

CUET · HOME SCIENCE · CLASS XII · CODE 315

Design for Fabric and Apparel

CUET unit: Fabric and Apparel — Design for Fabric and Apparel

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Snapshot

- Opens Unit IV (Fabric and Apparel) of Class XII and lays the conceptual base for fashion design, merchandising, garment production, conservation and care.
- Defines design as "harmony in form" — the planning and creation of an article for a specific purpose, not mere decoration; integrates aesthetics with utility.
- Distinguishes Structural design (form-based: fibre, yarn, weave, cut/silhouette) from Applied design (super-imposed: dyeing, printing, embroidery, trims/ notions).
- Systematically lists the Elements of Design (colour, texture, line, shape/form) and Principles of Design (proportion, balance, emphasis, rhythm, harmony) — the "tools" and "rules" of the Art.
- Covers colour theory (VIBGYOR, Munsell wheel, hue/value/intensity), Pantone shade card, colour schemes (related and contrasting), career scope and three practicals (Tie & Dye, Batik, Block Printing).

Detailed Notes

2.1 Core concepts

- Textile materials such as cotton, wool, linen and silk have been used since pre-historic times for apparel, household articles, fishing nets, ropes and ships' sails; manufactured and synthetic fibres were added in the last century (NCERT Unit IV Introduction, p. 154).
- Class XII Fabric and Apparel study covers Design in Fabric and Apparel, Fashion Design and Merchandising, Production and Quality Control in the Garment Industry, Conservation of textile products in museums, and Care and Maintenance of Fabrics in Institutions (NCERT Unit IV Introduction, p. 155).
- Design is "the human power to conceive, plan, and realise products that serve human beings in the accomplishment of any individual or collective purpose"; a good design integrates aesthetics with utility and price, colour and service (NCERT §Introduction/ Basic Concepts, p. 157–158).
- Design Analysis is studied in two aspects — **Structural** (depends on form, not super-imposed ornamentation; in fabric = fibre/yarn/weave; in dress = cut or silhouette) and **Applied** (super-imposed on the basic structure; fabric finishes,

- dyeing, printing, embroidery, trims and notions/fasteners) (NCERT §Basic Concepts, p. 158).
- Design has two main factors: **Elements of Design** (the tools — colour, texture, line, shape or form) and **Principles of Design** (harmony, balance, rhythm, proportion, emphasis) (NCERT §Basic Concepts, p. 158).
 - Colour is reflection of light striking an object; when all rays are reflected the object appears white, when none are reflected it appears black (NCERT §Elements of Design — Colour Theory, p. 159).
 - Sunlight scattered by raindrops gives the spectrum **VIBGYOR** — Violet, Indigo, Blue, Green, Yellow, Orange, Red; sunlight also contains ultra-violet and infra-red rays (NCERT §Understanding Colour box, p. 159).
 - Short-wavelength rays (green, blue-green, blue, purple) are **receding or restful** colours; longer wavelengths (red, orange, yellow) are **advancing or stimulating** colours (NCERT §Elements of Design, p. 159).
 - Colour is specified in three aspects: **Hue** (common name; Munsell's wheel — Primary = red, yellow, blue; Secondary = orange, green, violet; Tertiary/intermediates = red-orange, yellow-orange, yellow-green, blue-green, blue-purple, red-purple); neutrals (white, black, grey, silver, metallics) are **achromatics** (NCERT §Elements of Design, p. 159–160).
 - **Value** = lightness or darkness of a hue (tint when approaches white, shade when approaches black). Grey Scale and Value Chart is an 11-point scale (0–10) with 0 = black, 10 = white, 5 = mid grey/hue (NCERT §Elements, p. 160; Fig. 11.2 Grey Scale).
 - **Chroma or intensity** = brightness or purity of a colour; dullness results when a colour is blended with the colour opposite to it on the wheel (NCERT §Elements, p. 161).
 - **Pantone Shade Card** assigns a code number to each hue, tint and shade for international recognition — aids fashion forecasting and overseas orders (NCERT §Elements, p. 162; Fig. 11.4–11.5).
 - Colour application in fabric: **Fibre stage** is rarely done (most expensive, used only for hard-to-dye manufactured fibres or multicoloured yarns); **Yarn stage** produces stripes, checks, plaids, chambrays, Brocade, Jacquard, Ikat (tie-dyed yarns); **Fabric stage** is the most common (tie and batik); and colour can also be added by painting, printing, embroidery, patch or appliqué (NCERT §Colour in Fabric, p. 162–163).
 - Colour schemes are of two groups — **Related** (Monochromatic, Achromatic, Accented neutral, Analogous) and **Contrasting** (Complementary, Double complementary, Split complementary, Analogous complementary, Triadic) (NCERT §Colour Schemes, p. 163–164).
 - **Texture** is the sensory impression of sight and touch — described by how it looks (shiny/dull/opaque/transparent/glossy), how it behaves (limp/stiff/clinging/flowing), how it feels (soft/crisp/harsh/smooth/rough/grainy/pebbly) (NCERT §Texture, p. 164).

- Factors determining textile texture: fibre content; yarn processing & type; fabric construction technique (weaving, knitting, felting, braiding, lace); fabric finishes (starching, sizing, ironing, calendaring, tentering, napping, fulling); surface ornamentation (tufting, flock printing, embroidery, stitched effects) (NCERT §Texture, p. 164).
- **Line** connects two points; the two basic types are **Straight** (vertical = height/dignified/reserved; horizontal = width/stable/placid; oblique/diagonal = active, dramatic) and **Curved** (long flowing = graceful; large rounded = dramatic; tiny puffy = youthful). Straight lines = masculine/force; curved lines = femininity/daintiness (NCERT §Line, p. 165–166).
- **Shapes/Forms** are made by connecting lines; four basic groups — **Natural, Stylised, Geometric, Abstract**. In fabric shape refers to fall/drape and motif placement; in apparel it represents silhouette, cut and detailing. **Patterns** form when shapes are grouped (NCERT §Shapes/Forms & Patterns, p. 166–167).
- **Proportion** = relation of one part to the whole; based on the **golden mean** ratios 3:5:8 or 5:8:13 — e.g., blouse:skirt:total = 3:5:8; shirt:pant:total = 5:8:13. Equal divisions make a person look shorter & wider; unequal divisions look slimmer (NCERT §Proportion, p. 167–168).
- **Balance** = equalling the distribution of weight from the central point; achieved in three ways — **Formal** (symmetrical, least expensive, dignified but monotonous), **Informal**, and **Radial**. Horizontal balance is used to correct figure problems (e.g., dark hue for big size) (NCERT §Balance, p. 168).
- **Emphasis** = focal point first attracting the eye; created by colour, design lines, detailing or accessories; the face is the cultural focal point (embroidered yoke / contrasting blouse) (NCERT §Emphasis, p. 168).
- **Rhythm** = repeating of lines, colours or details to create visual unity; created by **Repetition** (laces, buttons, piping), **Cordation/Gradation** (gradual increase/decrease of motifs), **Radiation** (from a central point — gathers in waist/yoke), and **Parallelism** (tucks in a yoke, knife pleats) (NCERT §Rhythm, p. 168–169).
- **Harmony/Unity** = all elements together giving a pleasing effect; achieved through harmony of shape (collar, cuff, hem all curved if square pockets disrupt) and harmony of texture (silk kurta with silk salwar; silk kurta + cotton dupatta = bad harmony) (NCERT §Harmony, p. 169).
- **Composition** is an artwork developed by arranging elements of design and applying principles; can be 2-D or 3-D (NCERT §Composition, p. 169; Fig. 11.7).
- **Preparing for a career / Scope**: Field has become so vast it is split into two specialisations — Fabric design and Apparel design. Textile fashion has a quicker turnaround than furnishing design. Designers work in industry, design agencies or as freelancers (NCERT §Preparing for a career & Scope, p. 169–170).
- **Practical 1 — Tie and Dye**: oldest form of designing with colour; resist dyeing using thread, clay or wax. Techniques: Knotting, Marbling, Binding (lehria/bandhej),

Trik/ sewing, Folding. **Bandhani, chunari, laheria** are products. Gujarat and Rajasthan are homes of this fabric (NCERT Practical 1, p. 171–173).

- **Practical 2 — Batik:** resist printing where wax is applied; dyeing done in cold (below 35 °C) to avoid melting wax. The beauty of batik lies in cracks of wax letting colour enter. Wax application by Painting, Outlining, Dry brushing, Scratching; wax removed by freezing and hot-pressing between absorbent paper (NCERT Practical 2, p. 174–175).
- **Practical 3 — Block Printing:** one of the oldest methods; a separate block (mostly wood, sometimes metal-reinforced) is needed for each colour; design area raised, background carved away; multicoloured block printing starts with the **outline block in the darkest colour** then fills with lighter colours (NCERT Practical 3, p. 175).

This chapter opens the Class XII Fabric and Apparel unit and lays the foundation for fashion design (lehe202), garment production (subsequent units), and textile conservation. It is unique in HEFS Class XII for being part-art-theory, part-textile-chemistry — combining design vocabulary with practical Indian craft techniques.

The conceptual hierarchy: Design → Design Analysis (Structural + Applied) → Design Factors (Elements + Principles). Elements are the 'building blocks' — colour, texture, line, shape/form. Principles are the 'rules' that govern combination — harmony, balance, rhythm, proportion, emphasis. CUET commonly tests this binary; students often invert which set is 'tools' (Elements) and which is 'rules' (Principles).

Colour theory occupies the largest portion. The VIBGYOR spectrum (Violet, Indigo, Blue, Green, Yellow, Orange, Red) is the basis; Newton's prism experiment is the underlying physics. The Munsell colour wheel — 12 hues comprising 3 primaries (red, yellow, blue), 3 secondaries (orange = R+Y, green = Y+B, violet = R+B), and 6 tertiaries (red-orange, yellow-orange, yellow-green, blue-green, blue-purple, red-purple) — is the framework. Achromatics (white, black, grey, silver, metallics) are 'colours without colour' and stand outside the wheel.

Each colour has three aspects: Hue (the colour's name), Value (lightness/darkness — tint approaches white, shade approaches black, measured on Munsell's 11-point grey scale 0-10), and Chroma/Intensity (purity/brightness — dulled by adding the complement). Wavelength sensitivity classifies colours as Receding (short wavelength — green/blue/purple — restful, perceptually distant) or Advancing (long wavelength — red/orange/yellow — stimulating, perceptually close). The slimming effect of dark colours and the heightening effect of vertical lines are practical applications of these perceptual phenomena.

Colour-application stages: Fibre stage (most expensive, used only for hard-to-dye synthetic fibres or yarn-dyeing requirements), Yarn stage (gives woven stripes, checks, plaids, chambrays, Brocade, Jacquard, Ikat), Fabric stage (most common — tie-and-dye, batik, screen-printing, block-printing, roller-printing), and Garment stage (post-construction dyeing, embroidery, applique). The Pantone Shade Card / Pantone Matching System (PMS) gives every hue/tint/shade a numerical code (e.g., Pantone

18-3949 'Very Peri', Pantone Color of the Year 2022), enabling unambiguous international communication for fashion forecasting and overseas orders.

Colour schemes: Related schemes (at least one hue in common — Monochromatic, Achromatic, Accented neutral, Analogous) vs Contrasting schemes (no hue in common — Complementary, Double complementary, Split complementary, Analogous complementary, Triadic). CUET frequently asks for classification of a specific scheme.

Texture is the multisensory impression of a textile — visual (shiny/dull/transparent/glossy), behavioural (limp/stiff/flowing/clinging), tactile (smooth/rough/soft/crisp/pebbly). Texture is determined by fibre content, yarn type, fabric construction, finishes, and surface ornamentation.

Line and shape: Vertical lines convey height, dignity, reserve; horizontal lines convey width, stability, calm; diagonal lines convey activity and drama; long curved lines convey grace; large rounded curves convey drama; small puffy curves convey youthfulness. Straight lines suggest masculinity and force; curved lines suggest femininity and daintiness. Shapes/forms fall into four families: Natural (leaves, flowers, animals), Stylised (geometric simplification of nature), Geometric (square, circle, triangle), Abstract (free-form non-representational). When shapes group, they form Patterns.

Principles of design: Proportion (relation of part to whole, anchored in the golden mean ratios 3:5:8 or 5:8:13; unequal divisions slim, equal divisions widen); Balance (Formal/symmetrical — dignified, monotonous, least expensive; Informal/asymmetrical — sophisticated; Radial — emanating from a centre); Emphasis (focal point first attracting the eye — typically the face in cultural terms); Rhythm (visual repetition — Repetition, Cordation/Gradation, Radiation, Parallelism); Harmony (unity through shape harmony, texture harmony, line harmony, colour harmony).

Three practicals introduce Indian craft techniques. Tie and Dye is the oldest form of designing with colour — a resist technique using thread, clay or wax; key techniques are Knotting, Marbling, Binding (lehria/bandhej), Tritik/sewing, Folding. Gujarat (Jamnagar bandhani) and Rajasthan (Jaipur, Jodhpur lehria) are the heart of Indian tie-and-dye; the GI-tagged bandhani sarees of Kutch and Jaipur are iconic. Batik (originally Indonesian, popularised in India by Santiniketan, Bengal) is wax-resist printing — wax applied by painting, outlining, dry brushing, scratching; dyeing in cold (<35°C) prevents wax melt; the cracks in wax are the signature aesthetic; wax removed by freezing and hot-pressing between absorbent paper. Block Printing is one of the oldest Indian printing methods — wooden (sometimes metal-reinforced) blocks, design area raised, background carved away, separate block per colour; multicoloured printing begins with the outline block in the darkest colour and proceeds to lighter colours. India's block-printing centres are Sanganer/Bagru (Rajasthan), Pethapur (Gujarat), Bagh (MP), Farrukhabad (UP) and Machilipatnam Kalamkari (AP).

2.2 Definitions to memorise

Term	Definition	Page
Design	Human power to conceive, plan and realise products that serve human purposes; harmony in form (aesthetics + utility)	157–158
Structural design	Design that depends on form, not super-imposed ornamentation; fibre/yarn/weave; cut/silhouette in dress	158
Applied design	Design super-imposed on the basic structure — dyeing, printing, embroidery, trims, notions	158
VIBGYOR	Seven colours of the visible spectrum — Violet, Indigo, Blue, Green, Yellow, Orange, Red	159
Hue	Common name of a colour	159
Value	Lightness or darkness of a hue (tint or shade)	160
Chroma / Intensity	Brightness or purity of a colour	161
Achromatics	Colours without colour — white, black, grey, silver, metallics	160
Tint	Hue approaching white (high value)	160
Shade	Hue approaching black (low value)	160
Pantone Shade Card	International code-numbered card of hues/tints/shades used in fashion forecasting	162
Monochromatic harmony	Related scheme using one hue varied in value and/or intensity	163
Complementary harmony	Contrasting scheme using two hues directly opposite on the colour wheel	163
Triadic harmony	Combination of three hues equidistant on the colour wheel	164
Texture	Sensory impression of sight and touch — tactile and visual qualities of the material	164
Golden mean	Ratio (3:5:8 or 5:8:13) on which proportion of a garment is based	167
Formal balance	Symmetrical balance — least expensive, dignified but tends to be monotonous	168
Emphasis	The focal point of a garment that first attracts the viewer's eye	168
Rhythm	Repeating of lines, colours or details creating visual unity	168
Bandhej / Laheria	Tie-and-dye patterns of dots (bandhej) and diagonal stripes (laheria) from Gujarat & Rajasthan	171
Batik	Resist printing using wax; dyeing done below 35 °C; beauty lies in cracks in wax	174

2.3 Diagrams / processes to remember

- **Fig. 11.1 Colour Wheel** (p. 160): Primary (red, yellow, blue — circles), Secondary (orange, green, violet — squares), Tertiary (six intermediates — small triangles).
- **Fig. 11.2 Grey Scale** (p. 161): 11-point (0–10) scale, BLACK at 0, GREY at 5, WHITE at 10; horizontally labelled S-H-A-D-E-HUE-T-I-N-T-S.
- **Fig. 11.3 Colour Shades & Tints** (p. 161): Shades (0–5 Dark Value) and Tints (10–5 Light Value).
- **Fig. 11.4 / 11.5 Pantone Shade Card & Colour Chart** (p. 162): fanned shade card and PMS-numbered colour chart for textile orders.
- **Fig. 11.7 Composition** (p. 169): example of arrangement of elements applying design principles.
- **Figs. 11.8–11.12** (p. 171–173): Tie-and-Dye techniques — Knotting, Making a Ball, Coiling, Binding, Folding.

2.5 Key data / design table (Indian context)

Item	Value / fact	Source
Two aspects of design analysis	Structural; Applied	NCERT p. 158
Number of design elements	Four (colour, texture, line, shape/form)	NCERT p. 158
Number of design principles	Five (harmony, balance, rhythm, proportion, emphasis)	NCERT p. 158
VIBGYOR	Violet, Indigo, Blue, Green, Yellow, Orange, Red	NCERT p. 159
Primary colours	Red, Yellow, Blue	NCERT p. 159
Secondary colours	Orange, Green, Violet	NCERT p. 159
Number of tertiary colours	Six	NCERT p. 159
Achromatics	White, Black, Grey, Silver, Metallics	NCERT p. 160
Grey scale range	0 (black) – 10 (white), 5 mid	NCERT p. 161
Receding colours	Green, blue-green, blue, purple	NCERT p. 159
Advancing colours	Red, orange, yellow	NCERT p. 159

Item	Value / fact	Source
Most expensive dyeing stage	Fibre stage	NCERT p. 162
Most common dyeing stage	Fabric stage	NCERT p. 162
Pantone PMS use	International code for fashion forecasting	NCERT p. 162
Related schemes	Monochromatic; Achromatic; Accented neutral; Analogous	NCERT p. 163
Contrasting schemes	Complementary; Double-complementary; Split-complementary; Analogous-complementary; Triadic	NCERT pp. 163–164
Golden mean ratios	3:5:8 or 5:8:13	NCERT p. 167
Batik dyeing temperature	<35°C	NCERT p. 174
Three resist materials	Thread, clay, wax	NCERT p. 171
Bandhani regions	Gujarat (Jamnagar, Kutch); Rajasthan (Jaipur, Jodhpur)	NCERT p. 171
Block-printing centres (India context)	Sanganer/Bagru (Raj); Bagh (MP); Pethapur (Guj); Machilipatnam Kalamkari (AP)	India context
Block-printing colour order	Outline (darkest) first, lighter colours after	NCERT p. 175

2.4 Common confusions / NTA trap points

- **Primary vs Secondary vs Tertiary colours.** Primaries cannot be produced by mixing (red, yellow, blue); secondaries are mixes of two primaries (orange, green, violet); tertiaries mix a primary with an adjacent secondary (six in total). NTA often swaps these lists.
- **Tint vs Shade.** Tint = hue + white (towards 10 on the grey scale); Shade = hue + black (towards 0). Easy to invert.
- **Value vs Intensity (Chroma).** Value = lightness/darkness; Intensity = brightness/purity. Don't confuse the two aspects of colour.
- **Receding vs Advancing colours.** Short-wavelength (green/blue/purple) are receding/restful; long-wavelength (red/orange/yellow) are advancing/stimulating — NCERT calls them by these specific names.
- **Structural vs Applied design.** Weave and silhouette are **structural**; embroidery, printing, fasteners and trims are **applied**. NTA loves match-the-following on this.

- **Related vs Contrasting schemes.** Monochromatic, Achromatic, Accented neutral and Analogous are **Related**; Complementary, Double complementary, Split complementary, Analogous complementary and Triadic are **Contrasting**.
- **Golden mean ratio.** The ratios are 3:5:8 and 5:8:13 — do not confuse with the Fibonacci numbers beyond. Blouse:skirt:total = 3:5:8.
- **Batik dyeing temperature.** Must be below 35 °C (cold) to avoid melting the wax — a frequent factual trap.
- **Stages of colour application: cheapest vs most common.** Fibre stage = most expensive (rarely done); Fabric stage = most common.
- Texture is **multisensory** — visual + tactile + behavioural — not just touch.
- Rhythm types are four (Repetition, Cordation/Gradation, Radiation, Parallelism), not three.
- Balance has **three** types (Formal, Informal, Radial) — NTA may add Diagonal as a distractor.
- Block-printing **outline block in darkest colour first** — students often think lightest first.

Practice MCQs

PYQ Alignment

This chapter is a high-yield, definition-and-list-heavy opener of Unit IV — CUET typically asks 8–12 MCQs from it each year, mostly direct factual recall on colour theory (VIBGYOR, primary/secondary/tertiary, hue/value/intensity), classification of colour schemes (related vs contrasting), elements vs principles of design, golden-mean ratios, and named techniques in tie-and-dye, batik and block printing.