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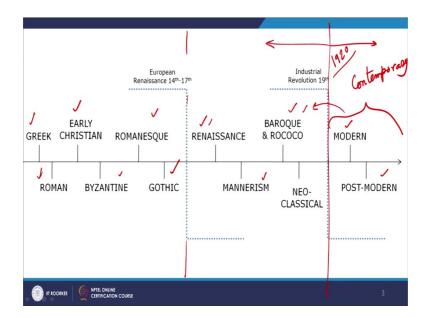
Lecture - 03 Industrial Revolution and Beginning of Modern Era

Welcome students to the online NPTEL course Contemporary Architecture and Design. In the previous two classes, we have discussed the before part of this contemporary architecture... contemporary architecture and design which was the pre-industrial revolution. So, we have started discussing with the classical architecture and then the renaissance what happened after renaissance and till industrial revolution. We have discussed about the art and design movement specially art movement as well as the parallel architecture movements till that time. So, in the previous two lecture was to give you the back drop of what happened just before contemporary architecture and design started.

So, which is the time lines starts from the industrial revolution which is 19th century onwards. And today we will discuss about the industrial revolution. So, which is phenomena in 19th century which started in Europe.

And this actually happened based on the, what started in renaissance after renaissance lot of things changed. So, that was paradigm shift from there, and from renaissance lot of advancement in art and as well as when technology started. And which went to the peak in industrial... just before the industrial revolution, and because all these things started accumulated and this industrial revolution started and from Europe there was boom in the industrial revolution, people started migrating from village to the city.

And then many of the country started colonialization. So, they started going to the different countries and occupying the land. So, that was the phenomena and then we know that world war and other things happened. So, which was part of the contemporary the simultaneously, which was going during contemporary part, which was when the modernism was going on in architecture and design.



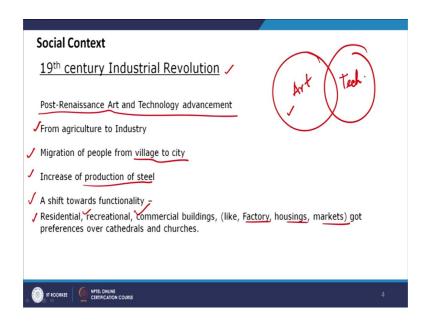
So, this is the time line we have discussed till now. So, we start with classical architecture Greek and Roman to the Early Christian, Byzantine, Romanesque and Gothic. And then in 14th century to 17th century there was this European Renaissance, during that time Renaissance architecture and art started flourishing then Mannerism, Baroque and Rococo again it went high on ornamentation.

So, from total construction based architecture to high ornament... ornate architecture which is Gothic, then in renaissance we have seen that low ornamentation most... mostly geometric style which was Renaissance, and then again went up to the baroque and rococo style which was high in on ornamentation, then total paradigm shift started in the in the industrial revolution. So, this part generally we discussed in the history of architecture, history of art, history of design.

And then from this time onwards which is mostly 1920s onwards, we start taking about the contemporary architecture art and design. So, contemporary has two parts, which is modern as well as postmodern. So, modern is mostly the time frame was during the World War 1 and World War 2, and that has a particular visual style and the postmodern is a little different when the world war stopped, and different visuals style started emerging because of the reaction against the modernist movement as well as the socio-cultural context was quiet different.

But still we will see this modernism and post modernism can be combined and it is very different from the design and art movement which happened during the... happened before the industrial revolution.

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So, there are some social context which changed during the 19th century industrial revolution, first this post renaissance art and technology advancement was there.

So, we have a lot of advancement in art as well as the technology. So, the new technology advancement of new material for example, the usage of steel glass, these things started coming in 19th century it was, it got evolved because of this 19th century industrial revolution. So, new material was there, new technology to handle this material was there and the art style changed. Because there was a total different style in the pre-industrial revolution, there was a emphasis on the craftsmanship of people, the artisans, local artisans, then because of this new advancement of technology that also impacted on the change of art style because mass production was required and then people started migrating from the village to city, new type of house, house and new type of buildings was required before that the buildings where village... in village mostly and the pre if go to the history of architecture, mostly we see the architecture models come... comes from cathedrals castles, and fortresses and mostly cathedral was quite an important part of it. And now because of this industrial revolution new typology of a building started emerging; for example, railway station, office buildings and high rise buildings.

So, their visual style will definitely be different. And then because of the new technology mass production and other advancement of technology, new materials, and then people started using metal and glass so, that will change the art style as well. So, we will discuss we will see how this affected the modernism and post modernism design, when we discuss step by step and each and every phases of modernism and post modernism.

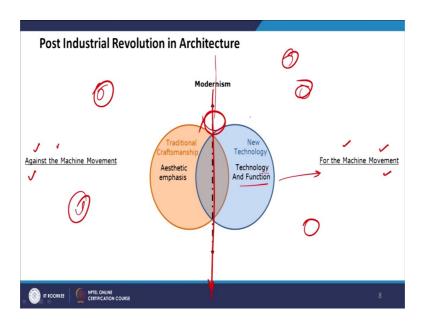
So, some social context was, people started migrating from agriculture to industry because of the boom in the industry, migration of people from village to city. So, there was new working people so, there even the fashion and everything changed because of the working class people of men as well as women. And then increase of production of steel, as well as the other new material are different metals and glass ah, shift towards functionality because residential, recreational, commercial buildings like factory, housing and markets were more important and before that it was.. the preference was over cathedrals and churches which we have seen from this...if we study Greek architecture we see Parthenon and Roman architecture we see recreational buildings were there but it was completely different like Colosseum and then public buildings were there like Parthenon... Pantheon and other places. But in Gothic we see a lot of examples in Cathedrals and other things so mostly it was combined to the Cathedrals and fortresses.

So, and the evolution of new school of thought in 19th century industrial revolution, there was a dilemma between the old traditional style and the craftsmanship. So, earlier the designed style used to be mostly hand crafted, artisans used to do it and each and every piece was different, because it was handmade and artisans used to made it... make it and the new invention which is material and technology, that changed the visual style, because of the new material and the new technology use of steel and glass, and the other thing is the provision of mass production, the factory production because factory used to give provision of mass production which can create many replica of the same thing in much lesser time so, the cost of this product comes down.

The old style can't be a incorporated in the steel structure, because we see when steel building that definitely should look different from the old style buildings, which is made out of the load bearings brick or stone. The prefabrication and mass production versus craftsmanship was also stylistic and technological differences. So, the crisis in architecture art and design generated, because of this new material new technology and the provision of this... all these new advancement cannot match with the previous visual

style. Because they cannot give something which looks like the previous style so, the style visual style has to change. So, that is why we see the modern buildings the contemporary buildings which is modern as well as the postmodern they look drastically different from the pre-industrial revolution buildings.

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So, after that the postmodern industrial revolution, there was a neo classical... after neo classical which was just before post... the industrial revolution. And then before modern there was two different thing because there is right now we see a dilemma be in art architecture and design. So, one style was.. what was there before is the traditional craftsmanship and another is new technology. So, two opposite style, opposite way and opposite paradigm is there right now. And then. So, in that situation the designers architect and the artist, they will it is common notion that somebody will support the traditional... stick to the traditional craftsmanship traditional style of visual language and traditional technology, and some architect and designer started accepting the new technology. So, when this thing happens then a totally polarized and two different style evolved.

So, that two different style we cannot call this a particular... we cannot put that in the particular umbrella, because that is opposite, and this is what the pre modern style is. So, one is the against the machine movement which went against the machine, which supported the traditional craftsmanship, and did not support the new technology, another

is for the machine movement which embraces the new technology new tools and techniques and new style of design.

So, totally polarized and totally two defined style evolved and that is the pre modern style. So, we cannot club it in a particular design style. So, one type of... one set of architect designer and art... artist they say it that this is the new technology, this gives us a lot of provision to experiment with the new visual style, let us go for this and another architect and designer said we should preserve our traditional style.

So, the aesthetic emphasis was there in the traditional craftsmanship, and then which went for the against the machine movement. And the for the machine movement there was new technology and function was emphasized. So, we will discuss this is one is for the machine movement one is against the machine movement. In against the machine movement there are 2 things art and crafts movement and Art Nouveau we will discuss all these visual style and all this movements in the later style.

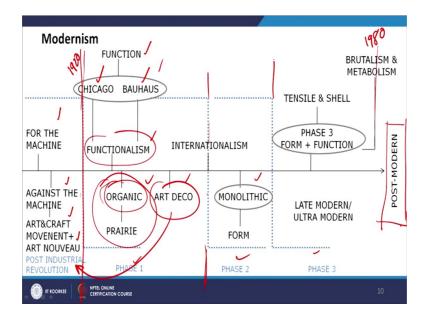
But from these two style now modernism has to come together. Because when the modernist movement started modernist movement also had two... had three phases, of modernism the early modern style, we will see lot of different modernist movement evolved which is like Bauhaus, Art Deco, Chicago school and Organic... few movements which are quite different from each other. So, they some movement like art deco supports the aesthetic emphasis and they are quite high on... high on visual elements, and some movements like Bauhaus is very functional. So, different... different fragmented movements were there, because they emerge from two different opposite pole of opposite school of thought. So, modernism somehow lies in between, and in the first phase they were somewhere here in the different movements, and gradually they started coming to somewhere in between which encompasses both the positive side of machine made aesthetics, the provision of mass production, and also it has some values taken from the aesthetic value and it changed the aesthetic style and visual style changed over the modernist... how the modernism phase is going on. So, from the first phase onwards first phase to second phase and third phase; second phase and third phase has more much more visual simile between the different movements. But in first phase there were lot of difference in the visual style.

So, this is the first phase which is Bauhaus, Art deco was part of the first phase. Bauhaus is more towards the machine movement and the functionalism... functionality was much more emphasized art deco has lot of visual elements which comes... which has a connection with Art Nouveau which is against the machine movement, and also it has it takes something from the baroque rococo style, which comes, which is part of the pre-industrial revolution movement.

Now we see organic where the design elements... is elements are coming from the context. And the visual elements are coming from the context like Hollyhock design and the things which Frank Lloyd Wright does and lot of emphasis there in the visual style as well as the functionality so; it is a blend of both. And then we see internationalism which is in the second phase, and where we see a blend of there is a visual style, but that visual style comes from a totally machine movement and functionality is also there new technology is there. So, it is part it is quite close to the machine movement. And then tensile and shell structure, brutalism, metabolism these are the movement which comes in the later phases of the modernism; which has tensile and shells structure if we see so, they take the... that positive point of the new technology, the shell the concrete shell and steel tensile structure.

But that looks... that is quite sculptural, and it also has a sculptural value and as well as the... this has the structure comes from the new advancement of the technology. So, this is the time line of modernism we will discuss this in detail.

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So, this is the pre modern style the post industrial revolution, after post industrial revolution which is... and just before the modernism.

So, modernism starts from here phase one, phase two and phase three it ends over here and then post modernism starts; which is almost like 1920's to 1980's. So, there is no particular hard and fast time line it starts from 1920's and it ends at 1980's, it continues and then some blend is also there during postmodern era some modernist movement was also there. So, for the machine movement as we are saying which embraces the machine aesthetics.

And against the machine movement which embraces the, which oppose the machine aesthetic which is the which is... and two movement was there art and craft movement and art nouveau will discuss this. And then a modernism phase one, one set of movement was emphasizing on the functionalism of the building. Because a new set of buildings like railway station, college and school building high rise building office buildings requires functionality as the foremost priority. So, Chicago school of thought which is American movement mostly, and then Bauhaus school which is European movement mostly is part of functionalism. Then organic and prairie... organic is a part of the bigger umbrella of prairie school of architecture, prairie school of thought which emerge... which takes the context from the local... it is most, it.... it is American movement.

So, it takes the prairie land of Americas style and then manifests that organic is also talks about the contextual... contextually designing the things. And art deco is connected with the art nouveau, but it also embraces the provision of machine aesthetics. Now from internationalism modernism kind of because here lot of fragmented design thoughts were there, visual style was there.

But from internationalism there was one holistic style; which they thought that so many different movements in different country, different continent might not work. So, we should have a particular visual style; which we followed be internationally ah- from that school of thought from that idea internationalism started and which does not talk about the context which has particular visual style which emphasizes steel, glass and the new material new technology and mostly this is very geometric.

So, these internationalism flourished in the phase two, and the, their monolithic forms which emphasis on the form and the new technology. Now in the phase three onwards with this technology there was large again some as aesthetics they wanted to... explore the sculpture quality in the, with the new technology. So, a tensile which is based on steel structure and the fabric and shell, which is based on the concrete. So, structure so, that structural excellence gives the form of this building.

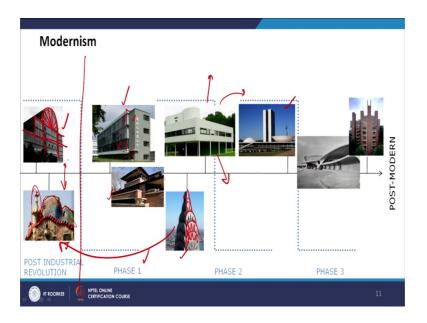
So, there is a form and function has the equal emphasis in the... this design. So, which is late modern ultra-modern some boogie architecture other architecture style also evolved. Now brutalism and metabolism also blends the function as well as the form. So, Brutalist architecture talks about the material which is concrete. So, brutalism comes from the concrete, exposed concrete and exposed brick structure that gives the aesthetic of brutalism.

And it looks robust, and it looks very heavy in visual style. Metabolism talks about the services becomes the aesthetics part. We will discuss this, but this... there is aesthetic element added to it and which comes from the services which is the new technology, and that they wanted to show as the building facade. So, so, they are is the again form and function both the functionality services and the form all the things are coming together.

So now, if we see this design style which we have already and if we compare that with the previous art and design movements architecture movements. We will see that there is one in one design movement, there was lot of emphasis in the functionality and the technology and the next movement might be something which is again emphasizing on the aesthetic values.

So, form and function some times and some movement, form becomes very important, and in the next movement function becomes very important. So, if we see the previous architecture movements also we can see that. So, will discuss this in due course, but let's see the buildings, which is related to this time line.

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So, we have seen for the machine movement so, these is our crystal place which is going to... it is under the for the machine movement. You can see all these steel and concrete members which forms the structural, creates the structure is actually creating the aesthetics parts. And this is this looks machine made, and this is the truss and this all this members steel member's functional members are actually the aesthetics elements. So, this is a... and this building does not look like something, which is before pre industrial revolution.

And the other opposite movement is against the machine movement, this is part of art nouveau this is Antonio Gaudi's design, we will discuss art nouveau in detail as well. So, here we if we see the minaret... like minaret like structure and the... and the roof.

So, this cannot be machine made, this is every curve every curvature is different and if we look at the facade treatment, and all these elements this is totally hand crafted and this emphasizes on the traditional craftsmanship. And it is highly depend on the artist and architects and designers... skill. So, this is totally opposite two movement, now here when we start the modernizing in phase one, one is Bauhaus which is totally functional. So, you can see a very box like structure, and if we look at the color compositions so, there is only primary color red, you can see yellow, there is blue inside.

And the over powering color is the color of the material which is glass which does not have any which is translucent, and this steel members, which is colored black and gray white and black which is the achromatic colors are there. Now this is a example of prairie school of architecture so, this is Robie House by Frank Lloyd Wright, and here you can see the these lines and everything is derived from the prairie grass land.

We will see, we will discuss how this has connection with the context, but this has value this style up design talks about the aesthetic value as well. As now this is art deco, and here we can see lot of ornamentation as there. But if we look at the ornamentation and also this talks about the arches, which different arches on top the growing arches so, this has a connection with pre industrial revolution.

So, they are taking some design elements emphasis from them, but if we look at it so, this talks about the machine aesthetics. So, mostly when we look at the art deco visual design, posters style, they are lot of typefaces and graphic design and as well as the architecture. So, we see lot of emphasis on the metallic color, but there are lot of emphasis on the aesthetics as well.

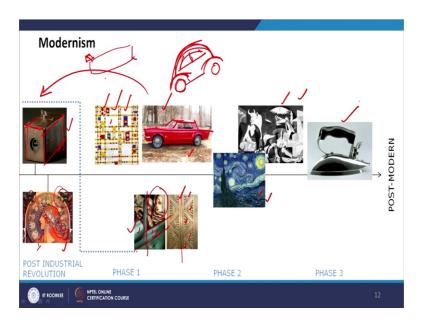
So, it has the connection with art nouveau as well, but there is the provision of and they, they are in composing and they are embracing the provision of mass production. So, there is blend of for the machine and against the machine movement as well so, it is together. So, this is internationalism and this comes in the in between phase one and phase two so, mostly in phase two, two and it continuous. So, this is Villa Savoye by Le Corbusier and some other buildings by other architects Oscar Niemeyer's building. So, this has this is the internationalism. So, you can see geometric elements ah, but there is emphasis on the form as well, but you see lot of emphasis on the new technology.

Now new technology here this is the concrete structure is a airport by Eero Saarinen So, this concrete shell structure gives the beautiful form of a flying bird. So, the here the

structure comes from the structure functionality and the form is also important. So, this is an example of brutalism and as well as the metal metabolism.

So, from outside these is exposed brick so, brick brutalism and you see lot of services are outside. So, this is also a services this is a staircase, this is a staircase and this is.... this some of these are staircases, these are wind shafts so, all these services which is quiet prominent. So, there is a visual style is coming from the new technology. After that the post industrial, post modernism starts.

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So in art and design also the singular thing happen so, this is for the machine movement. So, all these different style... type of machines comes in the in the post industrial revolution movement, new and you know that new type of new equipment, new tools and techniques... tools and equipment stated coming.

This is Kodak's first portable camera so, there was camera before which is huge in size. This is a portable camera which again is a very it is total square. And that talks about the geometry and that is also a style of for the machine movement. And the new first cars and you can if you see those type of designs where part of this for the machine movement. And another is Alphonse Mucha's painting which is which comes under art nouveau again; which is parallel to Antonio Gaudi's this design.

So, here also we see lot of different kind of lines which cannot be mass produced, and this looks totally like hand painted, but it is not exactly not... has lot of differences from the pre industrial revolution movement, but it is totally depended on the craft... the quality of hand work and the depended on the artist.

So, and all these different kind of lines.. biomorphic lines are called whiplash lines which looks like a whip's lash and they are different and from each other. And all these a treatments are different from each other. So, this is part of art nouveau movement, and it high on ornamentation. So, this is De Stijl movement which is quite which is parallel to Bauhaus movement, we have seen these Bauhaus design, we see that similarity with the Bauhaus and De Stijl style movement. De Stijl is an art movement, but still you can see the color pallet has... is quite a similarity and the rectilinearity in Bauhaus, the rectilinearity in the painting.

So, this is Piet Mondrian's Broadway Boogie Woogie is the name of the painting has lot of similarity with the Bauhaus movement. Now we have the art deco; so, art deco I was talking about this metallic color is there, and all these are replicas of the same design, but lot of emphasis is there on the design. This is Tamara de Lempicka's painting, but if look at the painting they have metallic shine, and the this car and everything this is part of it can break that in geometry, and metallic style is there. Now this is also there in the, this is part of this you can see this is contemporary to the Bauhaus movement in the functionalism was there, and there was no mix of different visual style. So, either it is rectilinear for example, here it is all rectilinear, and primary color or it will be totally circular. So, this is the car is this is ford mustang designed by Ford.

So, this car has all rectilinear lines, people started designing these cars from industrial revolution. So, first cars will have different parts will look different. So, if the cars bonnet is there so, some headlight will be attached the, different parts will be assembled and the car, car will be a mix, mix and match of different elements, and it will not have a very holistic visual style. But here in the ford mustang everything is rectilinear, every line if you look at these lines, these lines, those are all parallel lines and everything is a emphasizing on the rectilinearity of the design.

Now these ford mustang car comes in red, yellow and mostly and blue and white and black. So, these are primary colors and achromatic colors. Now there is another car

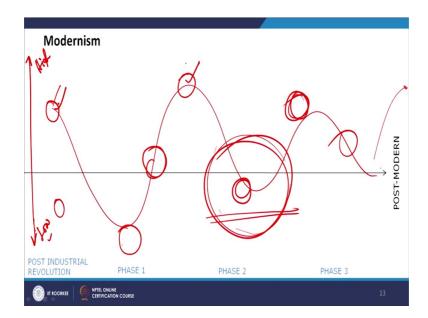
which become very popular during that time which is Volkswagen beetle. If you see Volkswagen beetle everything is circular so, there is no mix with the rectilinearity with the circularity.

So, Volkswagen beetle if I break down into very simple geometry. So, it will have this a very simplistic drawing of that Volkswagen beetle. So, all these elements which will be which is part of Volkswagen beetles has this circularity this is throughout the beetle's design. And beetle also comes in primary colors which is yellow become very famous the yellow, red, white, black these are the beetle's colors, but yellow is one of the popular yellow and red was popular beetle's color which is again primary color. Now there are different other art movements which is like this is Van Gogh's Starry Night which is part of the impressionism movement. So, here the technology is the way of drawing is way of painting is quite different. So, this is called impasto style we will discuss this.

So, it is, it has a thick color and this has a tactile texture on the canvas. So, this style of art is also quiet different form the pre-industrial revolution, this is an abstraction coming so, this cubist painting by Pablo Picasso, Guernica. So, this abstraction and different tools and techniques applying in art also started coming, started flourishing, and also if we look at the building, building also become quiet abstract because when it fits into a geometric shape which is like a dome, which is part of a sphere or total box or cylinder, then also it becomes abstract. And these another movement which is streamlining which is a quite similar to the ergonomic factors and streamline cars which you can... will discuss, and other product design talks about the ergonomics in case of car.

So, they talk about aerodynamics, and then the total design has lot of fluidity. So, as this tensile unshelled structure; so, those were kind of parallel movements and architecture as well and design.

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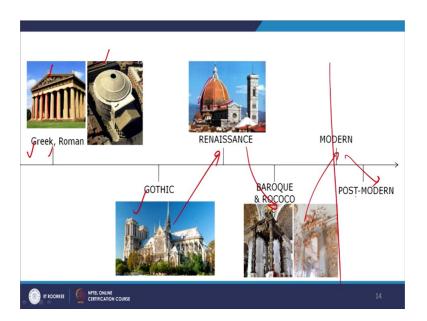
So now we will see in the modernism of also we see from the post industrial revolution, one is if I plot which is high on ornamentation and this is low on ornamentation. So, post industrial revolution high on ornamentation and this is mostly functional and low ornamentation. So, high ornamentation was against the machine movement, low ornamentation was for the machine movement. Now in phase one, if we look at low ornamentation was Bauhaus and Chicago, and then high ornamentation somewhere here was organic and prairie and very high ornamentation was art deco. So, this an art nouveau and art and craft movement, this is art deco.

Now, again internationalism comes low on ornamentation, now again the shell structure here, the shell structure again has the high ornamentation; so, high low ornamentation, high ornamentation. Again low ornamentation here, high ornamentation low ornamentation, and again high ornamentation, so this is going like a sine curve. So, again in the tensile shell we can see this there is lot of ornamentation, and which comes from the structure, but still is lot of ornamentation, and then in the metabolism there is a blend with the technology and ornamentation. Now after this postmodern we will see again in rise of ornamentation.

Because mostly in modernism this internationalism was the high modern and this flourished a lot in the modernism movement. So, in post modernism we will see again a

high ornamentation. So, it is always goes like a some a change shift with a low ornamentation and high ornamentation.

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Now if you look at the a pre-industrial revolution which is before modern and postmodern Greek, Roman architecture style we see lot of emphasis on the structure. So, the building comes from the structural stability. So, we see a in Colosseum and pantheon and dome shapes and here we see that trabeated structure and that is what the design was; now after few movements like Byzantine and early Christian we see Gothic which is extremely high on ornamentation.

Now we see after that we see Renaissance, Renaissance again low on ornamentation, we see the structure and the very geometric form, now after that after few revolution we again go back to Baroque and Rococo which is again high on ornamentation, then again we go to modern... in the initial stages there are different movements which does not which has the different visual style, but if we look at high modern which is internationalism was the most important and most flourished part and phase two and phase three, we see a low a decrease in the ornamentation and post modernism and we see again increase in the ornamentation.

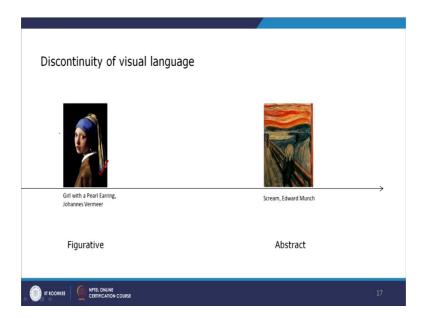
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Now in modernism and post modernism, we are clubbing these two cotemporary. So, there are lot of things got agglomerated together and then that gives us the provision of discussing modernism and post modernism together under the umbrella of contemporary. So, lot of change was there so, two measure changes was one is discontinuity in the technology, technology totally changed. So, this is the from previous technology was if you look at the stone buildings and brick buildings while there and concrete was used as a mortar... as binding material. So, that we see and the style in art was quiet detailed and, there was a figurative style and also the technique of art changed. So, were talking about the van Gogh's style.

So, this is impasto or the applying the color in thick color. So, this technology of the way of painting changed. Also if we look at the art nouveau movements and art deco movements, the technology... style of art also the application of technology in design also it changed. Now here we see lot of emphasis on the new material which is concrete, the glass and the provision of huge cantilever, everything was quite different. And the new material is also there in the product design. So, also the discontinuing in the visual style, earlier we see in the pre-industrial revolution lot of figurative, element figurative style of design is there.

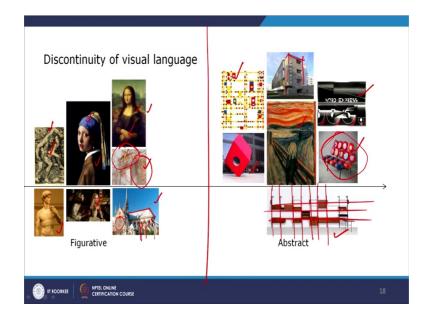
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And now in the contemporary, we see abstract form was getting more and more emphasized. So, this is a girl with pearl earring by Vermeer and if we look at and so, there is lot of Chiaroscuro style and ornamentation and different things were there which is which will vary from the pre-industrial revolution different art and design movement. But still we will see a very figurative depiction of a particular element. So, it will look like what it looks like in the natural setup. So, there was no breaking and there's is not much breaking in the visual style of how it looks ah, when we look at this Botticelli's Venus there is lot of stylistic change.

So, it... the neck is long and hairs does not look like a natural hair, but still the depiction of this human figure looks like human figure, but here this is Edward Munch which is scream and that the human face does not look like this. So, this is a expression of an artist and if you look at other paintings like van Gogh's starry night, the night sky does not look like this is an abstraction of the night sky.

And even if we look at Picasso other painting, like van Gogh's paintings was starry night and Picasso painting, and Salvador Dali's design the set of the painting, they do not like modern the exact way people perceived.

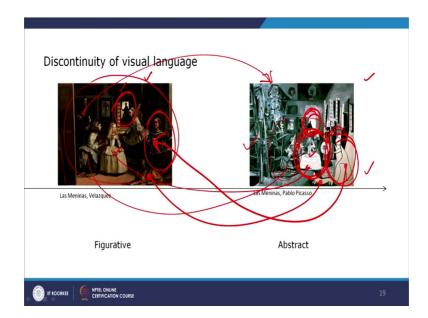


So, this is the some of the palette of art architecture and design. So, these are from this pre industrial revolution and this side is from postindustrial revolution modernism and post modernism. So, we see different medias and a different in architecture art and design, everything was quiet figurative. So, this is a the sculpture, in case of sculpture in case of paint media and in case of panting everything was figurative. In case of architecture also the ornamentations in rococo style was figurative, and in architecture all these elements which we see has this floral design and the roofs which looks like the traditional architectural form, and this has this there is no much geometric there is no intention of putting the form into a pure geometry.

When we put things into the pure geometry that becomes more abstract in nature. So, in Bauhaus we see a pure geometric which is manmade geometry encompasses the build form. And so, as in the art... art so, as in the sculpture this is Noguchi's sculpture in New York. And so, as in the product design, we see seating place is broken in... in pure geometric shapes, and that creates the seating space this is Marshmellow chair, we will discuss all these things this painting has been discussed.

So, here also the way the colors and everything has been applied is not... is abstract. And also in the art deco posters also in the furniture a things are modular and you can divide the design element in different lines, rhythm and this creates an abstract form of a design, which is quite different from the pre-industrial revolution.

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Now, this is an example of same painting, the same the same painting, r- interpreted the painting which is there in the pre industrial revolution which is Velazquez Las Meninas has re interpreted by Pablo Picasso is a Cubist painter and modernist era ah, which is that the again this is called as Las Meninas by Pablo Picasso. So, this in modernist style this is in the Velazquez's original painting by Las Meninas all the elements, you can see is here even the painter himself is here. So, here the chiaroscuro style which a high on light and shadow creates a dramatic effect. But this has... this is very figurative everybody's face and figure looks like a human being, but this has been broken in a... the pure geometric form and abstract form.

And he, the painter is ah, but every people all the people all the animals are... are here in these both the paintings. But based on their importance they have broken into the abstraction. So, this human being here, does not come in the focal point. So, he have just created few lines for this. And here there is a lot of a chiaroscuro affect a for this king who is entering in the in the setup has emphasis, and this is the main princess whose up on the focal point has created has some detail here, but again in the abstraction. So, this figurative to abstraction is change is there in the art architecture and design. So, the next class onwards will start discussing of about different art different architecture and art movement of modernism and post modernism.

Thank you.