Interior Design
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Lecture - 26
Interior Design: Interior Design Technology: Innovative trends and
technologies–Tiny Houses, Origami

Namaste. Hello, everyone. We are in week six of my NPTEL course on interior design. So today we are at lecture number twenty-six. And we are going to focus on interior design technology, specifically discussing innovative trends and technologies.

We will also see some specific examples of tiny houses and applications of origami. So, innovative trends, some aspects of technology when we specifically talk about interior design and interior architecture, tiny houses, and origami applications, specifically in space-making. So let's talk about interior design technology and how this technology is revolutionizing the world of interior design. In recent years, technology has emerged as a transformative force, redefining how professionals approach design, interaction, and the ultimate customer experience. In addition to creativity, aesthetics, and functionality, technology currently plays a fundamental role in transforming the world of interior design.

So when we talk about technology, we discuss 3D visualization, different kinds of new software simulations, tools, and methods that help us visualize interior design much better for our clientele. Also, the technology that provides augmented reality and virtual reality allows us to experience things in real mode and in real time. So, from 3D visualization to home automation, technology has already made its mark on interior design. The integration of technological innovation is opening new possibilities for personalization, functionality, sustainability, and inclusivity, taking interior design to a new level of excellence. Technological tools such as 3D printing allow for personalizing furniture and decorative objects, offering various exclusive options adapted to customers' preferences.

So this is what these tools and technologies offer us. This increases flexibility in design, allowing for more creative and specific solutions for each project. In personalized projects, these tools gain new strength. So they are sort of aids and tools for all the

designers, creating new avenues, possibilities, and opportunities for designing, presenting, brainstorming, and disseminating. So if I were to list seven ways to leverage technology for interior design, here would be the overview.

And I would like to start with marketing and advertising technology for interior design. Marketing and advertising are also very important when working as designers. The prowess of the Internet allows designers to access digital tools that help them easily market their work, showcase designs, and gain new clientele. It's also about receiving work, disseminating it, and showcasing it. Interior design tools.

Interior designers use tools to make optimum use of their time, money, and resources. There are many tools available today, be it software, visualization kits, or well-researched templates, which are put to use through applications and other means. Learning is also an important way because education and upskilling are really important. They are the need of the hour in today's changing world. Interior designers have a host of learning and e-learning possibilities and opportunities available to them at their disposal.

From dabbling in design courses to learning from seasoned designers, there are opportunities to grow and scale as an interior designer. There is also the option of AR and VR, which are augmented reality and virtual reality. Interior designers use augmented reality and virtual reality to create powerful-looking 3D models, and even 3D printing is also handy. And, you know, it helps design professionally and discuss with our clientele in a much more holistic manner. This helps them easily visualize a room or a space without having to physically create it.

Designers even use 3D models of decor and other products to create a virtual environment that helps the client understand if the outcome is what they are looking for. Then, socializing and collaborating is another method. Interior design is a huge community around the world. Interior designers work with each other and collaborate to understand new technology, the latest trends, ideas, and gadgets so that they can improve their work. Business management is also very important, and it needs to be discussed, starting with our studies focusing on interior design as students and also as professionals.

To manage their businesses, projects, and schedule meetings with stakeholders and partners, designers need to use proper project management and business management tools, such as software, to meet deadlines, hold meetings efficiently, and manage their work easily. Tech elements are very important, you know, and we are already in 2024, approaching 2025. So these elements come very, very handy. As a designer, you will know that the world is moving toward a more sustainable space. Today, people want to build smart homes, integrate the Internet of Things, and ensure their homes are highly energy-efficient.

Integrating security features, building modular kitchens and bathrooms and using smart lighting are a few ways to incorporate tech elements and create projects with a futuristic vision. Now, throughout this course and during several lectures, we have discussed most of these aspects, you know, which I have highlighted here in blue. So, IoT, AIoT, energy efficient spaces, green interior, sustainability, modularity, you know, all of these things. So, as and when we come across during different lectures, we have discussed these at length with examples. Now some of the innovative trends that probably I thought could be discussed in this stipulated time and which are quite interesting.

So to begin with, what is an interior design trend? So a trend in an interior design project could be a central idea based on a worldview around which all the elements of a project are designed. It is the thread which binds together all the design elements and gives central character to the whole project. And there is a lot of research that lots of agencies, individuals and schools, they do, you know, to forecast and predict these trends and then also discuss these trends, talk about the methods to achieving these trends. So there is a validation through experts, through professionals.

And that's how, you know, they get showcased. So some of the interior design trends for 2024 I have put together. Sustainable and eco-friendly design. Like this is one of the most important trends that has come, you know, come up and has grabbed attention. So sustainability remains a key focus in 2024, 2025 and of course the times to come.

With eco-friendly materials and practices becoming more mainstream. From recycled wood and bamboo flooring to organic cotton textiles and low volatile organic compounds in paints. The emphasis is on creating beautiful spaces that also protect the environment. So that's a very important trend. It's also the need of the hour.

Designers are integrating energy-efficient appliances and smart technology to reduce carbon footprints. And that's the key takeaway. Biophilic design is another trend. Now, it's a very technical term. I have just tried to put things here in a very simplistic and loose manner.

So I could explain biophilic design, which incorporates natural elements into interiors. It continues to thrive. This trend goes beyond just adding houseplants. It involves integrating natural light, organic shapes, and materials like stone and wood to create a calming, nature-inspired atmosphere. This is also a very interesting trend, and it is thriving and will thrive further.

Warm and earthy tones, such as terracotta, rust, olive green, and deep browns. These hues create a cozy and inviting ambiance, perfect for making any space feel like a sanctuary. These colors pair beautifully with natural materials and greenery. That's the advantage. Maximalism.

Now, we always talk about minimalism. It has dominated interior design projects for a long time. But maximalism is in vogue when we talk about 2024 and 2025. This trend celebrates bold colors, rich textures, and eclectic patterns. So this is also in trend.

Then, curved and organic shapes. Curved furniture and organic shapes are softening interiors in 2024. Sofas with rounded edges, circular rugs, and oval coffee tables add a sense of fluidity and comfort to living spaces. So we are seeing the softening of interiors, more organic shapes, rounded edges, circular forms, and very fluid and dynamic patterns in interior spaces and architecture projects. Then, vintage and retro revival.

Vintage and retro styles are making a significant return. Mid-century modern furniture, 70s-inspired color schemes, and antique decor pieces are being incorporated into contemporary designs. This trend is all about nostalgia, offering a comforting nod to the past while blending with modern aesthetics. So these are some important and interesting details. Next, tech-integrated homes.

Voice-activated assistants, smart lighting, and high-tech security systems. We are seeing more of these. Home automation is seamlessly blending into the design, making life more convenient while maintaining style and elegance. Textural Variety: Textures

play a crucial role in 2024 interiors and times to come. Mixing different materials like velvet, wool, metal, and wood adds depth and interest to spaces.

Tactile elements such as plush rugs, textured wallpapers, and artisanal ceramics are being used to create a rich, layered look. So this is interesting—how through textures and tactile elements, we are able to add depth to a space and create points of interest and attention. Bold marble is also a popular trend emerging in 2024. Marble, especially with bold, dramatic veining, is a major trend. This luxurious material is being used in kitchens, bathrooms, and even living rooms.

Black and green marbles are particularly popular, adding a touch of elegance and drama to interiors. One of the lectures focuses on stone as a material, and we have talked about a variety of stones. So two of these, the black and the green marbles, are particularly popular when we talk about trends in 2024. Personalized spaces. Personalization is key.

People are creating spaces that reflect their unique tastes, lifestyles, and stories. Customized furniture, bespoke art pieces, and personalized decor elements are making spaces appear truly one-of-a-kind. This trend is about making a house feel like a home, filled with meaningful objects and designs. So in any case, when we work on interior design projects and in the field of interior architecture, Particularization and personalization are always important because we are working on a micro scale, and the intention is to capture the stories of the clientele, of the users, and to tell stories and narratives through the design of interior spaces.

Outdoor-inspired interiors is another interesting trend. Bringing the outdoors in is more popular than ever. This trend involves using natural materials, large windows, and open spaces to create a seamless connection with nature. Outdoor furniture is being used indoors, and spaces are being designed to maximize views and access to the outside. Now let's talk about tiny houses and why they are emerging as a popular concept.

Tiny houses have become popular in recent years as property costs have skyrocketed. This is one of the reasons, and these are very compact. Many people have also adapted to a more sustainable way of living, reducing their carbon footprint and the blueprint of the building itself, which is why many are turning to tiny houses. Additionally, some of these may be mobile and portable, appealing to those who love traveling and want to have a tiny house with them all the time. This is another option in that scenario.

A tiny house interior provides a more flexible way to live, whether as an off-the-grid hideaway or a means to live more simply and affordably. Now, these houses have less area compared to a typical conventional house. But the amount of detailing is paramount in these kinds of projects. For multifunctionality and space optimization, one must consider innovative joinery and features like portability, foldability, and modularity. This is all very important, and when tiny houses are designed, these details can be seen in such projects.

Trends and technologies for tiny houses. Wall paint color is very important. Light paint colors are preferred in compact house interiors, and there are important reasons for that. Because they reflect light effectively, neutrals like whites, grays, and beige make rooms appear bigger and airier than they typically are. Therefore, it's important to make the right selection or choice for the paint color.

While bright colors and wallpapers could also be used, they need to be utilized cautiously because they can make the space seem tight or congested. So one has to see what the project type is, what the space being addressed is, what the climatic context is, and of course what the preference of the clientele is for whom the houses are being designed. But yes, typically the light colors, like we saw over here, They reflect light, and therefore the neutrals are quite often chosen to make the space appear bigger and airier. The interiors.

Now, choosing black and white interiors is a great way to keep things minimalist if the tiny house is on the smaller side. Like we see over here, this black and white scheme. This scheme opens up the space and makes it appear sleek and modern. So a lot of people choose this kind of color scheme because the house or the space is very compact as it is, and one has to make it look seamless. Through our design, we have to make it open up a bit. So this is one heck of a thumb rule that could be adopted.

When decorating the tiny house interiors, something to consider is the choice of patterns and colorways. For furnishings and couches, it will make a lot of difference in how one can make the space appear, even if it is so tiny, small, and compact. Using plants to add some life is another interesting method that could be integrated while designing tiny houses. So plants are a much-needed staple of tiny house interiors. Hang greenery from the ceiling, mount plants on the wall, or place succulents in otherwise unused areas to add pops of color and keep the air fresh.

So this is a very very interesting and precious way of lighting up a tiny house. For some people environmental sustainability draws them towards tiny house living as I was mentioning when I started talking about tiny houses and why it is becoming popular as a concept. To achieve this, it is promoted to use as many reclaimed or refurbished items as possible. So this is very interesting. And during the lecture on green interiors, we are talking about the incentivization while using, you know, reclaimed or refurbished items.

So these are all very, very important points, crucial for interior architecture and especially talking about aspects of sustainability, which are paramount today and times to come. And of course, by default, it's very important to protect environment through our designs. Storage and bookshelves. A tiny house design necessitates being inventive, like I was talking about interesting unique joinery, etc. One way to do it is by using walls effectively.

To optimize space utilization and multifunctionality, design unique joinery, which is a very, very important tool that any designer, you know, could utilize. So joinery is very interesting, very important for projects like a tiny house. Then install floating shelves, hidden tables and wall workstations to maximize vertical space and to add storage. Above eye level, we may also hang portraits, plants and other accessories. So those are also options.

Then, windows and openings. The number of windows and the amount of natural light that enters impact comfort directly in any tiny house, and of course in any project, but more so for a tiny house. Placing one in the kitchen, sleeping areas, and lounge is the minimum that one should pursue. So, this is sort of a thumb rule, and it will help in designing tiny houses if some of you are planning to work on that project. Lighting and furnishing a tiny house interior can be tricky, as one does not want to overwhelm the space.

Fortunately, lighting lets one go all out since lights do not take up too much room, and lighting can be very, very interesting and very important in how we make our interior spaces beautiful. Look, or, you know, felt by the users. There is, in any case, an elaborate discussion that we have on lighting, color, and different aspects of, you know, interior design. And there are lectures which specifically focus on all of these topics. Hanging a chandelier is also an interesting way of creating interest in a tiny house.

Install Edison bulbs, interesting and beautiful joinery details, portable objects, and furniture. Make the tiny house interior stand out with a mid-century modern lamp. So, these are some of the interesting details that could be incorporated while working on tiny houses. Now, some case studies, you know, focusing on tiny houses. This is one case study: the clapboard cottage.

So, with the help of his dad and brother, this homeowner spent 15 months renovating his 1940s-era, two-bedroom, one-bath, 800-square-foot cottage in Tennessee. It's a very interesting project. You know, there is this happy color choice for the front door and window trim. And in front, his four-season ode to the Southern garden included hydrangeas, azaleas, and abelia. So, there is a very interesting landscape detail.

There are very interesting color choices. Like we see over here, the contrast between the background and the foreground. And a very interesting composition. Compact house, very interesting. Converted schoolhouse.

Designers John Leque and Jason Oliver Nixon of Madcap Cottage looked outside the home box for their upstate New York tiny home. So, this is also a very interesting project that we see over here, quite compact. In just 858 square feet, this 1840s schoolhouse features at least a dozen paint colors, just as many patterned fabrics and wallpapers, and ample antiques behind its door. So, very interesting color palettes, fabrics, wallpapers, and very interesting antiques. So, even though the space is quite small and compact, there are other ways to create interest within a space and to create variety.

And for that, paint colors, fabrics, wallpapers, antiques, objects of decor—all of these have been incorporated as design vocabulary. Then there is this tiny holiday home. I have put elaborate details, at least about this case study here. The rest, of course, you can read a bit more on that if you are interested to find out—specifically, the interior details.

So, this one is a very, very interesting project. This is situated in the Netherlands. This beautiful tiny house is designed by Chris Kolaris of I-29 Interior Architects. With a footprint of only 75 square meters, this house has a luxurious feel of space and all-around panoramas of the surrounding nature. As you can see over here, there's a

beautiful site context and lovely surroundings—quite compact and small, situated again in a very, very beautiful place.

This compact home is built for a family of four, including a living room, a kitchen-dining room, a patio, three bedrooms, one bathroom, and two toilets. The layout is developed from the inside out. The smart arrangement of functions makes use of every square centimeter. That's the philosophy of the interior architect. So you must have noticed that I use this term 'interior architect' often.

So there are proper qualifications, you know—there are degrees, there are programs which will qualify you as an interior architect. And we have already begun this discussion, you know, in the very beginning. Interior design, interior architecture, interior decor—and why interior architecture is a more holistic, more cohesive term, and why it is becoming more and more popular. So here you can see some of the details, you know—how the blocks are placed and the massing is done for this project, how it sits here on the site. And then we see over here the elevations and how the surroundings are used for views and panoramas.

These are the details over here. It is designed inside out in very, very interesting ways to, you know, bring the landscape from outside to in and from inside to outside—how the spaces are flowing. So the details, the use of color to make it appear larger, and the area to bring in light. So all these interesting details we will see over here in this project. Here also, the furniture details.

So all the interesting joinery details can also be seen in this project. These are, you know, interesting sections—different sections—and how one can understand through these sections, you know, the functionality within a space and the architectural program, while also trying to understand the overall form and the levels with which the architect has played. So we see these spaces over here, and you know, the connections in between. A very interesting project in, you know, such a small square footage. This is another section.

Whenever you create your interior design portfolio, the wall elevations and sectional elevations are a great way to communicate your ideas. So this is again a very interesting use of space and the way it is configured around the views and nature. Another one

looking this side. This is also very interesting, and we see the overall form over here. This one again.

So very tiny but very effective, quite aesthetic, functional, making use of every square centimeter with interesting material details. We saw some of those case studies focusing on tiny houses. And there are many more. I could recommend a series on Netflix called 'Tiny House Nation,' which gives a tremendous amount of details. While I'm talking about recommendations, I could also recommend another one, 'The World's Most Extraordinary Homes.' That's also a beautiful series. Amazing, you know, interior spaces and very unconventional, extraordinary projects that have been showcased, dissected, deciphered, and discussed during that series. Now, let's talk about origami.

Now, I find it very interesting, especially when one explores origami for space-making, you know, for interior architecture. So that kind of interesting application is what fascinates me. So just to give an overview, a lot of us probably already know about it. Origami is the paper-folding art without cutting, sticking, gluing, or checking. And it is derived from the Japanese word 'Ori,' meaning folding, and 'Kami,' signifying paper.

And these are the three kinds of folds that are used while working with origami. The mountain fold, the valley fold, and the combination of both of these. Essentially, through these folds, different kinds of designs can be achieved. So, there are certain types of origami. Modular origami, kirigami, action origami, and origami tessellation.

When there is one unit or module used to create a certain object or design, that is essentially modular origami. It is the most common and quite popular origami. In kirigami, certain cuts are introduced. That's also interesting. It's used extensively for making lamps.

Then there is action origami, which suggests some actions. If we recall some games from our childhood, we just press a paper frog, and it jumps. So, there is some suggestion of an action. Action origami is very interesting. It is utilized mostly for toy-making and very interesting action-oriented designs.

Then there is origami tessellation, which is very, very complex. I haven't discussed that in the examples that I have put over here. But if you are interested, please look it up. It's quite complex, and it creates very interesting volumes and a very interesting world with a single surface. It gives you a lot of 3D expression, and it requires some skill sets.

It does have certain embedded systems or mathematics behind it. So if one is interested, please look it up. But these are the most popular types of origami, and among these, modular origami is very, very extensively used by designers. Now, how can we incorporate origami into designs?

There are certain examples and certain ideas that have been put over here. Origami can be incorporated in architecture as well as interior design through the concepts of static or rigid, deployable fixed, deployable kinetic. These are very interesting concepts, and I could take one lecture each or even more to explain each one of these, but I'm just trying to present them here in an overview manner.

We see some examples here from Expo 2020 Dubai. In static, the form remains the same with the same configuration over time. This state is chosen due to aesthetic and structural reasons. So, we are discussing static, and this is another interesting example—the facade of the Japan pavilion. The fine material of the facade, resembling Japanese paper, protects the pavilion from direct sunlight.

This is a very interesting project, discussing the principles and concepts of origami applied to space-making, whether it's just the facade or other kinds of applications we will see throughout the remaining slides. Then there are deployable fixed materials. They have the self-supporting capabilities of rigid origami surfaces and the ability to be folded into flat and compressed objects. They can be used in temporary structures for events and disaster management. They can also be used for homeless shelters and site workers—wherever we need ephemeral or temporary structures to be built.

They can be used in interiors for foldable and movable furniture, which tends to be mobile and easy to carry. So, when we talk about deployable fixed, foldability and movability—or portability—are important attributes. They could also be used in decorative artifacts. Then there is deployable kinetic furniture. In this concept, the system acts independently to create transformable structures.

So, there is a dynamism and a kinetic attribute to the overall design. It can be used in shading devices, reconfigurable walls, and acoustical treatment. Now, some of the materials that could be used while designing for interior architecture—and of course, it is not just paper—we are applying the principles and concepts of origami, but it requires a different material palette, including various kinds of paper, depending on the scale

and the design capacity. But these are some of the materials that could be used for interior architecture, keeping the origami concept in mind. Design for rigid frame structures: cement blocks, steel outline for deployable portable structures, gentle steel, polycarbonate sheets, PVC sheets, and some tensile textures.

For interiors: wood, compressed wood, overlays, fabric, and thick paper. So, what kind of paper, board, or cardboard depends on the density. Even different kinds of paper and cardboard could be used, depending on the design. Foldable furnishings. Origami furniture—I can show some examples.

So, here are some origami-inspired furniture pieces that apply the attributes of foldability and multifunctionality. Some more origami-inspired designs when we talk about furniture. Some furniture for kids—here, different kinds of packaging cardboards or edge boards could also be employed in the designs. Since it's for kids and not adults, the load-bearing capacity is less and not needed in the same amount. This is an interesting palette to utilize. To give different shapes and forms based on kids' psychology. And then also keeping sustainability aspects in mind.

Here are some more examples of origami-inspired furniture. There are also origami-inspired buildings. This is the most interesting and fascinating part for me as an interior architect. Here we see one structure. An interior architecture structure based on circular origami pleating.

We are trying to imbibe or get inspired by the principles of origami. Then we try to create spaces or an interior architecture structure. This is another way of expanding the applications and trying experimental approaches. The structure itself forms a dome. There is no need for columns or any external support.

Here we see this pleating mechanism and a huge expanse achieved because it is domical, creating a free-flowing space without columns interfering. Then there is an installation based on a water bomb structure. When we talk about origami—and I always emphasize this—there are technical and structural aspects involved in interior design. So when we talk about origami, there is a pine cone structure, there is a water bomb structure and so on. We must have often come across origami swans.

They use a pine cone structure. Here, what you see is a water bomb structure. And there is an installation based on that water bomb structure. It offers maximum curves and can stand without external support. So, there is always a system in place.

There is always a structural detail that has to be kept in mind, whether it's an object of use, furniture, a product, or a building. One has to really understand the embedded system, the structure, and how things are put together in a holistic manner to create that space or design. This is another structure based on origami, and you know how it can change shapes and forms. So, these are some of the references. Some websites and some of the references are also put on the slide.

Thank you so much. I'll see you next time.