Dereje Hundesa	B	Garment Technology	Oromia	Waliso Poly Technic College	Bilisuummaahundessa@Gmail.com	0917638726

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