Module 10

Lecture-1

Introduction to fundamental principles of colour, colour theory: hue, value, saturation, gray scale, cool and warm colour. Visual patterns, textures.

This chapter is an introduction to fundamental principles of colour and colour theory: hue, value, saturation, gray scale, cool and warm colour. Visual patterns, textures etc. Colour is one of the most important and strong design elements.

Colour is a property of light. Our eyes can see only a small part of the electromagnetic spectrum called visible light. Visible light is made up of the wavelengths of light between infrared and ultraviolet radiation (between 400 and 700 nanometers). These frequencies, taken together, make up white (sun) light.

Colour has three distinct properties: hue, value and saturation or intensity. To understand colour you must understand how these three properties relate to each other. Hue is a name of any colour. Value is lightness or darkness of a particular hue. Such as the value of blue hue is dark blue to light blue. Saturation is brightness or dullness of a particular hue which means brightness to dullness of a particular hue. For eg.bright red to dull red. Saturation is concerned with the intensity, or the brightness and dullness of colour. A saturated colour is high in intensity, it is bright. A colour that is dull is unsaturated or low in intensity. Another term for saturation is chroma. A colour without any brightness (no hue) is achromatic (black, white and/or gray-Fig 131) Saturation is the most difficult aspect of colour to understand. Since value and saturation are often confused.

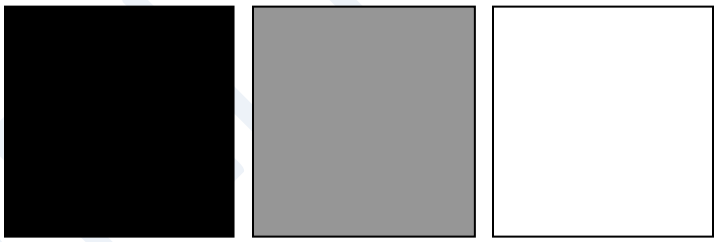


Fig. 131: Achromatic colours

Itten's 12-pointed star expands the colour wheel to include variations in lightness. He was one of the first colour theorists to include not only hue but saturation and values. Black, gray and white may be regarded as colours without any brightness (fig. 131)

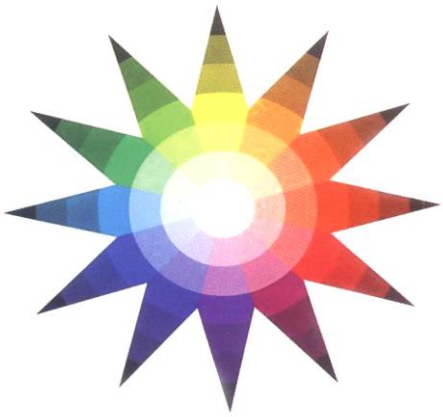


Fig. 132: twelve point colour star

Itten's second colour chart was the wheel. It began in the center with the three pigment primaries – red, yellow and blue. The secondaries were connected to the colours from which they were derived. Tertiaries were then distributed uniformly around to form the wheel. In figure 133 Itten's colour wheel showing primary, secondary and tertiary colours.

Fig. 133: colour wheel.

Lecture-2

Saturation scale:

Make a stepped scale that goes from one hue to its exact complement. The two complementary colours will be the only paints used to make the scale. All of the saturation steps must be equal and an achromatic gray must be in the sequence. There must be at least seven steps in the scale. In this saturation scale the complements are cyan and red. Any set of complements can be used for value scale. With different colours there might be more or fewer steps between the hues and gray. (Fig.134).

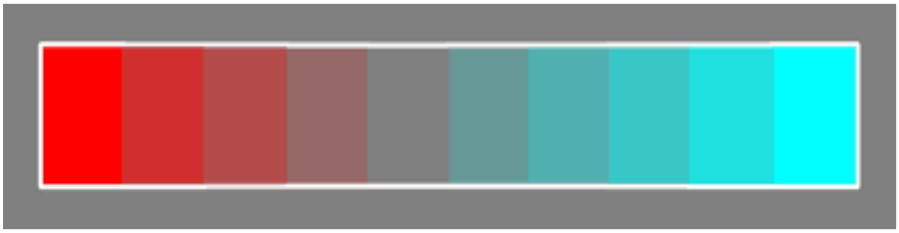


Fig. 134: A stepped scale from red, to its complementary colour, cyan.

The strongest contrast available in pigment colour is black to white. Strong contrast is useful for controlling attention. Colours can contrast but hue and saturation differences are weaker than value contrasts. With or without colour the designer must be aware of the value structure of a composition. The visibility, and hence the readability, of an image depends mostly on the careful use of colour values.

Colour contrasts Why look for contrasts?

Our sense organs (eyes, ears, and nose) can function only by means of comparisonsand hence colour effects are intensified or weakened by contrast.

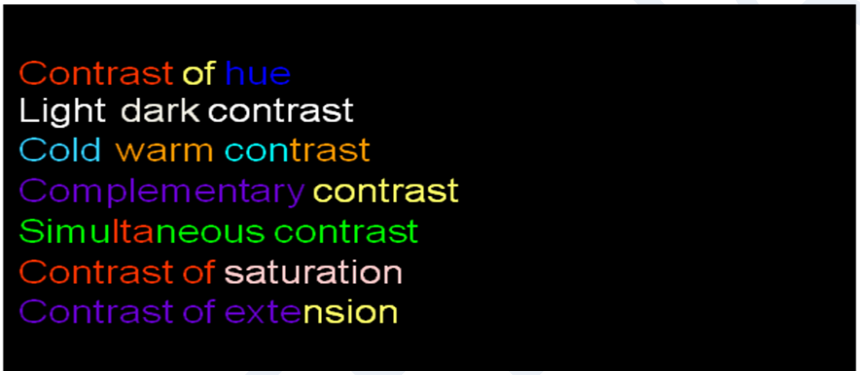


Fig.135: Colour contrast and readability.

The contrast of hue:

The contrast is formed by the juxtaposition of different hues. The greater the distance between hues on a colour wheel, the greater the contrast. The strongest co-hue is of the triad yellow/ red/ blue.
As shown in Fig.136.

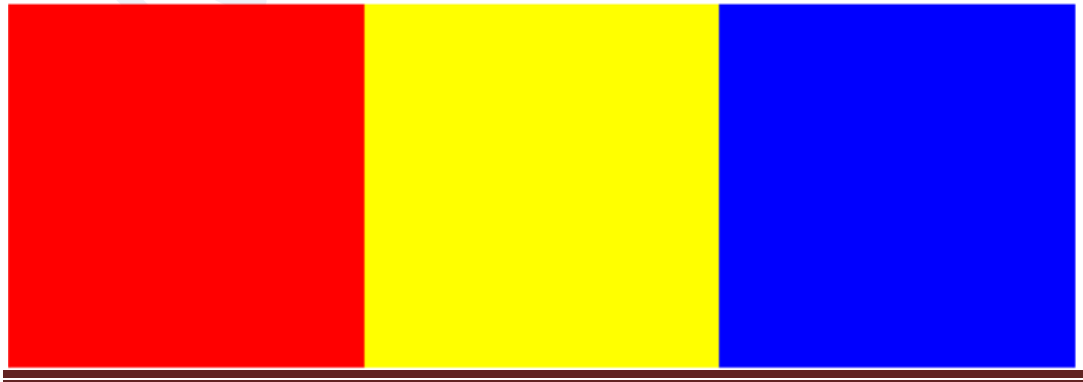


Fig. 136: Strongest co hue

Light dark contrast:

The yellow and violet are the hue of light dark contrast according to the Itten's colour wheel. Therefore this set is a good combination amongst various hues (colours)

Fig. 137: Light dark contrast

Lecture-3

The contrast – interaction:

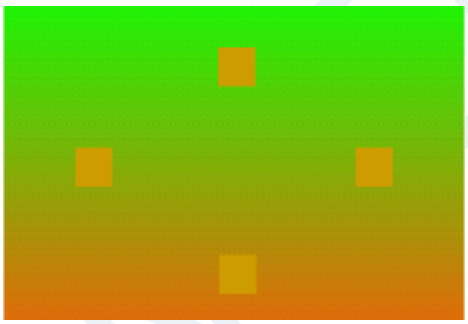


Fig. 138: Colour interaction between green, orange

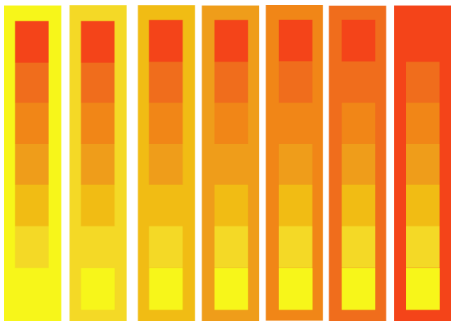


Fig.139: Interaction between red and yellow

Fig. 140: Colour interaction

The blue dots with a cool green background are very subdued, whereas the blue dots on the red background appear very bright, and against yellow background it looks contrast, while all blue dots are the same hue. (Fig 141).

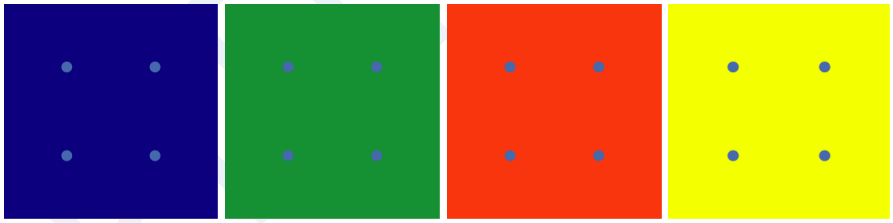


Fig.141: Colours can contrast but hue and saturation differences are weaker than value contrasts

Warm and cool contrast:

The contrast is formed by the juxtaposition of hues considered 'warm' or 'cool.' Red-orange and ice-blue make for an intense cold-warm contrast. It is a proven fact that a difference of 5-7 degrees in the subjective feeling of heat and cold is felt when sitting in a room painted in blue-green as compared to one in red-orange Red-orange/ blue-green exhibit extreme cold-warm contrast .Each complementary pair has its own peculiarities: (Fig. 142) Yellow/ violet are not only complementary but also an extreme light-dark contrast pair Red/green has the same brilliance (Fig.143).

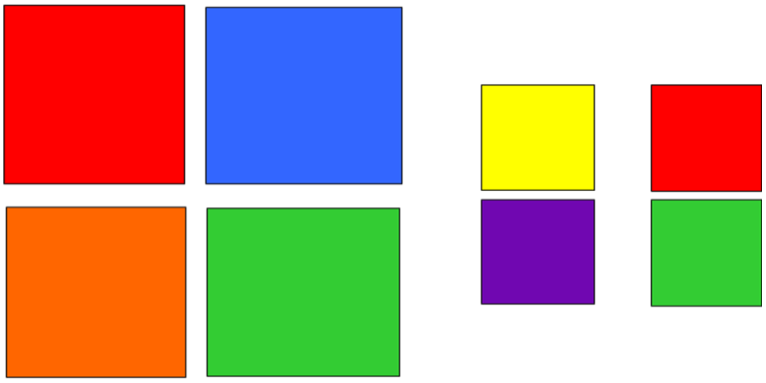


Fig. 142 and 143: Contrast of complements

Contrast of complements:

The contrast is formed by the juxtaposition of perceptual opposites. Two colours are called complementary if on mixing them we get a neutral gray-black. Again, complementaries are a strange pair they are opposites, they incite each other to maximum vividness when adjacent and annihilate to gray-black when mixed.

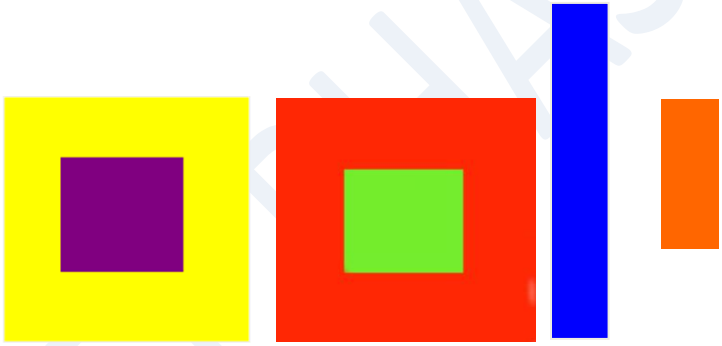


Figure 144 Yellow-Violets, Red-Green, and Orange-Blue

The Rule of Complementary:

Our eyes require any given colour to be balanced by its complementary and will spontaneously generate the latter if it is not present (Itten). This rule of complementary is the basis for harmonious design because its observance establishes a precise equilibrium in the eye.

Two forces determine the force of a colour:

- It's brilliance/intensity.
- It's extent

Brilliance of a particular hue is fixed but we can control its extent. Based on Itten's theory students may do some home work of different colour combination and its extent and brilliance. The ratios of brilliancy are: Yellow-9, Orange-8, Red-6, Green-6, Blue-4, and Violet-3

Fig. 145 Order in brilliance or intensity

In the above example, according to Itten, showing the balance of colour brilliance of yellow (rating -9) with violet colour (rating-3) the proportion ratio is 1: 3.

Lecture-4

Simultaneous contrast:

The contrast is formed when the boundaries between two complementaries perceptually exist. This set of colors creates noise between them and interesting illusions are accomplished. Fig. 146, below.

Fig. 146: Contrast created by complementary colours.

The simultaneously appearing colour not being objectively present but generated in eye induces a feeling of excitement and lively vibration of ever changing intensity.

The contrast of saturation:

The contrast is formed by the juxtaposition of light and dark values and their relative saturation. It is also called Dull-Vivid contrast. It is a contrast between a pure intense colour with a dull, diluted colour. A colour may appear vivid beside a dull tone and dull besides a more intense colour.

Fig. 147: Contrast between a dull and a vivid colour.

The contrast of extension:

Also known as the Contrast of Proportion. The contrast is formed by assigning proportional field sizes in relation to the visual weight of a colour. Harmonious areas yield static and quiet effect. If other than harmonious proportion are used in a colour composition, thus allowing one colour to dominate, then the effect obtained is very expressive or effective in the context of design

Fig. 148. Contrast of extension

Lecture-5

Visual Weight of colour:

When viewing a composition, what we perceive as giving design elements varying degrees of interest. It depends on visual weightage we try to depict in a composition. Typically, visual weight is attributed to objects which are saturated in colour, are larger in size, possess a contrasting value to the rest of the composition, or are placed closer to the edge of the page. Below are examples of such layouts. (Composition).

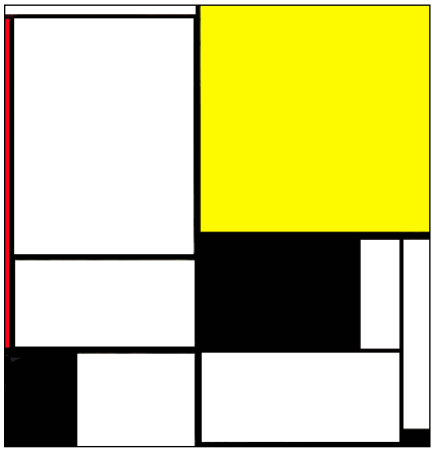


Fig.149: Right Heavy Composition

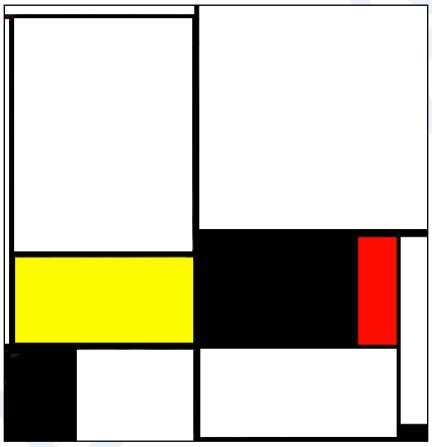


Fig.150: Bottom Heavy Composition

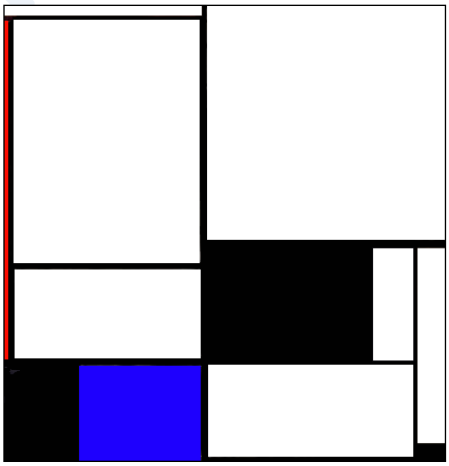


Fig.151: Left Heavy Composition

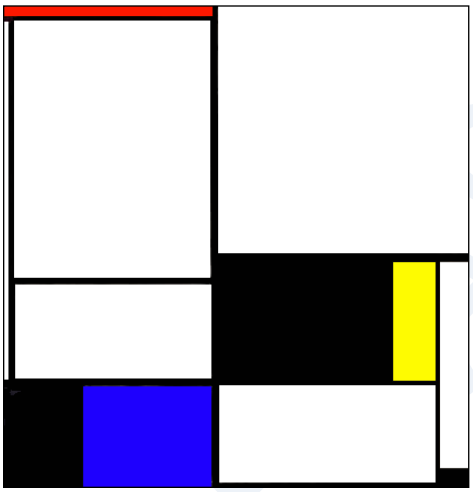


Fig.152. Balance Composition

Colour – Common problems:

Red and Green are pure complements, so they do not work together for text and background. They create noise and fight with each other. Therefore readability decreases. This should be checked out by using other set of complimentary colour. See how two complementaries reduced readability (fig.153)

Fig.153: How two complementarities do not work together

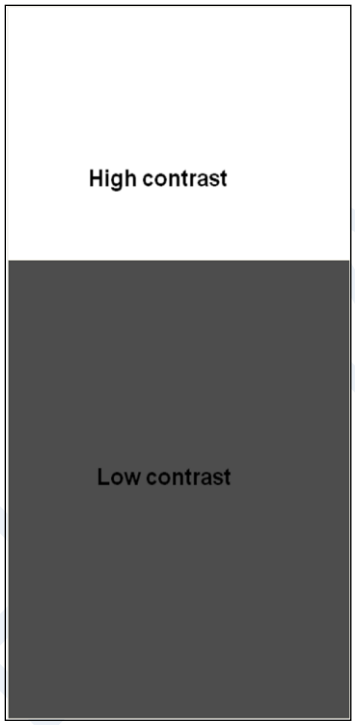


Fig.154: Good contrast is necessary for readability.

If there isn't enough value difference, even if there is a difference in hue (colour), it will be hard to read text. See the fig.155 bellow.

Fig.155: Placing text on background with a wide range of values results in poor readability.

(The above lectures consist of illustrative examples in order to help understand the theory in a simple way followed by a range of hands-on assignments to enrich students manual skill and' understanding about the topic)

Lecture-6

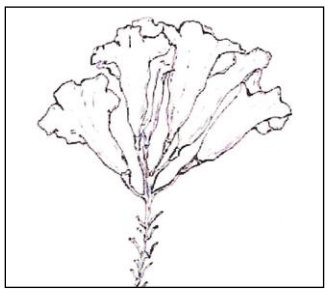
Visual pattern and texture:

When we talk about pattern first, let us know that what do we mean by pattern? Pattern is a type of visual elements of recurring events or objects, sometimes referred to as elements of objects. These elements repeat in a predictable manner. It can be a template or model or image which can be used to generate things or parts of a thing, especially if the things that are created have enough in common for the underlying pattern to be inferred and can be generated by repeating a particular element into a proper structure. Textured surface of any object if we look at it from a very close distance we notice some repetitive elements which, together construct the textured surface. If we look at it even more microscopically we shall notice various kinds of patterns and their characteristics would surfaced up.

In this lesson we will analyze some naturally inherited pattern from various natural objects. As a designer we shall see them very rationally in order to create new pattern for our requirement. But it is also commonly described as the "Science of Pattern." Any sequence of visual element that may be modeled by a mathematical calculation is considered as pattern.

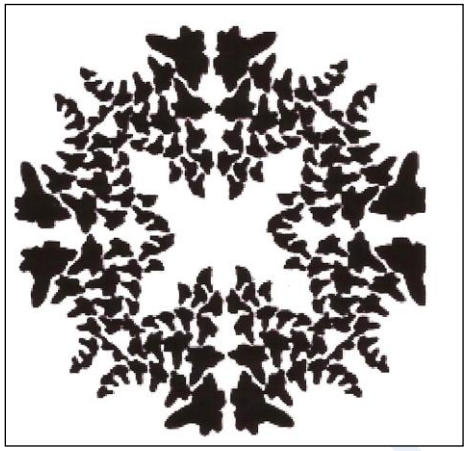
In the context above a few assignment has been given to the students in order to understand about how we easily can extract pattern from the nature around us e.g. fruits, vegetables or any other object you chose for the assignment. Here we are taken a flower as our reference. Initially do the detail study of the flower such as characteristics of various visual elements like formation of petals and its structure, the stem etc. in this example we have taken the form of the whole flower as basic design elements instead of petals and

stem for your easy understanding of the process of extraction of design elements. See the image bellow. After extracting the element (s) we then use various orientations in order to get various interesting pattern out of it fig156 (a).

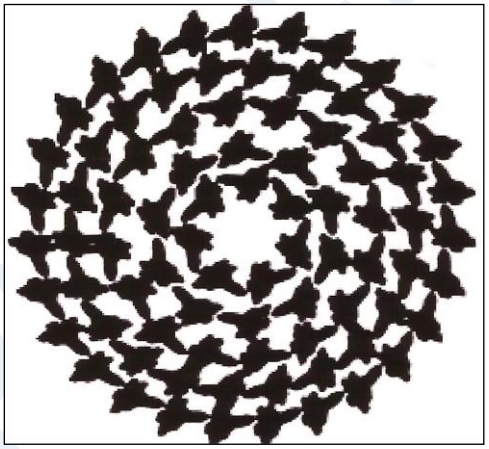


Pencil Sketch

Colour sudy



Dialation and rotation



Rotation and radiation

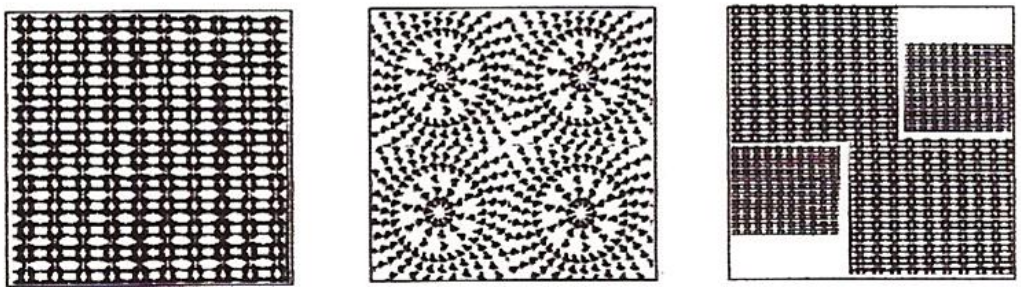
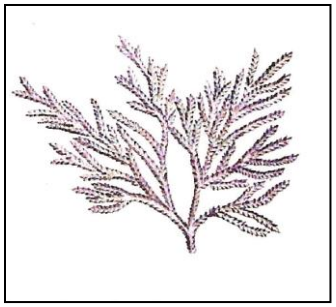
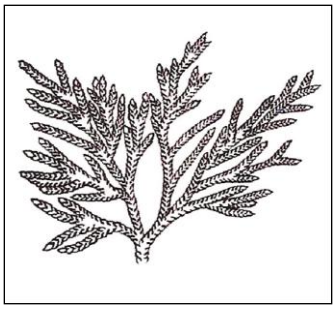


Fig.156 (a): Exploration of various orientations

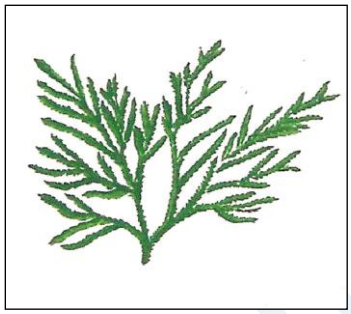
Another similar kind of work process showing bellow as reference. Here a small extracted design elements e.g. a leaf is taken for exploration of pattern. And see how beautifully one can create many interesting patterns just by rotation, reflection and repetition of the small unit of design elements. Fig, 156 (b).



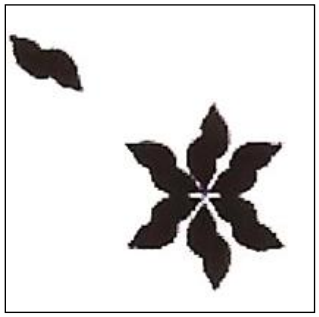
Pencil sketch



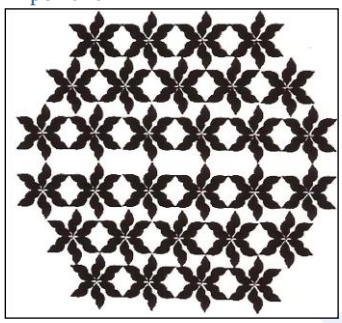
pen and ink



Colour study



Extraction of basic elements



Patterns as repetition

b

Exploration of various patterns

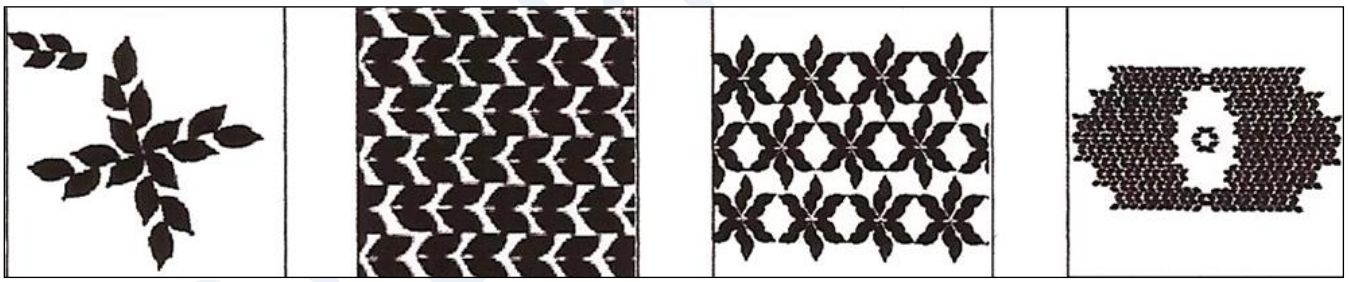


Fig.156 (b): Patterns created by using various orientations

Lecture7

In this visual world we experience different kind of objects visually, all the objects we found and we see that the surface of those objects have their own texture, which determines the quality and character of those objects. Now what is texture? The texture actually refers to surface characteristics and appearance of an object given by the size, shape, density, arrangement, proportion of its elementary parts. A texture is usually described as smooth or rough, soft or hard, coarse of fine, matt and glossy, etc. But when we put texture in design context we than refer it to arrangement of various patterns through which we can see the textural quality of a surface. Colour is one of the components a of texture. Various colour combinations may produce interesting surface texture.

We have discussed in previous module about how to create texture by using various tools. In this lecture we will talk and show how pattern can create different textures on a 2d surface. The assignment done by students showing in previous lecture, here we incorporate some of them as example of how we can create surface texture. Therefore, we will discuss about textural effects only on 2d surface. Examples cited in this lecture do not address either any 3d effect or any tactile surfaces e.g. emboss holes, rough, smooth etc. When a surface of an object we observe from distance we only see textural surface of the object but when we go close and try see extremely precise way with great attention to details (microscopic) we will observe very regular and structured patterns spreading on all over the surface (of the object). Therefore, once you know how to create pattern it is easy to create surface texture. See the fig.157a and b.

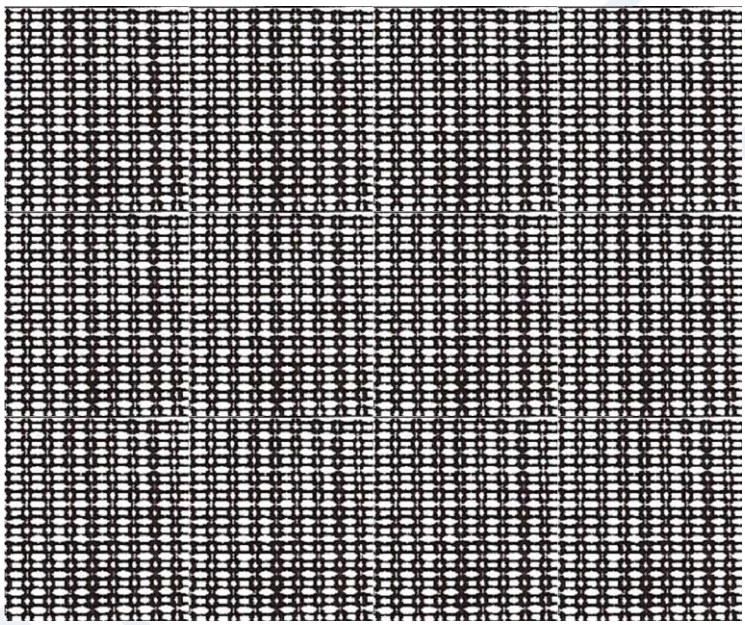


Fig.157a: texture on 2d surface

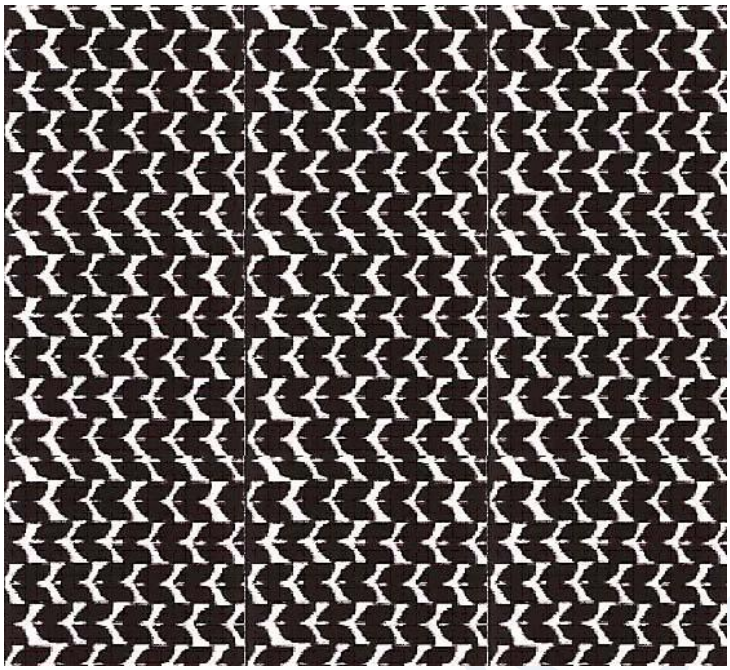
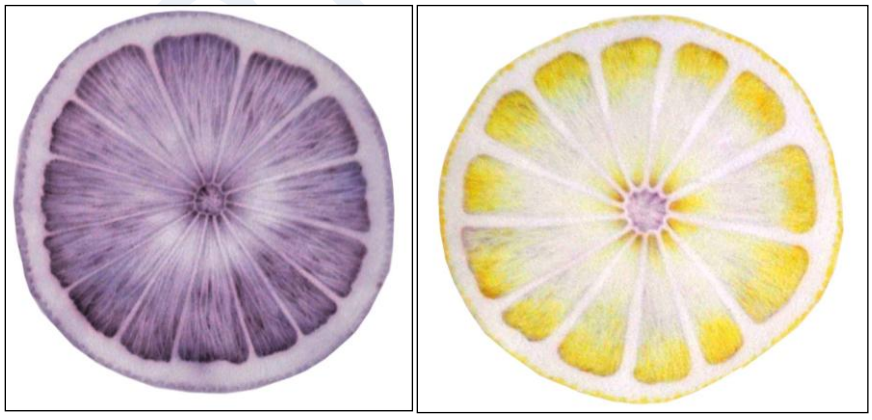


Fig.157b: texture on 2d surface

We extract basic design element (motif) from a flower fig 156 a. We have been repeating the pattern several times (twenty-four times vertically and thirty two times horizontally) in order to acquire the surface texture showing in fig. 157a. Similarly we are putting another example of pattern we extracted from a leaf fig. 156 b. By simply repeating the leaf on a given space can create beautiful surface texture fig. 157b.

Students created patterns by following the process of texture making from patterns generated from object taken from nature. For their clear understanding about the process they work in the class room under the author's guidance. Some of the outcome you can see in fig.158.



Study of a lemon

Exploration of basic design elements

Fig. 158: Surface texture created from the pattern generated from lemon

Question & Answer

Module 10

1) What are the three important property of colour? How these work with each other?

- See lecture 1. hue , value and intensity

2) What is colour brilliance and extent? Explain with example.

- See lecture 3.

3) What do you mean by colour interaction? How we can use them for a particular design layout?

- See lecture 2 and 3

4) What is colour contrast? Why we need colour contrast for our design?

- See lecture 4

5) What is visual texture means? How we can achieve texture from nature?

- See lecture 7

6) How we can extract pattern from natural object and can use them for our design requirement?

- See lecture 6 and 7.