AIM : Understand and apply color theory in creating attractive web content.

OBJECTIVE :

Some websites and services allow you to customize your profile by uploading pictures, changing the background color or other aspects of the design. Opening up the ability to customize your site's color scheme can be a recipe for disaster unless you are flexible and understand how to find maximum color contrasts.

At the end of this experiment

1. You will understand the fundamental properties of color, color wheel and color context.
2. You will be able to apply color theory in creating attractive web content.
3. You will understand essential features required for color text legibility on web pages.
4. You will be able to apply W3C guidelines for color text readability on web pages.

THEORY :

1. What is color theory?

Color theory is the collection of rules and guidelines which designers use to communicate with users through appealing color schemes in visual interfaces. To pick the best colors every time, designers use a color wheel and refer to extensive collected knowledge about human optical ability, psychology, culture and more.

2. Color Properties :

Hue : Hue defines pure colors in terms of red, green or blue. Hue also defines mixtures of two pure colors like red-yellow or yellow-green.

Tint : A tint is a mixing result of an original color to which has been added white. If you tinted a color, you've been adding white to the original color

Shade : A shade is a mixing result of an original color to which has been added black. A shade is darker than the original color.

Tone : Tone is result of mixing a pure color with any neutral/grayscale color including the two extremes white and black. By this definition all tints and shades are also considered to be tones.

Lightness or Value = Tone in percentage : Lightness is usually one property of three when used to determine a certain color and measured as percentage value. Lightness defines a range from dark (0%) to fully illuminated (100%).Any original hue has the average lightness level of 50%. Lightness is the range from fully shaded to fully tinted. Value or tone is a measure of how light or dark a color is, without any consideration for its hue.

Saturation or Chroma : Saturation is usually one property of three when used to determine a certain color and measured as percentage value. Saturation defines a range from pure color (100%) to gray (0%) at a constant lightness level. A pure color is fully saturated. Saturation is the purity of a color. The chroma or saturation of a color is a measure of how intense it is. High saturation colors look rich and full. Low saturation colors look dull and grayish.

Intensity / Luminosity : It can be used in conjunction with any color property. Luma (%) is the intensity of the achromatic signal contributing to our color perception.

Brightness / Luminicance : Brightness is an attribute of our perception which is mainly influenced by a color's lightness. For one color of specific hue the perception of brightness is also more intense, if we increase saturation.

Gray Scale : A grayscale is a series of neutral colors, ranging from black to white, or the other way around. Each step's color value is usually shifted by constant amounts.

3. Color Wheel :

A color wheel or color circle is an abstract illustrative organization of color hues around a circle that shows relationships between primary colors, secondary colors, complementary colors.

Primary Colors : Colors at their basic essence; those colors that cannot be created by mixing others. e.g. Red, yellow and blue.

Secondary Colors : Those colors achieved by a mixture of two primaries. e.g. Green, orange and purple

Tertiary Colors : Those colors achieved by a mixture of primary and secondary hues. e.g. Yellow-orange, red-orange, red-purple, blue-purple, blue-green & yellow-green

Complementary Colors : Those colors located opposite each other on a color wheel.

Analogous Colors : Those colors located close together on a color wheel.

TOOL :

Website : https://hci-iitg.vlabs.ac.in/Color_simulator.html

IIT guwahati provides a Shakshat Virtual lab wherein out of multiple virtual labs one of the lab is based on color theory. We can use the color theory simulator which will help us to implement color theory on a website page. This static web page allows us to select certain areas and apply color theory on those areas.

PROCEDURE :

The screen consists of two sections

  a) website window - black outline

  b) color- setting window -- blue outline

1. You will see a mock web-site of IITG, Guwahati in this window with broad black outline. Various sections of this homepage have been identified with thin black borders.
2. You can select any of these sections by clicking within its boundary. When you select a section the color of its border will change to red.
3. You can now use color setting window to set colors of this selected section.
4. Unless you select a section from the homepage the color setting will not be applied.
5. You can give the RGB color values required through the input boxes provided. The converted hex color code will automatically be displayed.
6. To apply this color to text or to background press the set color button.
7. Visa-versa if you know the hex color code of a color, you can directly enter it in the input box provided. The corresponding RGB color values will be computed and dislayed after you press set color button.
8. Using color selection slider - In case of hex color code setting, a color selection slider can be used which will give you an immediate visual feedback of the color selected.
    Press OK button to select the color identified using the slider.
9. Remember that the set color button will apply the text color settings only to the selected section of the website.

IMPLEMENTATION :

Figure 1 : Original website before applying color theory

Figure 2 : Final website after applying color theory

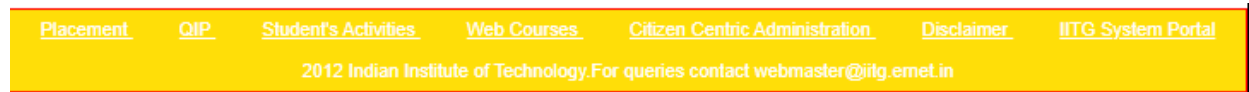Figure 3 : Final website header after applying color theory

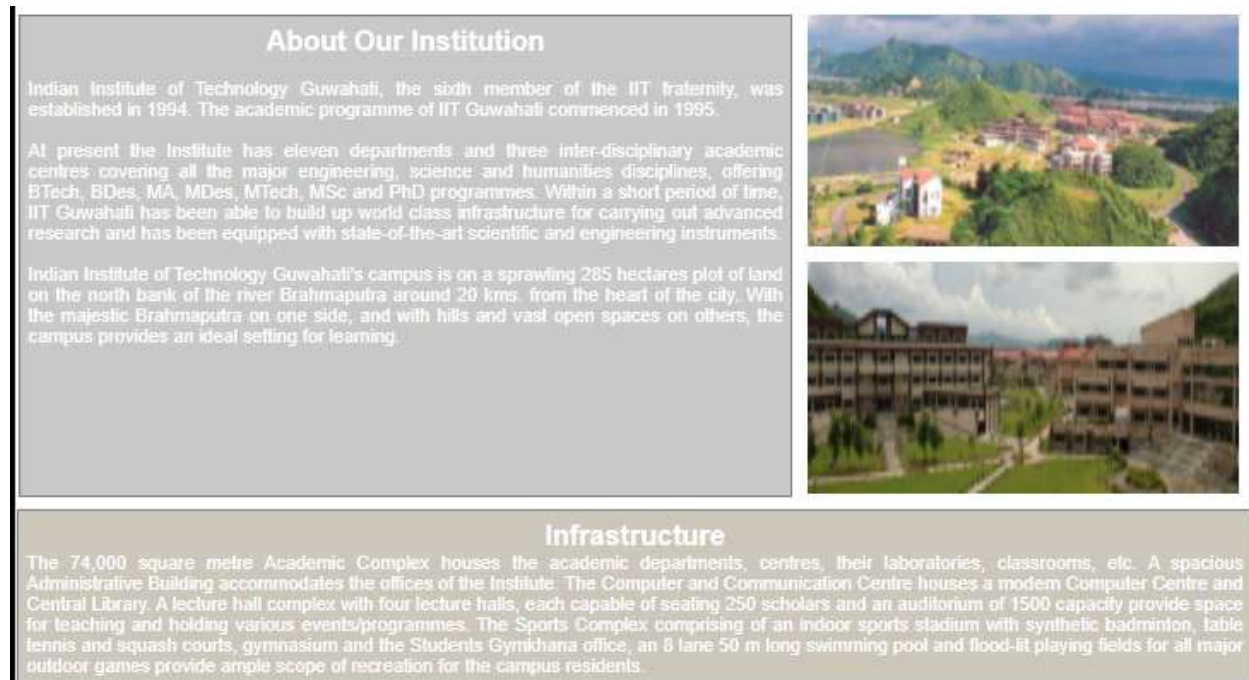Figure 4 : Final website footer after applying color theory

Figure 4 : Final website main section after applying color theory

CONCLUSION :

From this experiment we learnt about color theory. Color theory is the collection of rules and guidelines which designers use to communicate with users through appealing color schemes in visual interfaces. We understood the concepts that are required to create a proper appealing website. We used the IIT guwahati virtual lab color theory simulator and performed this experiment.

REFERENCES :

1. https://hci-iitg.vlabs.ac.in/Color.html

2. https://hci-iitg.vlabs.ac.in/Color_simulator.html

3. https://www.interaction-design.org/literature/topics/color-theory

4. https://www.beachpainting.com/blog/color-hue-tint-tone-and-shade/#:~:text=Tint%20refers%20to%20any%20hue,to%20which%20white%20is%20added.&text=Shade%20is%20a%20hue%20or,the%20hue%20remains%20the%20same.

POST LAB QUESTION ANSWERS :

1. What do you mean by tone and saturation of a color?
   Answer : Tone is result of mixing a pure color with any neutral/grayscale color including the two extremes white and black. Saturation defines a range from pure color (100%) to gray (0%) at a constant lightness level.

2. What is the difference between tint and shade of a color?
   Answer : Tint refers to any hue or mixture of pure colors to which white is added. Shade is a hue or mixture of pure colors to which only black is added. It contains no white or gray. Shade darkens the color, but the hue remains the same.

3. What are primary, secondary and tertiary colors?
   Answer : Primary Colors are those colors that cannot be created by mixing others. e.g. Red, yellow and blue. Secondary Colors are those colors achieved by a mixture of two primaries. e.g. Green, orange and purple. Tertiary Colors are those colors achieved by a mixture of primary and secondary hues. e.g. Yellow-orange, red-orange, red-purple, blue-purple, blue-green & yellow-green