**(System Analysis & Design)**

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| --- | --- | --- |
| **1-Bath room** |  | |
| **-Bed room** |  | |
|  |  | |
| kitchen |  | |
| Living Room |  | |
| Corner |  | |
| **Office** |  |  |
| **Office** |  |  |

**Latest developments in 3D design and animation technologies:**

**Research recent developments in 3D design software such as artificial intelligence in generating designs, or using virtual reality (VR) to provide an immersive experience.**

**Study how to integrate modern technologies such as Real-Time Rendering to speed up the visualization and animation process.**

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#### ****Sketches and Initial Ideas****

#### ****• Objective:****

#### ****To develop an initial concept of the design by drawing quick sketches that reflect the basic ideas.****

#### ****• Implementation:****

#### ****o Draw horizontal plans (Plan) to distribute rooms and spaces initially.****

#### ****o Create manual or digital sketches (using programs such as Photoshop or Procreate) that illustrate the interior design (furniture, lighting, colors).****

#### ****o Identify key points in the design such as the entrance, living room, kitchen, and bathrooms.****

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#### ****2- Develop a structural concept for 3D models and their design style (3D Modeling Structure)****

#### ****• Objective:****

#### ****Convert the initial sketches into a 3D structural model.****

#### ****• Implementation:****

#### ****o Use 3D modeling programs such as Blender, 3ds Max, or SketchUp to create the basic structure of the apartment.****

#### ****o Divide the model into main components (walls, floors, ceilings, furniture).****

#### ****o Determine the design style (Modern, Minimalist, Industrial) and ensure its application in the 3D model.****

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#### ****3- Identify the stages of modeling, texture, lighting, and animation (Modeling, Texturing, Lighting, Animation)****

#### ****• Objective:****

#### ****Develop a detailed plan for the stages of work to ensure accurate and high-quality implementation.****

#### ****• Implementation:****

#### ****o Modeling:****

#### ****Create a 3D model based on initial sketches.****

#### ****Add fine details such as windows, doors, and furniture.****

#### ****o Texturing:****

#### ****Apply materials such as wood, marble, and metals to surfaces.****

#### ****Use programs such as Substance Painter or Quixel Mixer to create high-quality materials.****

#### ****o Lighting:****

#### ****Add natural (windows) and artificial (interior lighting) light sources.****

#### ****Use techniques such as Global Illumination to achieve realistic lighting.****

#### ****o Animation:****

#### ****Create smooth camera movements to show the design from different angles.****

#### ****Add simple interactions such as opening doors or turning on lights.****

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#### ****4- Create sketches or initial concept drawings of models and environments (Concept Art)****

#### ****• Objective:****

#### ****Develop a more detailed visual concept of the design before starting 3D modeling.****

#### ****• Implementation:****

#### ****o Create concept drawings that illustrate the interior and exterior design.****

#### ****o Use programs such as Photoshop or Procreate to draw fine details.****

#### ****o Determine colors, materials, and lighting in the concept drawings****

#### ****Expected results****

#### ****• Provide a high-quality 3D model of an 80 square meter apartment.****

#### ****• An animation video that displays the design in an interactive and realistic way.****

#### ****• Achieve a balance between functionality and aesthetics in the design****

#### ****Determine the animation methods used (Rigging, Keyframing, Motion Capture)****

#### ****• Objective:****

#### ****Choose the appropriate methods to animate the 3D model.****

#### ****• Implementation:****

#### ****Keyframing:****

#### ****Define keyframes to move the camera or elements in the scene.****

#### ****1. Literature Review****

#### ****Study similar projects:****

#### ****Analyze previous projects that were implemented in similar areas (80 square meters) to determine the design standards and methods used.****

#### ****Focus on how to optimally utilize the space while maintaining aesthetics and functionality.****

#### ****Study the internal distribution of rooms (living room, kitchen, bathrooms, private rooms) and how to achieve integration between them.****

#### ****o Analyze the artistic methods and techniques used:****

#### ****Evaluate the software tools used in 3D design such as AutoCAD, SketchUp, 3ds Max, Blender.****

#### ****Study how lighting, colors, and materials are used in design to enhance aesthetics and realism.****

#### ****Analyze the animation techniques used in presenting architectural projects such as Lumion, Unreal Engine, or Cinema 4D.****

#### ****the latest developments in 3D design and animation techniques:****

#### ****Search for recent developments in 3D design programs such as artificial intelligence in generating designs, or using virtual reality (VR) to provide an immersive experience.****

#### ****Study how to integrate modern technologies such as Real-Time Rendering to speed up the visualization and animation process.****

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#### ****Hypothesis****

#### ****Hypothesis 1:****

#### ****The design of an 80 square meter apartment can be achieved in a functional and aesthetic way through the optimal use of space and the integrated distribution of rooms.****

#### ****Hypothesis 2:****

#### ****Using the latest 3D design and animation technologies will enable the provision of realistic visualizations and high-quality animation videos that accurately reflect the final design.****

#### ****Hypothesis 3:****

#### ****Integrating modern developments in design such as artificial intelligence and virtual reality will improve the user experience and make the design more interactive.****

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#### ****3- Execution****

#### ****Functional design:****

#### ****Divide the space into functional areas (living, dining, sleeping, services) while considering the free flow of movement between them.****

#### ****Use multi-functional furniture (such as folding beds or adjustable tables) to maximize the use of space.****

#### ****Choose light colors and light-reflective materials to enhance the sense of spaciousness.****

#### ****Aesthetic Design:****

#### ****Adopting a modern design style using clean lines and neutral colors with touches of bright colors.****

#### ****Using smart lighting (LED) to create different atmospheres according to the time and purpose.****

#### ****Choosing high-quality materials such as natural wood, marble, and shiny metals to add a luxurious touch****