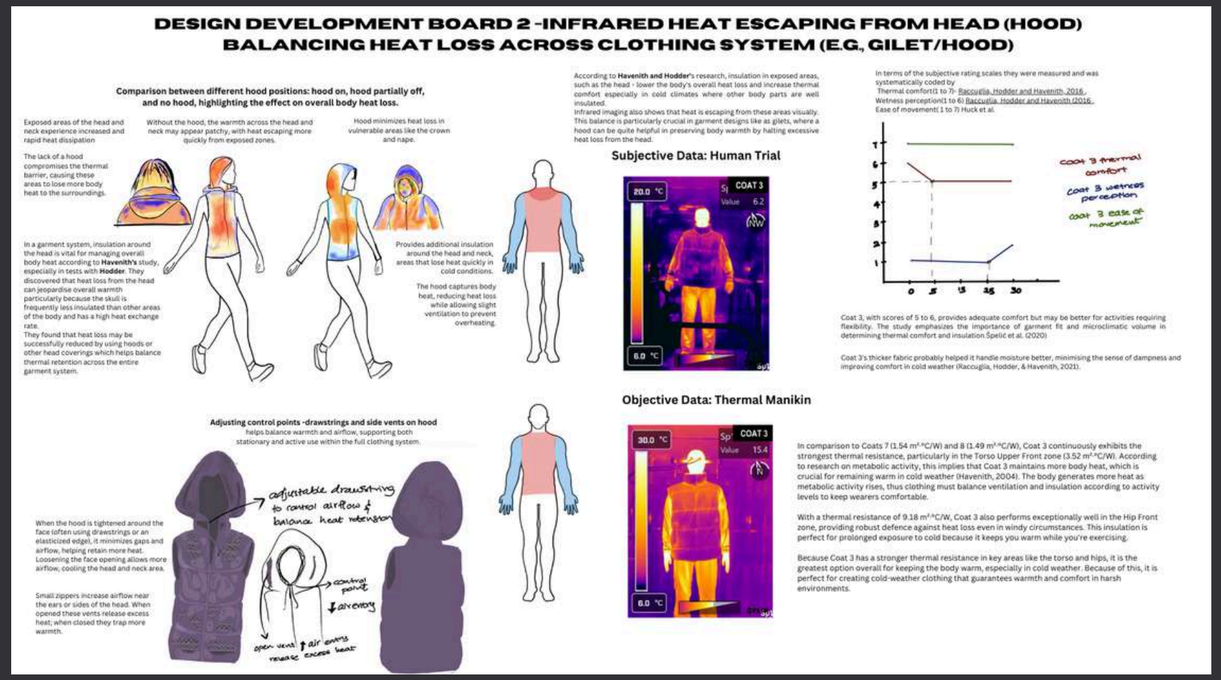
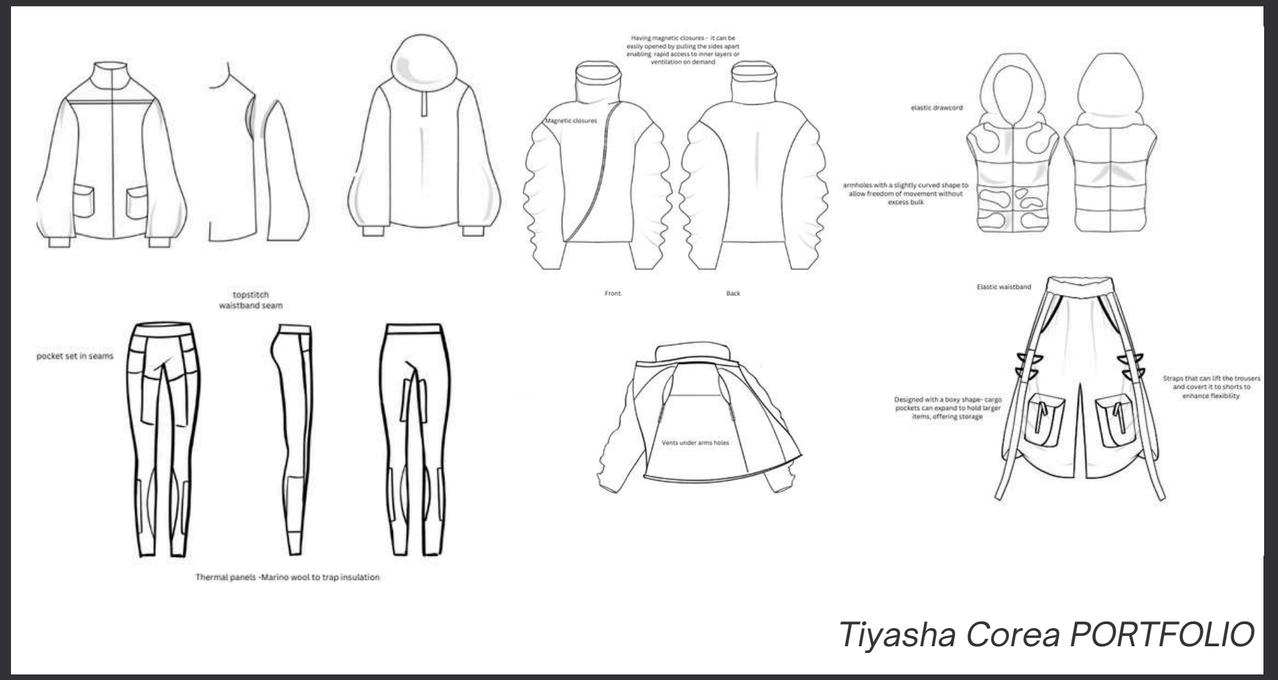
FASHION & TECHNOLOGY PORTFOLIO

TIYASHA COREA

Loughborough University

PROJECT CELLURA - Designs & Technical flats





Tiyasha Corea PORTFOLIO

PROJECT CELLURA - Technical Report

ACB261 Advanced Digital Design Processes

Technical Report

Title: Insulation

Name: TIYASHA COREA
Student ID: F313151

Abstract

This report examines the thermal performance of gilets, open-vent and closed-vent coats, assessing their ability to balance insulation, ventilation and mobility in moderate outdoor conditions (16°C, 50% humidity, 1.0 m/s wind). Using a combination of objective data from thermal manikin tests and infrared cameras alongside subjective human wear trials this study evaluates how each coat performs in terms of heat retention, breathability and comfort. The results highlight significant differences in thermal resistance with gilets offering superior insulation in key zones while open-vent and closed-vent coats provide varying levels of flexibility and moisture management. Key findings reveal that gilets excel in active movement and closed-vent coats provide the best thermal comfort and moisture control for cold damp environments. These insights have been implemented for designing outerwear that meets the demands of active outdoor lifestyle of a student in Canada, ensuring a balance between performance, comfort and sustainability in cold-weather apparel design.

1. Introduction

1.1 Introduction to the research

As gorpcore fashion, outdoor lifestyles, and sustainability gain popularity, it's critical to design outerwear that strikes a balance between comfort and performance. Clothing made for outdoor pursuits like hiking and city commuting needs to be weather-adaptable in terms of mobility, ventilation, and insulation. Functionality, durability, and waste reduction are ensured by testing these attributes before to mass production.This study looks at thermal comfort when engaging in outdoor activities in 16°C, 50% humidity, and 1.0 m/s wind. Light activities like hiking, which call for a balance between breathability and heat retention, are simulated by these moderate circumstances. Thermal comfort is influenced by ventilation, insulation, and how the wearer interacts with the clothing. Performance was evaluated using a mix of subjective and objective techniques. Thermal manikin tests assessed insulation and heat retention in several body zones, while Subjective data was gathered from wear trials, where participants rated thermal comfort, ease of movement, and wetness perception.

1.2 Aim and Objective of the Report

The purpose of this report is to analyse and compare the design characteristics of gilets, open-vent and closed-vent coats with a focus on their ability to balance insulation, ventilation and mobility. The goal is to evaluate how well each design provides warmth, breathability and flexibility for a variety of activities, such as hiking in a climate that varies between heat at 16°C, 50% relative humidity and 1.0m/s wind speed in a controlled climatic chamber designed to simulate specific environmental conditions. By investigating features such as silhouette, venting options and layering capabilities the study hopes to determine which design is best suited for active or stationary use, improving temperature control, ease of movement and overall functionality. Finally, this report will provide guidelines for developing autumn/winter outerwear.

2. Method

This study employs a blend of objective, performance-based metrics and subjective, user-experience data to evaluate the insulation, ventilation, and flexibility of gilets, open-vent, and closed-vent coats.
This study employed a mixed-methods approach combining both quantitative and qualitative data collection techniques to evaluate the thermal performance of three types of outerwear: Coat 3, Coat 7, and Coat 8. The study aimed to measure key performance indicators such as thermal insulation, ease of movement, and moisture management. The methodology involved two main testing procedures: objective thermal measurements using a thermal manikin and subjective data collected from human wear trials. Both methods provided complementary insights into the garments performance under controlled environments.

Coat 3 Gilet



Fabric composition:100% Nylon, 100% Polyester

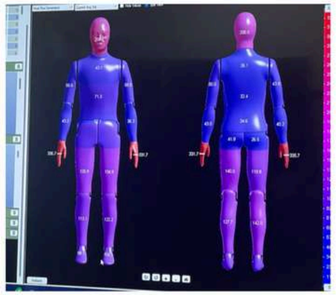
Coat 7 (Vents open).

Coat 8 (Vents closed)



Testing Procedure:

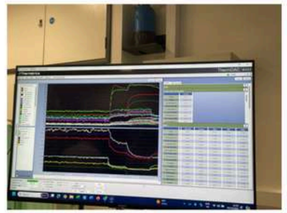
1. Preparation: The thermal manikin was calibrated to ensure accurate heat loss measurements. The sensors were calibrated for precision and the manikin was dressed in each coat type (Coat 3, Coat 7, and Coat 8) with base layers to ensure consistency throughout all experiments.
2. Controlled Environment: The testing were carried out in a climate room set to 16°C with 50% relative humidity and a wind speed of 1.0 m/s. These parameters were intended to approximate mild cold weather conditions found in urban and outdoor settings during the cooler months. This chamber replicated the conditions in which the coats would be worn, ensuring that the results were applicable to real-world performance.
3.Activity Simulation: During the testing, the manikin went through a simulated activity phase that included 30 minutes of brisk walking. This phase was created to replicate light physical activity, such as walking or trekking, which is frequent in outdoor areas and to measure how well the coats retain heat during movement.
Data Collection and Analysis: Real-time data on thermal resistance and insulation effectiveness were gathered with FLIR infrared (IR) cameras. These cameras generated temperature maps that showed changes in heat retention and loss across bodily zones. Each coat's thermal resistance (measured in $m^2 \cdot °C/W$) was evaluated to identify the best effective insulation design. These thermal maps were used to calculate the clo ratings, which are a standardised measure of insulation.

Thermal Manikin

2.2.1 Thermal manikin test (Objective data)

A thermal manikin is a life-sized, tool that replicates the heat loss of a person as it's used to provide data to users researching apparel and outdoor gear. It simulates human thermal responses and heat exchange in 32 independent thermal body zones through sensors in different clothing and environments. (Hodder, Simon). It enables researchers to test clothing insulating qualities precisely and evaluate thermal comfort without the unpredictability of human subjects. Thermal performance tests using clo ratings were conducted to compare insulation properties across gilets, open-vent and closed-vent coats identifying which garments retain the most heat at the temperature of 16°C with a relative humidity of 50% and wind speed strength of 1.0m/s in a controlled climatic chamber designed to simulate specific environmental conditions.



By demonstrating how each coat fared in moderate temperatures and little wind, the clo rating system offered a quantifiable means of evaluating insulation. In relatively cool settings, this standardised method assisted in assessing the thermal efficiency of vented coats and gilets. For testing, thermal manikins were covered with gilets, open-vent, or closed-vent coats and fitted with sensors to evaluate insulation and heat loss.

In order to replicate the body's reaction to moderate movement, the manikins were put in a controlled environment with precise settings that replicated brisk walking. This task was essential for evaluating each coat's ability to retain insulation during mild exercise. Real-time data on insulation and heat retention was gathered by the sensors. In order to compare ventilation and heat retention, open-vent coats were tested with and without vents. The ratings for Clo of each coat type were analyzed, along with the thermal insulation effectiveness of each garment zone with base layers, under these conditions (Havenith & Nilsson, 2004).

2.2.2 Human wear trial (Subjective Data)

The thermal performance study collected extensive thermal data using a variety of sophisticated testing equipment including FLIR infrared (IR) cameras and subjective scales. The IR cameras were used to detect infrared radiation resulting in detailed thermal images that highlighted temperature differences across the coats base layers. This visual data revealed areas of heat retention and loss providing useful information about the effectiveness of insulation and ventilation in coat designs. Additionally, subjective rating scales were used, in which the human participant rated his perceived thermal sensations on a scale. Using different sensation scales,

CASE STUDY :The convergence of RTW X SPORTSWEAR ; Upcyling/Repurposed sustainable methods.

1.Introduction

This essay explores the convergence between ready-to-wear (RTW) fashion and sportswear, while focusing on how modern life changes, consumer expectations and technological breakthroughs are merging these disciplines. The research focuses on the "Nike Re-Creation" initiative, which directly explores the potential of upcycling pre-existing RTW garments into functional sportswear. Traditionally, these disciplines have been separate categories in the fashion industry fulfilling different consumer requirements and goals. RTW has been associated as a commercial fashion system centred on aesthetic appeal, seasonal trends and mass accessibility while sportswear began with an emphasis on functionality, movement and performance.

The convergence of RTW and sportswear opens possibilities for hybrid garment innovation while sportswear elements are increasingly embedded within the aesthetics of RTW collections, it also presents several challenges across design, production and consumer engagement. The primary difficulty is combining aesthetics and functionality. As RTW frequently prioritises shape, silhouette and visual appeal, whereas sportswear emphasises movement, breathability and technical performance. However, customer demands have altered as they seek comfort, adaptability and multi-functional clothes, resulting in a convergence in industry lines.

Furthermore, developments in design technology such as the use of nanotechnology has heralded a new age of innovation, notably in the Ready-to-Wear and sportswear industries. As customer expectations for higher performance, comfort and sustainability rise, nanotechnology provides a cutting-edge answer by improving textiles at the molecular level. This literature review investigates key themes including technological innovation, material convergence, lifestyle-driven design and consumer perception. Also identifying the emerging opportunities and challenges in developing future-ready fashion that seamlessly merges style with function.

Table 3. Themes and participant quotes

Theme	Key Findings	Participant Quotes
1. Comfort as Priority in Everyday RTW	Participants consistently valued comfort, noting how sportswear elements enhance wearability in daily outfits.	P2 "Sportswear is definitely more comfortable - like tracksuits and shirts that I can move around in freely." P1 "I regularly wear sportswear as everyday clothing just for normal activities - it is comfortable."
2. Blurring Boundaries Between Fashion and Function	The aesthetic value of sportswear is now equally important as functionality, with RTW adapting performance-based features.	P2 "I think the line between them is becoming blurred - it is becoming more common in everyday wear." P1 "I would wake up and just put on tights and a cute oversized jumper - it is easy."
3. Desire for Multi-Functionality	Participants showed strong interest in hybrid garments that could be worn across multiple settings.	P2 "If I can wear a pair of pants in three or four scenarios, I would be more inclined to buy them." P1 "If a garment looks stylish, feels comfy and affordable - that is the perfect balance."
4. Growing Acceptance of Performance Features in RTW	There is a shift in consumer expectation where RTW garments should include functional benefits like sportswear.	P2 "Yes, 100 percent. If I had a jumper that regulated temperature and did not smell - that would be amazing." P1 "That would be cool - adding features makes garments more appealing."
5. Sustainable but Stylish	Participants expressed willingness to adopt upcycled fashion, but only if design and quality are not compromised.	P2 "Yes, I try to be sustainable with my buying habits - but if it does not look good, I will not buy it." P1 "If the quality is still good, I would be open to it."

6. Conclusion

This study found an increasing customer demand for apparel that combines the comfort and practicality of athletics with the visual appeal of ready-to-wear fashion. Through theme analysis of qualitative interviews, it is clear that Gen Z consumers, in particular are driving demand for hybrid clothes that suit their dynamic lives while matching with their ideals of style, comfort and sustainability.

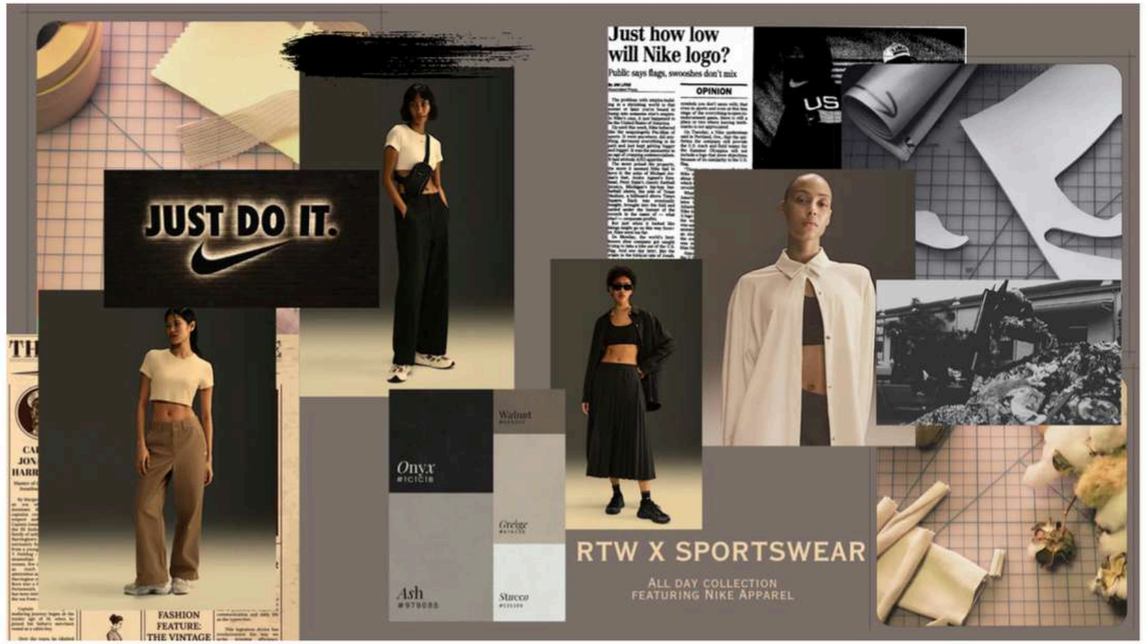
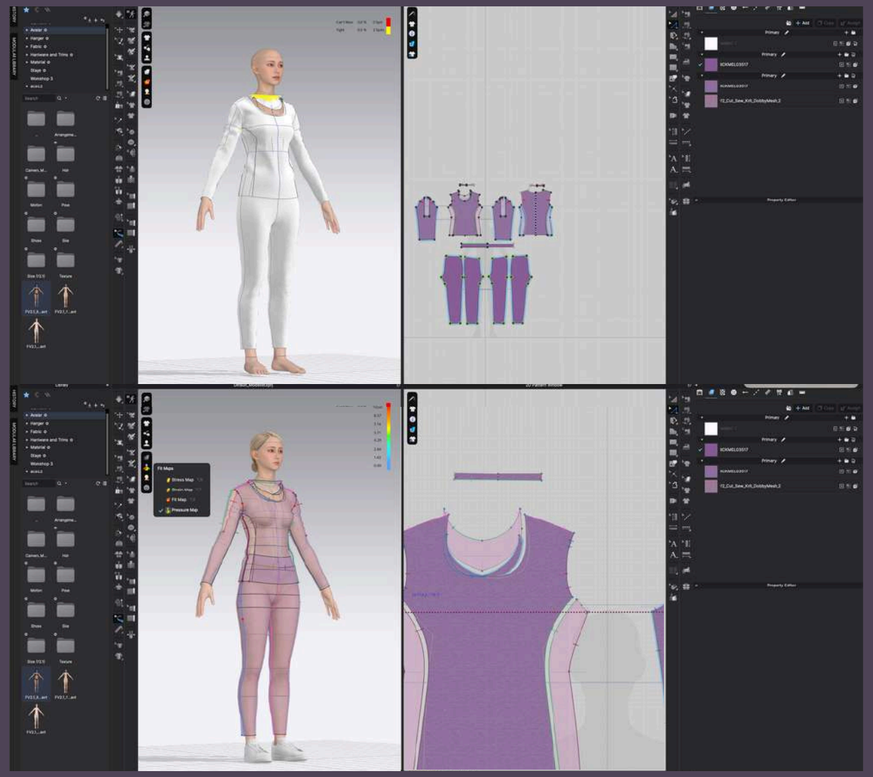
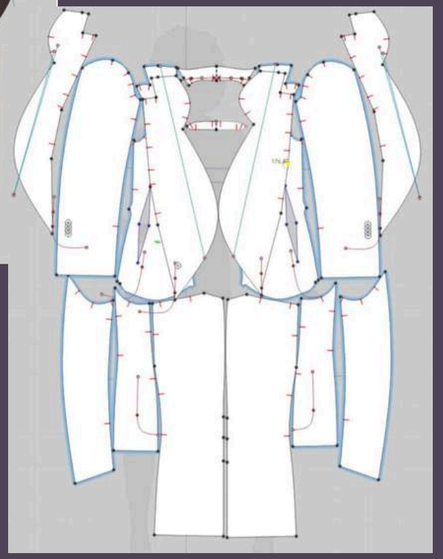


Figure 4: Mood board created inspired by the research on RTW X Sportswear

The mood board (see figure 4) visually underlines this synthesis by featuring minimalist shapes, upgraded athletic staples, neutral tones and legacy allusions in vintage media and tactile textures. Together, these aspects convey a clear message, today's consumers demand clothing that reflect their values of performance, sustainability and timeless design. Nike's status as a sportswear symbol is quietly repurposed in a new context, where functionality blends perfectly with elegance. This collection idea and accompanying research highlight the rising desire for transitional, flexible apparel that transcends trends, promoting both personal expression and ethical consumerism. Finally, RTW & Sportswear offers a concept of modern attire that responds to flexible lives and demonstrates that practicality and luxury may coexist together.

Clo3D virtual design software - pattern making & layout





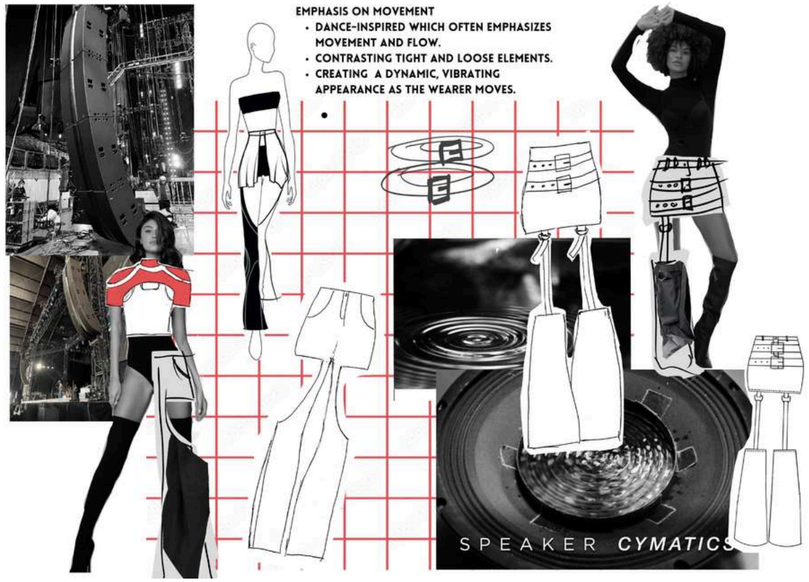
PROJECT VIBRATION - Design Development

FESTIVALS ARE VIBRANT ENVIRONMENTS WHERE MUSIC, LIGHT, AND MOVEMENT COME TOGETHER TO CREATE UNFORGETTABLE EXPERIENCES.

THIS COLLECTION DRAWS INSPIRATION FROM THE PULSATING BEATS OF MUSIC FESTIVALS, TRANSLATING THE RHYTHM AND ENERGY INTO WEARABLE GORPCORE OUTFITS. VIBRATION, AS A CORE ELEMENT, SYMBOLIZES THE HEARTBEAT OF THE FESTIVAL SCENE—DYNAMIC, IMMERSIVE, AND ENGAGING.

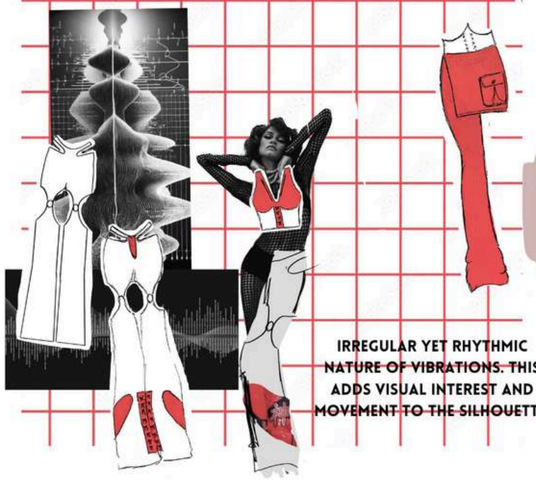
EMPHASIS ON MOVEMENT

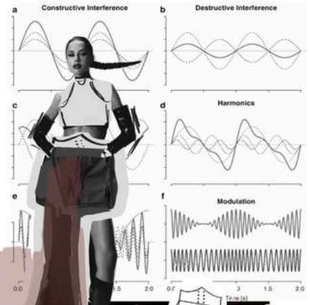
- DANCE-INSPIRED WHICH OFTEN EMPHASIZES MOVEMENT AND FLOW.
- CONTRASTING TIGHT AND LOOSE ELEMENTS.
- CREATING A DYNAMIC, VIBRATING APPEARANCE AS THE WEARER MOVES.



WAVE-INSPIRED SHAPES

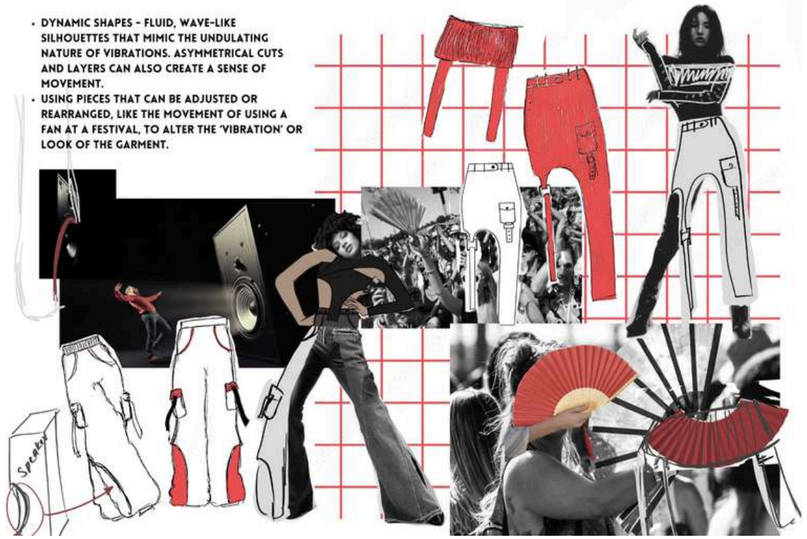
- UNDULATING LINES: CREATE GARMENTS WITH FLUID, WAVE-LIKE HEMS, NECKLINES, AND SEAMS THAT MIMIC THE NATURAL UNDULATIONS OF SOUND WAVES.



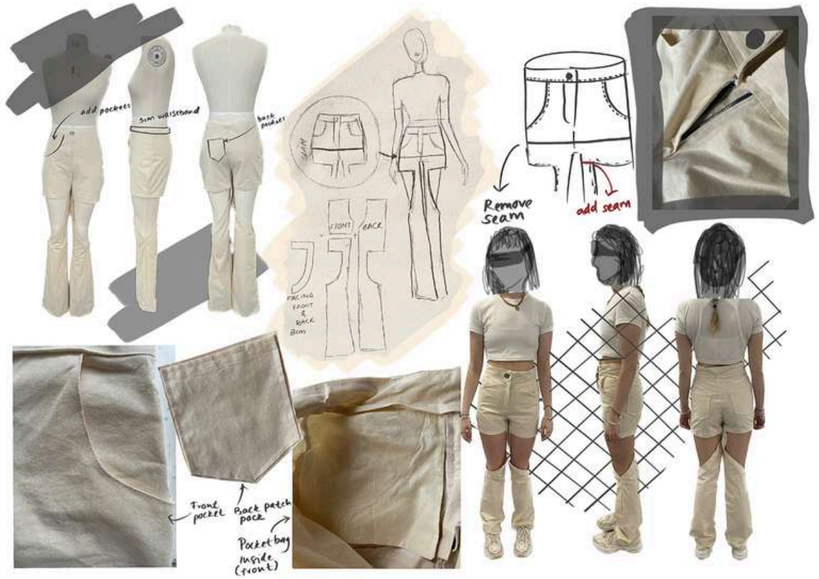


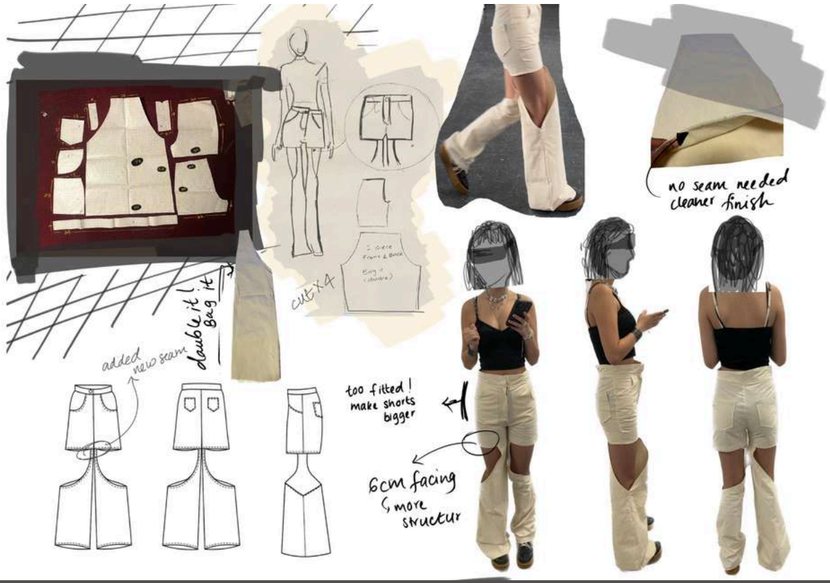
IRREGULAR YET RHYTHMIC NATURE OF VIBRATIONS. THIS ADDS VISUAL INTEREST AND MOVEMENT TO THE SILHOUETTE.

- DYNAMIC SHAPES - FLUID, WAVE-LIKE SILHOUETTES THAT MIMIC THE UNDULATING NATURE OF VIBRATIONS. ASYMMETRICAL CUTS AND LAYERS CAN ALSO CREATE A SENSE OF MOVEMENT.
- USING PIECES THAT CAN BE ADJUSTED OR REARRANGED, LIKE THE MOVEMENT OF USING A FAN AT A FESTIVAL, TO ALTER THE 'VIBRATION' OR LOOK OF THE GARMENT.



PROJECT VIBRATION - Toile Development & Manifacture





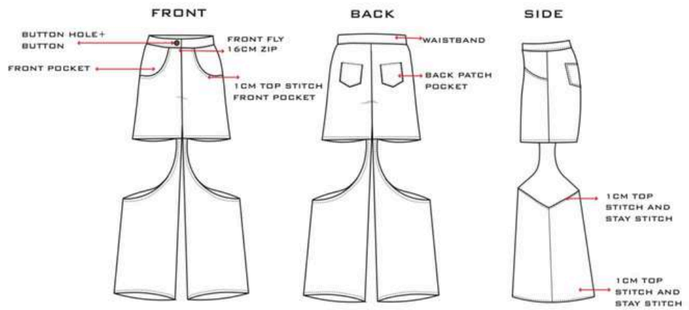
PROJECT VIBRATION - Tech Pack

TECH PACK // OVERVIEW

DESCRIPTION : WOMENS TROUSER-
BRAND : FDT LBORO
DESIGNER : T.COREA

SEASON / COLLECTION : SPRING SUMMER 25
STYLE CODE : FDTLBORO-LOOK5
MAIN FABRIC COMPOSITION : WOOL
POCKET BAG FABRIC COMPOSITION : COTTON LIGHT-

COLOUR (MAIN AND POCKET) : BLACK
SIZE RANGE (UK) : 6 8 10 12 14
SAMPLE SIZE : 12
SAMPLE RECEIVED BY : 31/05/2024

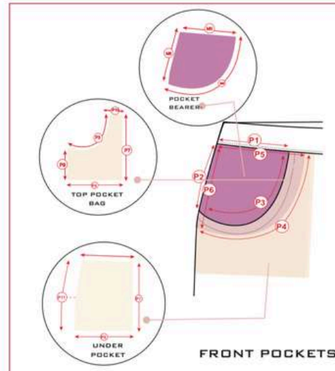


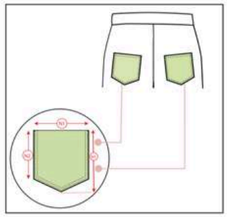
TECH PACK // POCKET CONSTRUCTION

DESCRIPTION : WOMENS TROUSER-
BRAND : FDT LBORO
DESIGNER : T.COREA

SEASON / COLLECTION : SPRING SUMMER 25
STYLE CODE : FDTLBORO-LOOK5
MAIN FABRIC COMPOSITION : WOOL
POCKET BAG FABRIC COMPOSITION : COTTON LIGHT-

COLOUR (MAIN AND POCKET) : BLACK
SIZE RANGE (UK) : 6 8 10 12 14
SAMPLE SIZE : 12
SAMPLE RECEIVED BY : 31/05/2024



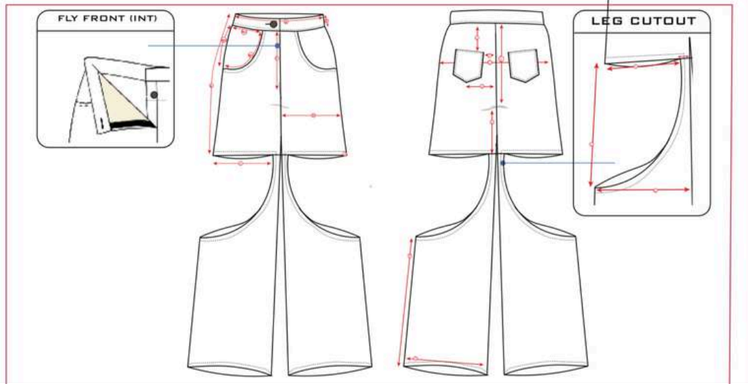


TECH PACK // POINTS OF MEASURE

DESCRIPTION : WOMENS TROUSER-
BRAND : FDT LBORO
DESIGNER : T.COREA

SEASON / COLLECTION : SPRING SUMMER 25
STYLE CODE : FDTLBORO-LOOK5
MAIN FABRIC COMPOSITION : WOOL
POCKET BAG FABRIC COMPOSITION : COTTON LIGHT-

COLOUR (MAIN AND POCKET) : BLACK
SIZE RANGE (UK) : 6 8 10 12 14
SAMPLE SIZE : 12
SAMPLE RECEIVED BY : 31/05/2024

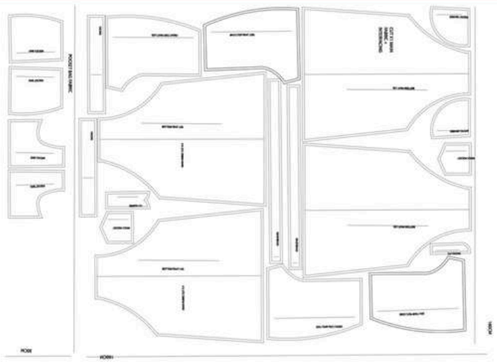


TECH PACK // LAYPLAN

DESCRIPTION : WOMENS TROUSER-
BRAND : FDT LBORO
DESIGNER : T.COREA

SEASON / COLLECTION : SPRING SUMMER 25
STYLE CODE : FDTLBORO-LOOK5
MAIN FABRIC COMPOSITION : WOOL
POCKET BAG FABRIC COMPOSITION : COTTON LIGHT-

COLOUR (MAIN AND POCKET) : BLACK
SIZE RANGE (UK) : 6 8 10 12 14
SAMPLE SIZE : 12
SAMPLE RECEIVED BY : 31/05/2024



TECH PACK // BILL OF MATERIALS

DESCRIPTION : WOMENS TROUSER-
BRAND : FDT LBORO
DESIGNER : T.COREA

SEASON / COLLECTION : SPRING SUMMER 25
STYLE CODE : FDTLBORO-LOOK5
MAIN FABRIC COMPOSITION : WOOL
POCKET BAG FABRIC COMPOSITION : COTTON LIGHT-

COLOUR (MAIN AND POCKET) : BLACK
SIZE RANGE (UK) : 6 8 10 12 14
SAMPLE SIZE : 12
SAMPLE RECEIVED BY : 31/05/2024

	DESCRIPTION	PLACEMENT	CONTENT	COLOUR	QTY	SIZE / WIDTH
FABRIC	Wool	Main garment	100% wool	Natural		190 cm
	Lightweight cotton	Pocket bags (top and under)	100% cotton lightweight	Black		30 cm
	Interfacing	Fly front	100% polyester	Black		60 cm
TRIMS	Zipper	Centre front - fly front		Black	1	16 cm
	4-hole button	Centre front	Resin	Black	1	1.5 cm
THREAD	Cotton thread	Whole garment	100% cotton	Black	1 spool	
LABELS	Main label	Centre back - waistband interior	Calico written	White	1	
	Care label	-	-	White	1	
	Hang tag	-	-		1	
PACKAGING	Poly bag		Non-woven polypropylene	Transparent	1	
	Wooden hanger		Wood	White	1	

TECH PACK // MEASUREMENTS

DESCRIPTION : WOMENS TROUSER-
BRAND : FDT LBORO
DESIGNER : T.COREA

SEASON / COLLECTION : SPRING SUMMER 25
STYLE CODE : FDTLBORO-LOOK5
MAIN FABRIC COMPOSITION : WOOL
POCKET BAG FABRIC COMPOSITION : COTTON LIGHT-

COLOUR (MAIN AND POCKET) : BLACK
SIZE RANGE (UK) : 6 8 10 12 14
SAMPLE SIZE : 12
SAMPLE RECEIVED BY : 31/05/2024

	PONT OF MEASURE (MEASURED ON THE FLAT)	(cm)
A	Waist width (at waist seam)	38.0
B	Waistband height	4.0
C	Hip	45.0
D	Inseam length (from crotch to hem edge)	18.0
E	Outseam (top of waistband to hem bottom edge)	42.0
F	Front rise (from crotch not including waistband)	27.0
G	Back rise (from crotch not including waistband)	38.0
H	Thigh (1 inch below crotch)	25.0
I	Leg opening (edge to edge)	27.0
J	Hem height (bottom edge to furthest topstitch seam)	1.0
K		6.5
L		4.0
P1	Front pocket opening	10
P2	Front pocket opening (along sideseam)	8.0
P3	Front pocket opening (following contour of opening)	16.0
P4	Front pocket bearer (following contour)	24.0
P5	Front pocket bearer top (from waistband)	13.0
P6	Front pocket bearer side (along sideseam)	14.0
P7	Front top + under pocket bag height (closest to CF)	23.0
P8	Front top + under pocket bag width	18.0
P9	Front top + under pocket bag height (along sideseam)	12.0
P10	Front top pocket bag top (from waistband)	4.0
P11	Front under pocket bag top (from waistband)	22.0
N1	Back pocket bag width	12.5
N2	Back pocket bag height to point	14.0
N3	Back pocket bag height	11.0
O	Back pocket placement (top of pocket to waistband)	5.0
M	Back pocket placement (top of pocket to CB seam)	4.0
Q	Back pocket placement (bottom pocket point to CB seam)	6.0
R	Fly width	4.0
S	Fly length	15.0
T	Bottom leg length	52.0
U	bottom leg width	38.0

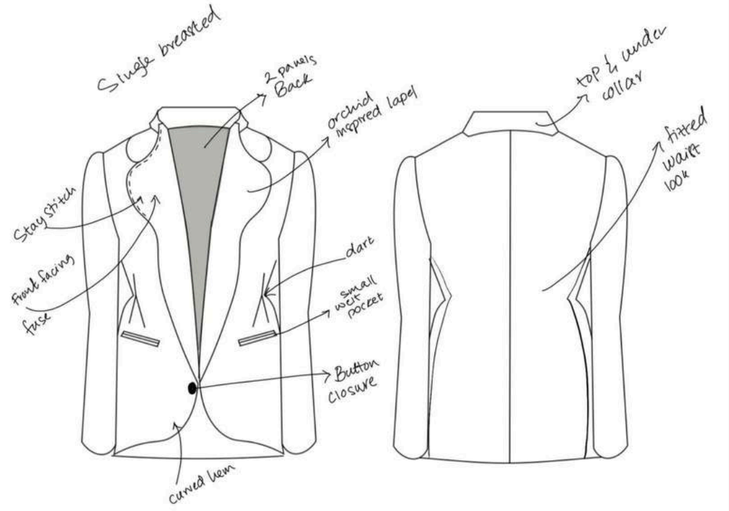
PROJECT: Botanic Batik Tailoring - Design Development

Closeup of orchid throats

natural petal curvature

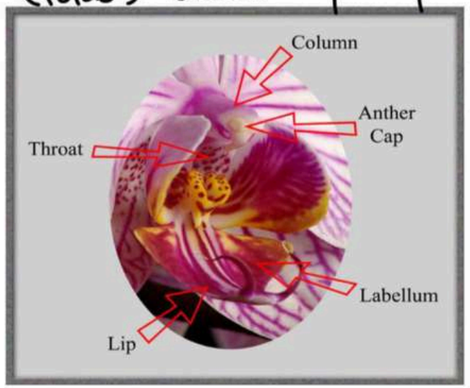
side view

showing the layered petal formation

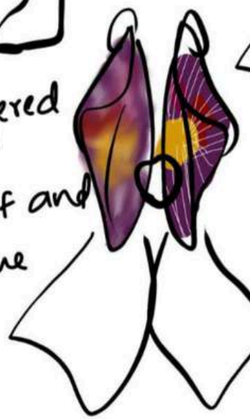


colour transition

Structured shoulder (folds) lines



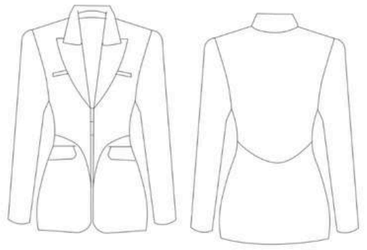
double layered fabric - so it's stiff and softer at the edges

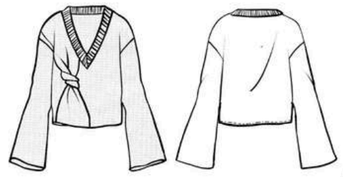


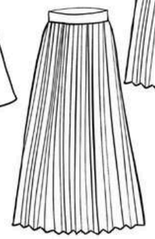
PROJECT: Botanic Batik Tailoring -Technical Flats

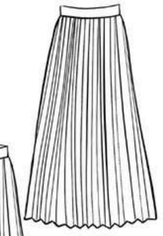
Craft	Handprinted Batik
Material	Cotton
Pattern	Abstract
Color	Red
GSM	Weight: 110 | Width: 45" (115 cms)
Origin	India

LOOK 1



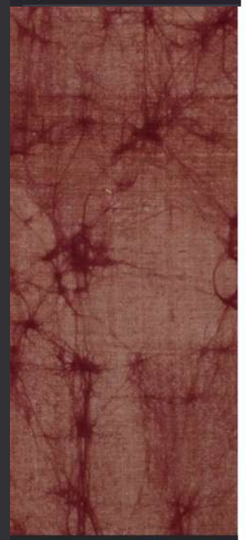






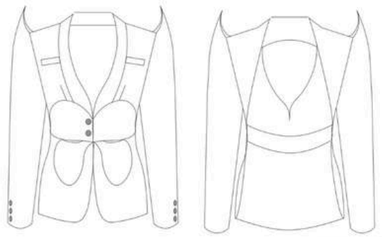
White Sheer Viscose Lightweight Fabric
65% recycled viscose, 35% polyamide

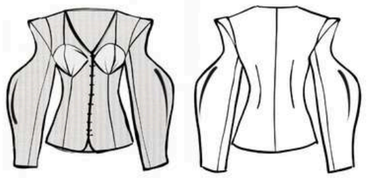
Plain bamboo jersey
95 % Bamboo 5%Elastane

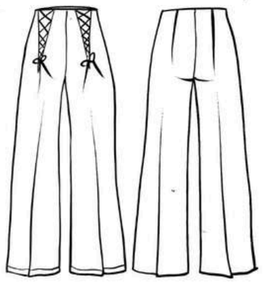


Craft	Handprinted Batik
Material	Handspun Khadi , Cotton
Pattern	Abstract
Color	Brown
GSM	Weight: 92 | Width: 45" (115 cms)
Origin	India

LOOK 3

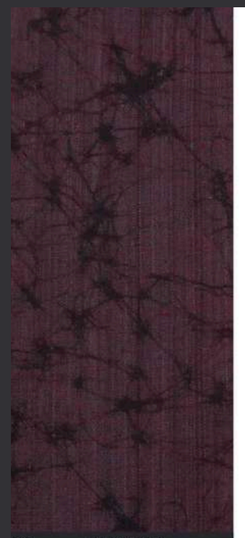






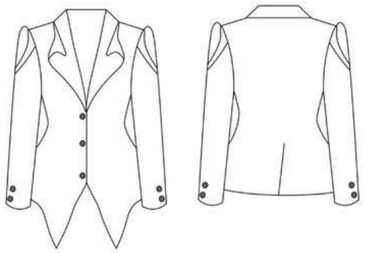
Cotton silk grid-textured batik
GSM 120

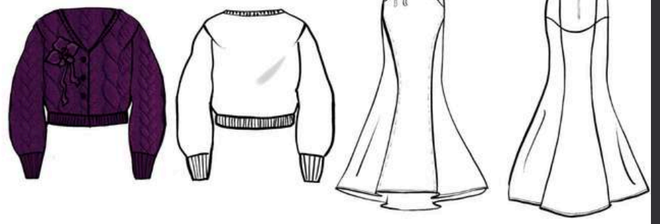
100% Cotton twill



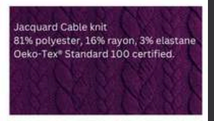
Craft	Handprinted Batik
Material	Cotton
Pattern	Abstract
Color	Plum
GSM	Weight: 95 | Width: 45" (115 cms)

LOOK 2





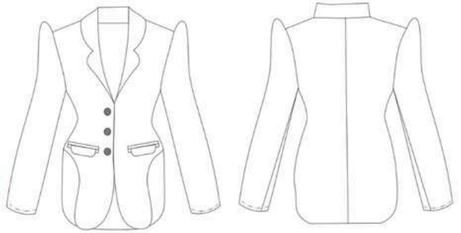
Jacquard Cable knit
81% polyester, 16% rayon, 3% elastane
Oeko-Tex® Standard 100 certified.

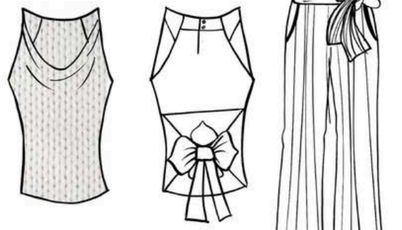


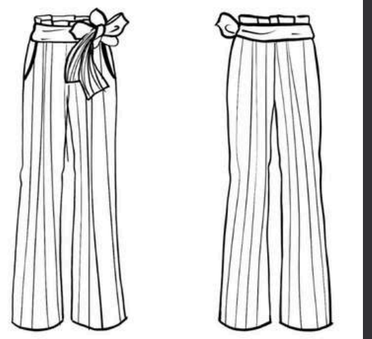
Yarn dyed khadi cotton chambray
GSM 158

Craft	Handprinted Batik
Material	Cotton
Pattern	Abstract
Color	Purple
GSM	Weight: 110 | Width: 45" (115 cms)
Origin	India

LOOK 4







Lyocell, Tencel Twill
200 GSM

Stockinette Stitch
wool knit organic cotton
GSM 170