

Prifysgol Cymru

Y Drindod Dewi Sant

University of Wales

Trinity Saint David

BA (Hons) Computer Games Design & Animation and VFX

Personal Portfolio Development (ACCA6033)/
Datblygu Portffolio Personol(ACCA6033)

Rendering 3D Models In Unreal Engine 5/
Rendro modelau 3D Mewn Unreal Engine 5



Rendering Models in Unreal Engine 5

Rendro modelau 3D Mewn Unreal Engine 5

Lecture Contents Nodiadau Darlith

- 1 Preparing for UE5**
- 2 Setting up the UE5 world**
- 3 Basic Lighting**
- 4 Camera Set up**
- 5 Advanced Lighting**
- 6 Rendering**



Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering Models In Unreal Engine 5

Preparing For Unreal Engine 5



Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Prepping Assets for UE5

1. Navigate Moodle to **Evolving Your Creative Craft.**

2. Under **Evolving your creative craft – Resources**, select **Backdrop For 3D Model Turnaround.**

3. **Download** the Showreel backdrop FBX file.

The image shows a Moodle course page titled "Evolving Your Creative Craft - Resources". The page has a light blue header with the course title. Below the header, there is a section titled "Resources for Tutorial Sessions can be downloaded from here." which lists four resources. The first resource is a PDF file titled "Techniques - Silhouettes (Walt Disney Family Museum)" with a description: "General advice about characters and silhouettes from the Walt Disney Family Museum." The second resource is a folder titled "ECC Colour Theory Source Images" with a description: "PSD layered versions of the source files used for the Colour Theory lecture." The third resource is a folder titled "Orthographic Reference Exercise - Range Rover" with a description: "Front, Top and Side images of a vehicle used to create an Orthographic reference sheet." and a note: "NOTE: This process helps you create scaled images as well as using existing ones - in this instance the construction lines help you to draw a correctly scaled view from a different perspective." The fourth resource is a folder titled "ECC - 3D Reference Images (Range Rover)" with a description: "Reference Images used for the exercise of the ECC - 3D Reference Images presentation (ECC_REF_RR_side / front / top)". The fifth resource is a folder titled "Backdrop For 3D Model Turnaround FBX" which is highlighted in yellow.

Evolving Your Creative Craft - Resources	
Resources for Tutorial Sessions can be downloaded from here.	
	Techniques - Silhouettes (Walt Disney Family Museum) PDF General advice about characters and silhouettes from the Walt Disney Family Museum.
	ECC Colour Theory Source Images PSD layered versions of the source files used for the Colour Theory lecture.
	Orthographic Reference Exercise - Range Rover Front, Top and Side images of a vehicle used to create an Orthographic reference sheet . NOTE: This process helps you create scaled images as well as using existing ones - in this instance the construction lines help you to draw a correctly scaled view from a different perspective.
	ECC - 3D Reference Images (Range Rover) Reference Images used for the exercise of the ECC - 3D Reference Images presentation (ECC_REF_RR_side / front / top)
	Backdrop For 3D Model Turnaround FBX



Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering Models In Unreal Engine 5

Setting Up The Unreal Engine 5 World



Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Creating a project:

1. Load up Unreal Engine 5.5.4. ✓
2. Select the Third Person template and name the project “UE5_Showreel_Render”.
3. On the same menu under Project defaults, enable Raytracing and set quality preset to Maximum.





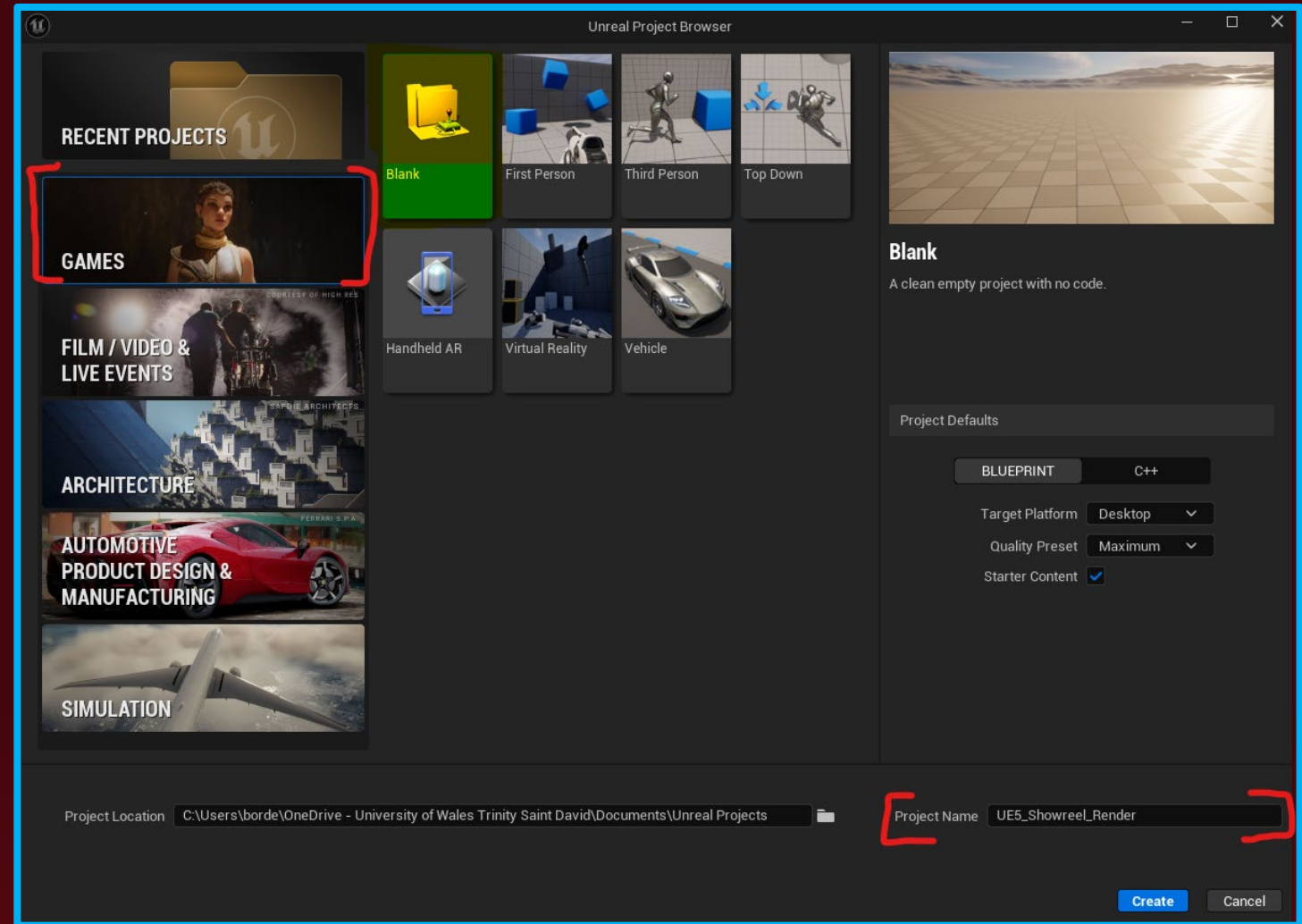
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Creating a project:

1. Load up Unreal Engine 5.5.4. ✓
2. Select the Third Person template and name the project “UE5_Showreel_Render”. ✓
3. On the same menu under Project defaults, enable Raytracing and set quality preset to Maximum.





Personal Portfolio Development/Datblygu Portffolio Personol

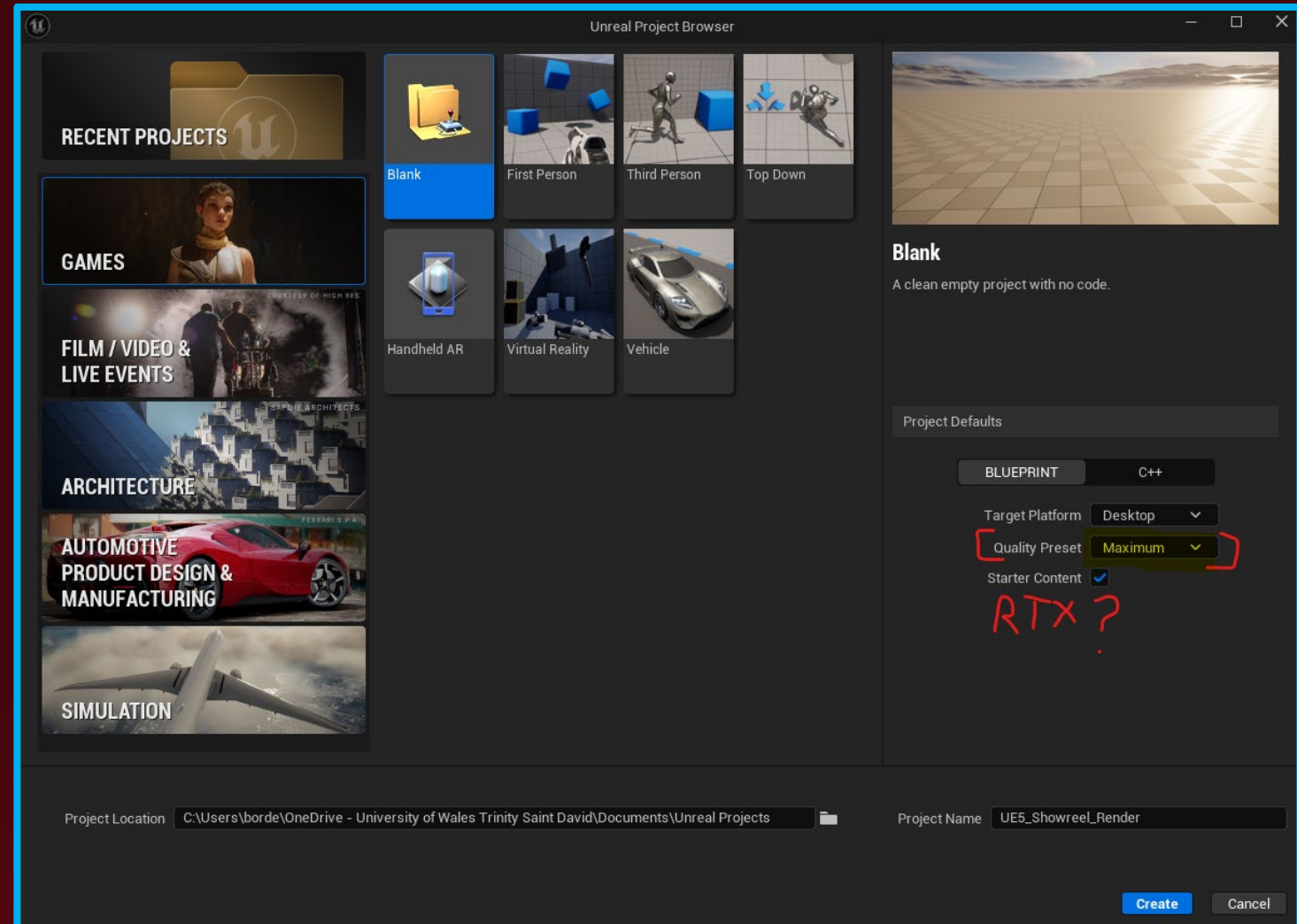
Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Creating a project:

1. Load up Unreal Engine 5.5.4. ✓
2. Select the Third Person template and name the project “UE5_Showreel_Render”. ✓
3. On the same menu under Project defaults, enable Raytracing and set quality preset to Maximum. ✓

(Note: Raytracing option may not be available depending on Engine version).





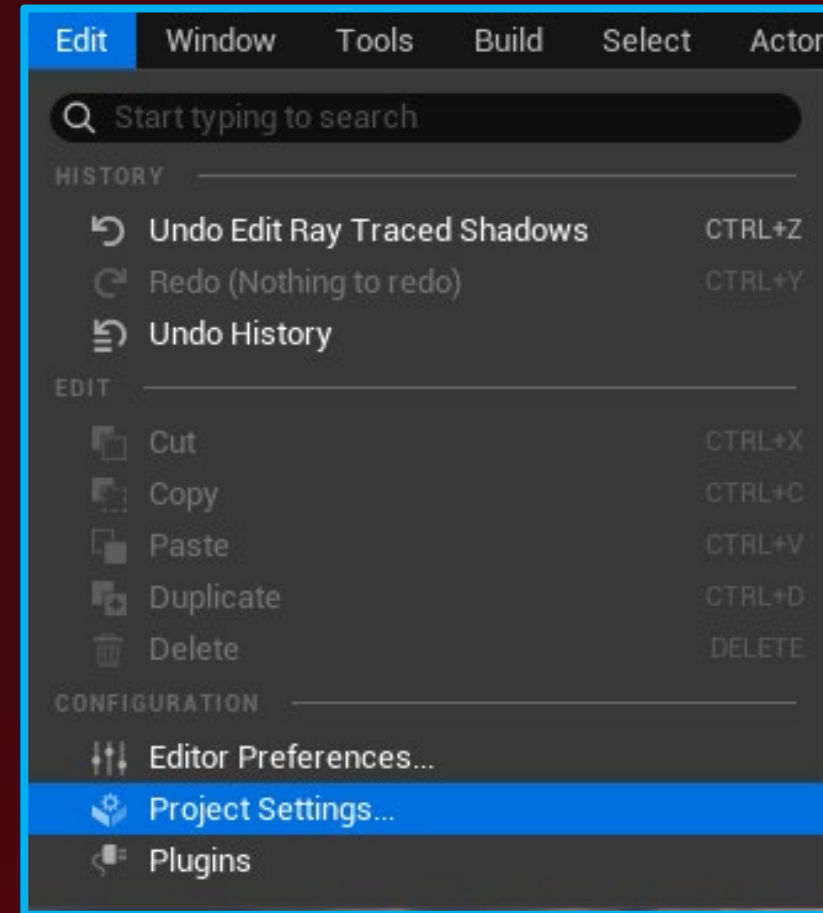
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Implementing Raytracing:

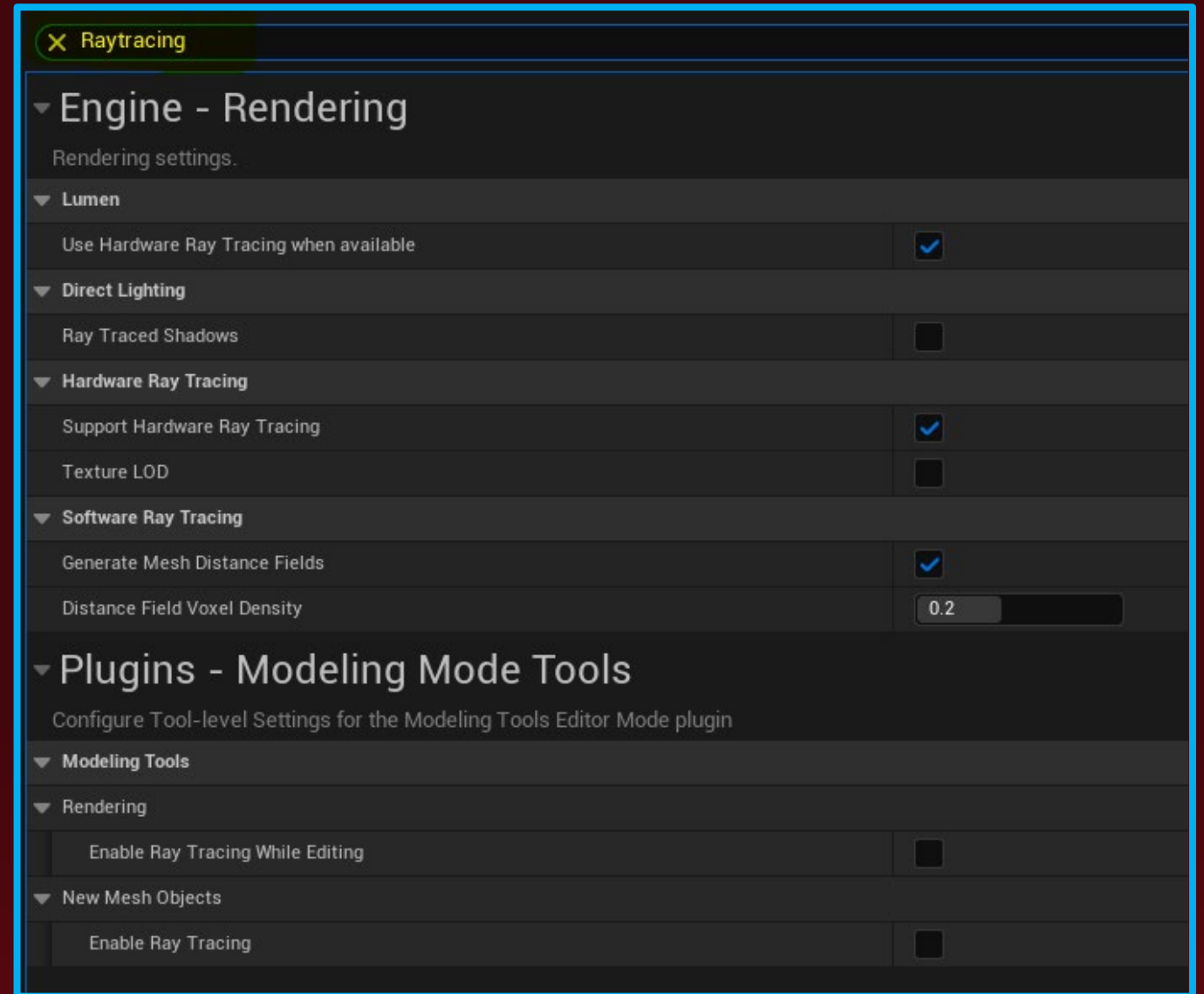
1. Navigate to the **project settings** (Under the Edit tab). ✓
2. Using the search bar, **search the term “Raytracing”**.
3. In Engine Rendering, under the **Hardware Ray Tracing tab**, enable **Support Hardware Ray Tracing**.





Setting Up The Unreal Engine 5 World Implementing Raytracing:

1. Navigate to the **project settings** (Under the Edit tab). ✓
2. Using the search bar, **search the term “Raytracing”**. ✓
3. In Engine Rendering, under the **Hardware Ray Tracing tab**, enable **Support Hardware Ray Tracing**.



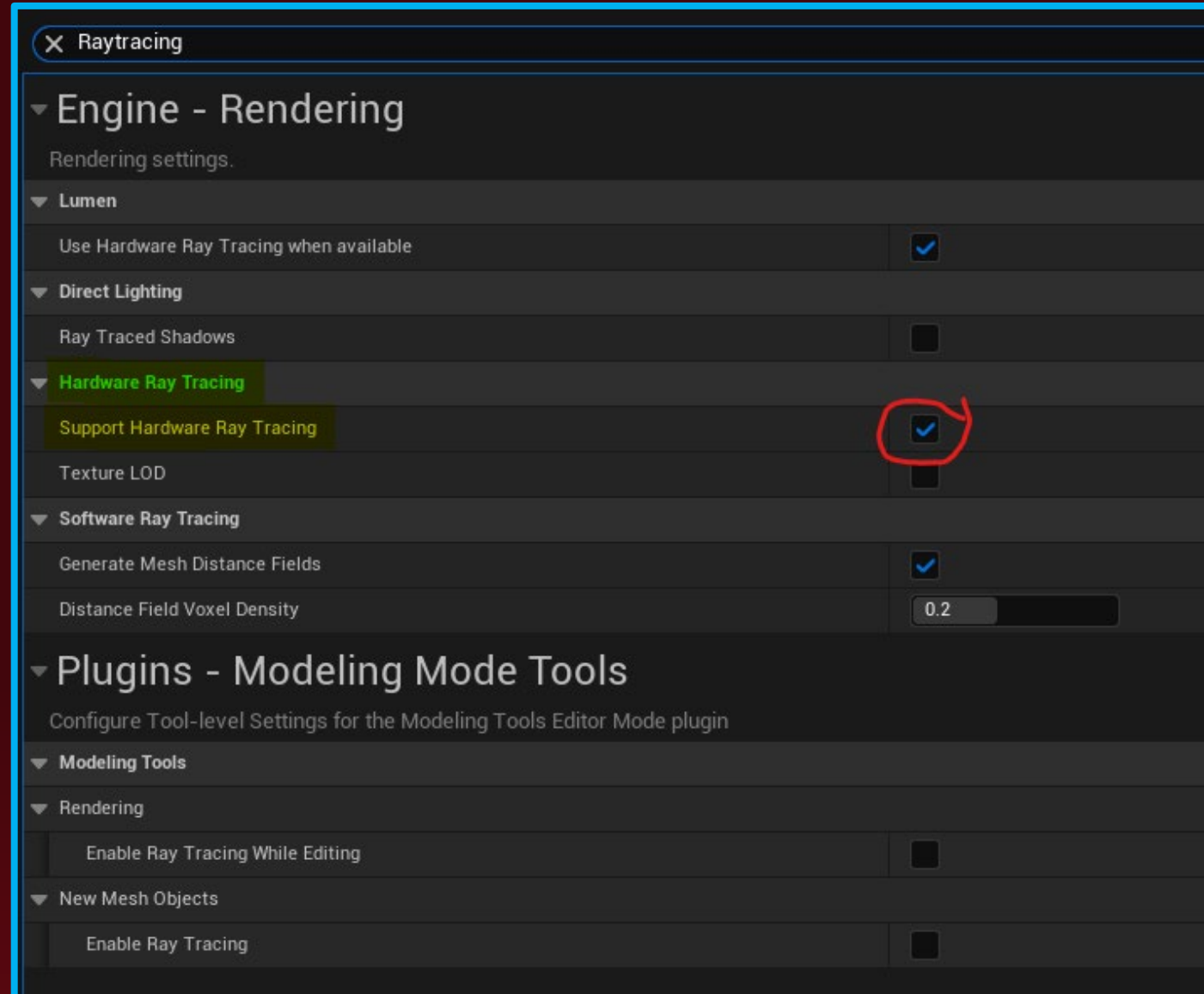


Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World Implementing Raytracing:

1. Navigate to the **project settings** (Under the Edit tab). ✓
2. Using the search bar, **search the term “Raytracing”**. ✓
3. In Engine Rendering, under the **Hardware Ray Tracing tab**, enable **Support Hardware Ray Tracing**. ✓





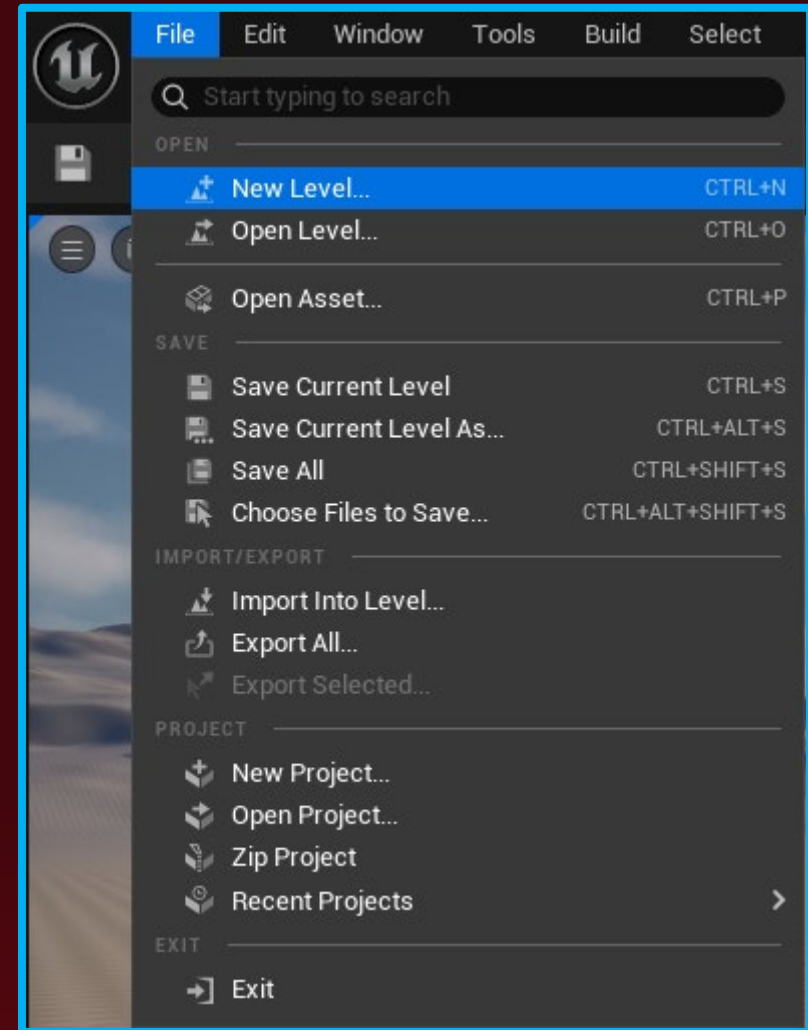
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Starting from scratch:

1. Navigate to **New Level** under the file tab. ✓
2. Create a **Empty Level** and save it as “ShowreelTemplate”.





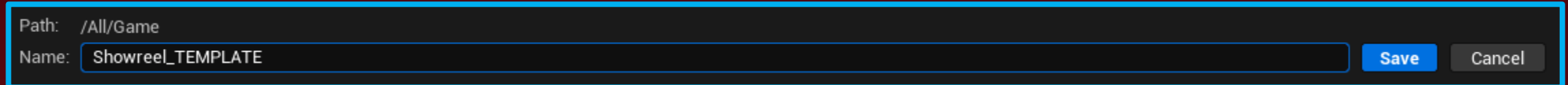
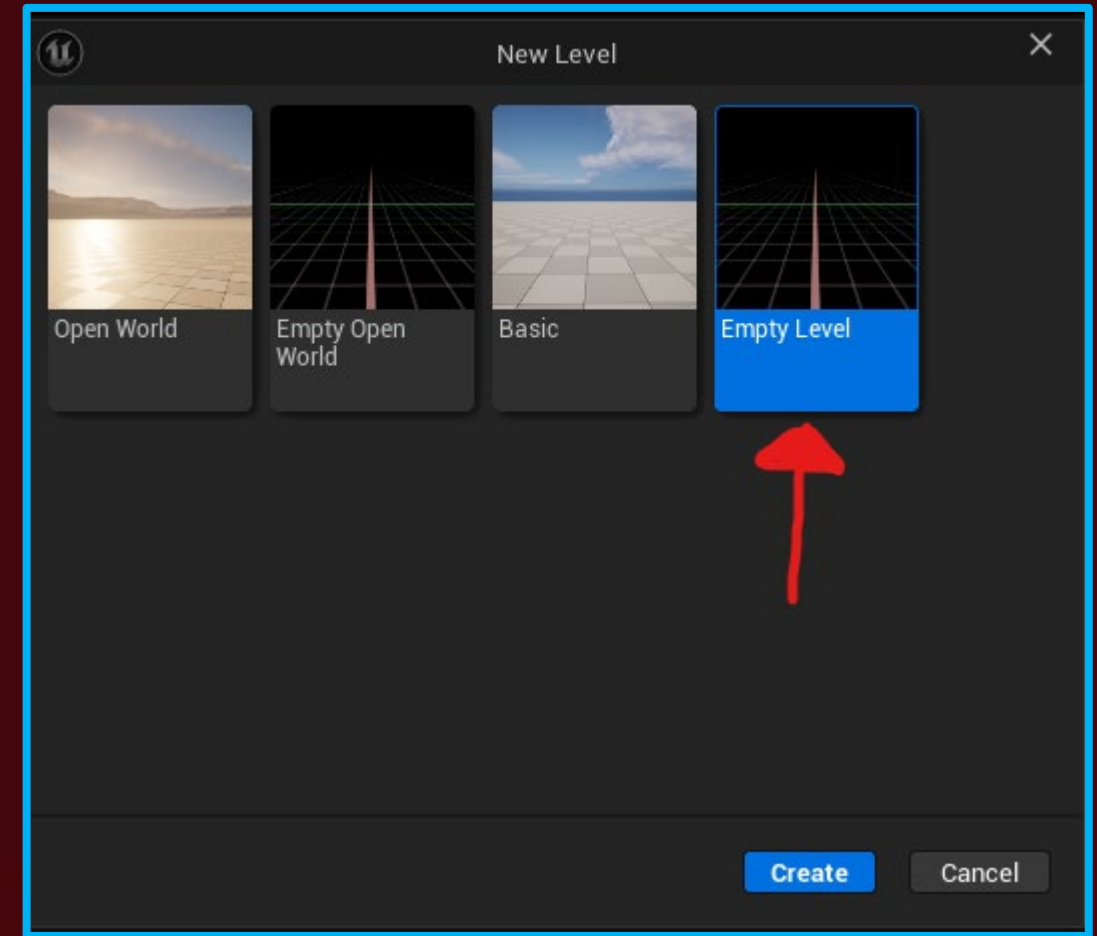
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Starting from scratch:

1. Navigate to **New Level** under the file tab. ✓
2. Create a **Empty Level** and save it as “ShowreelTemplate” (File>Save current level). ✓





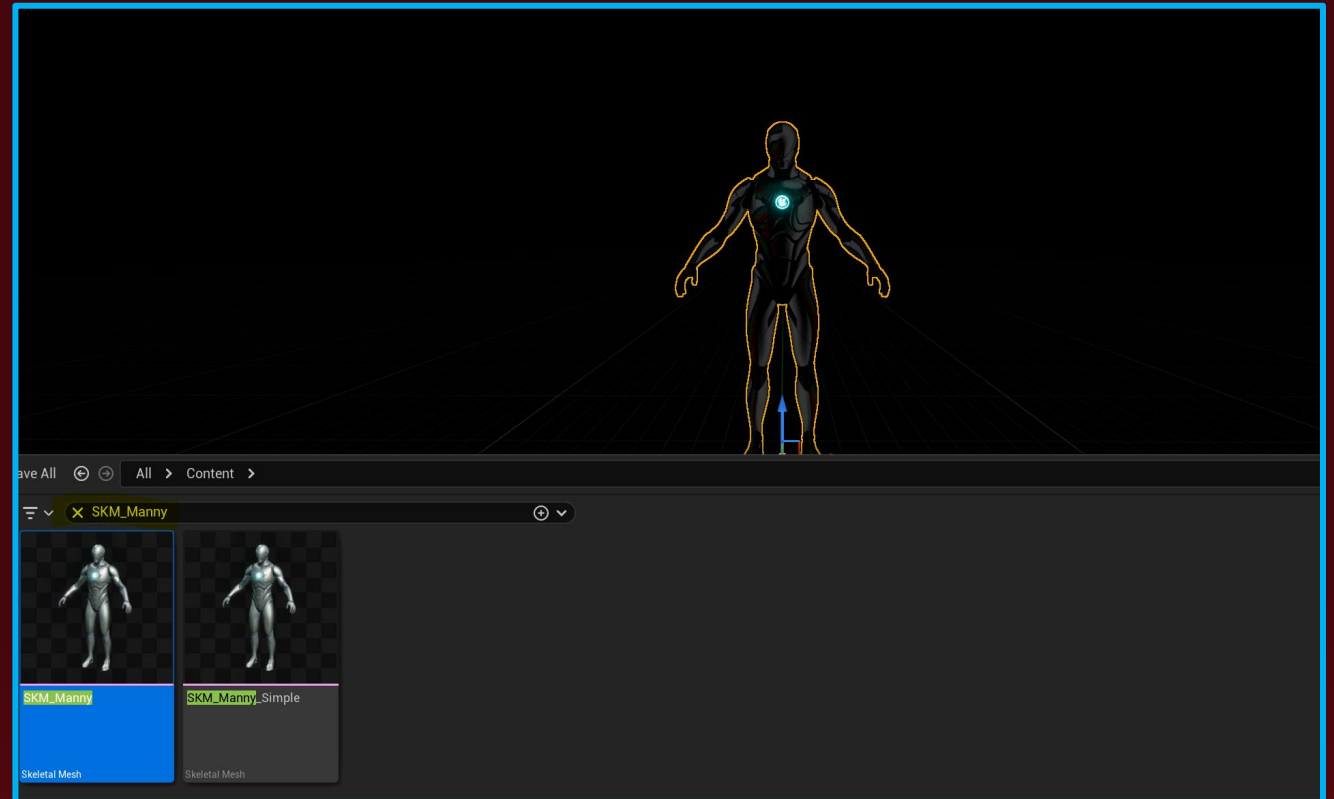
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Adding our character:

1. In the content browser search **“SKM_Manny”**. ✓
2. Drag and drop the “SKM_Manny” skeletal mesh into the level.





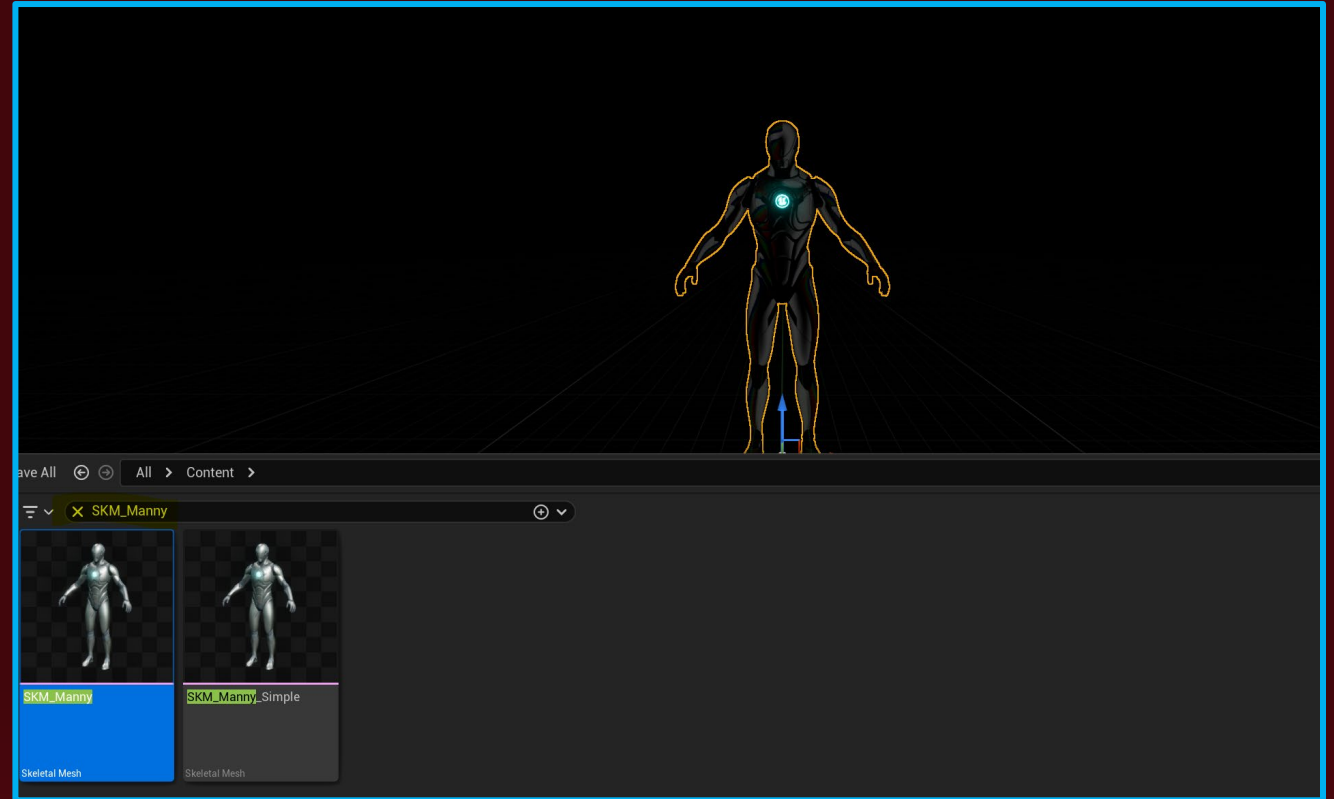
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Setting Up The Unreal Engine 5 World

Adding our character:

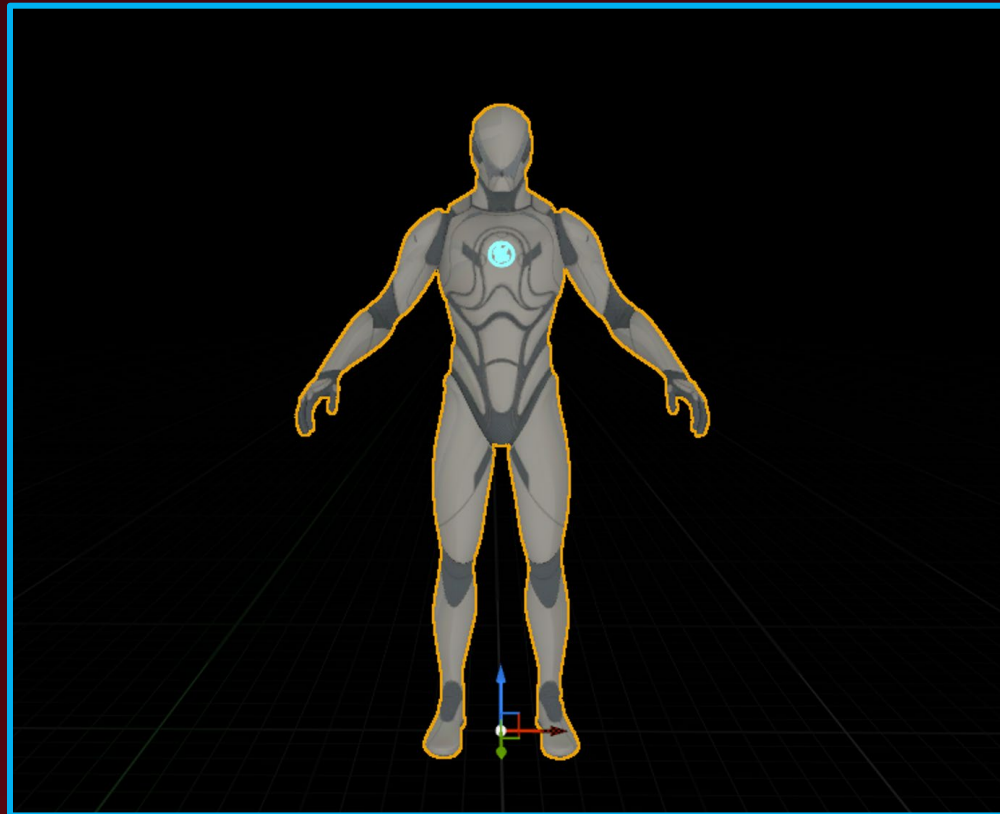
1. In the content browser search “SKM_Manny”. ✓
2. Drag and drop the “SKM_Manny” skeletal mesh into the level. ✓





Rendering Models In Unreal Engine 5

Basic Lighting





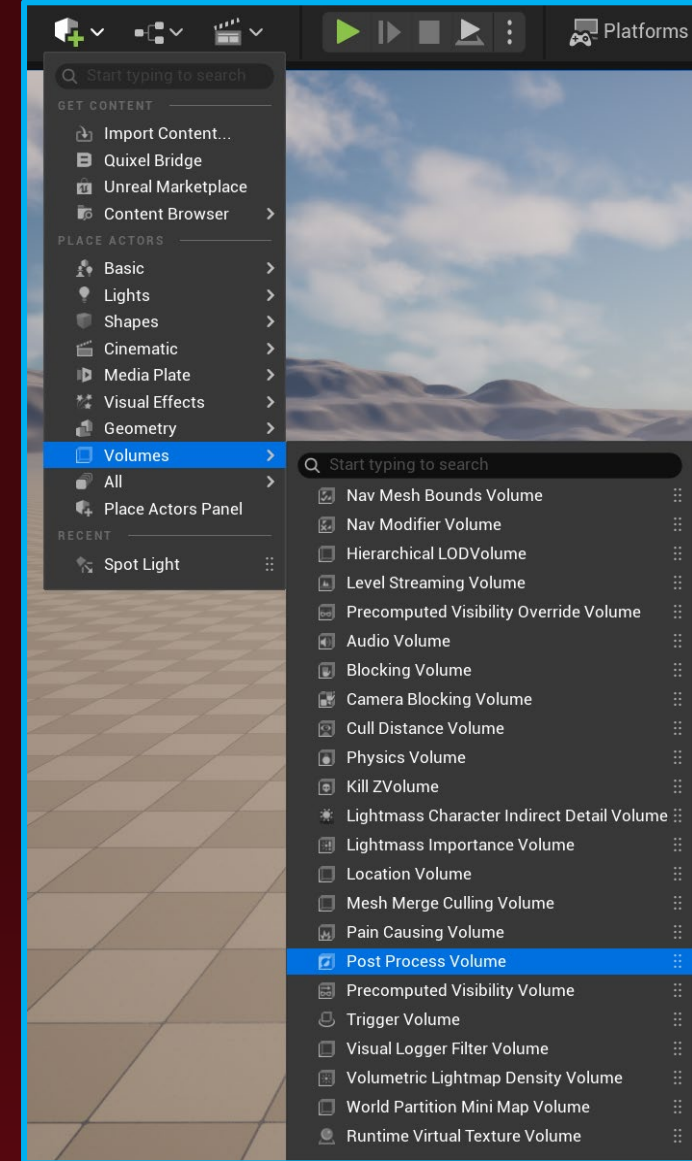
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Post Process Volume

Correcting Camera and Eye Exposure Levels:

1. Select Quick add to project (White cube with a green plus).
2. Scroll down to Volumes.
3. Scroll down and select Post Process Volume





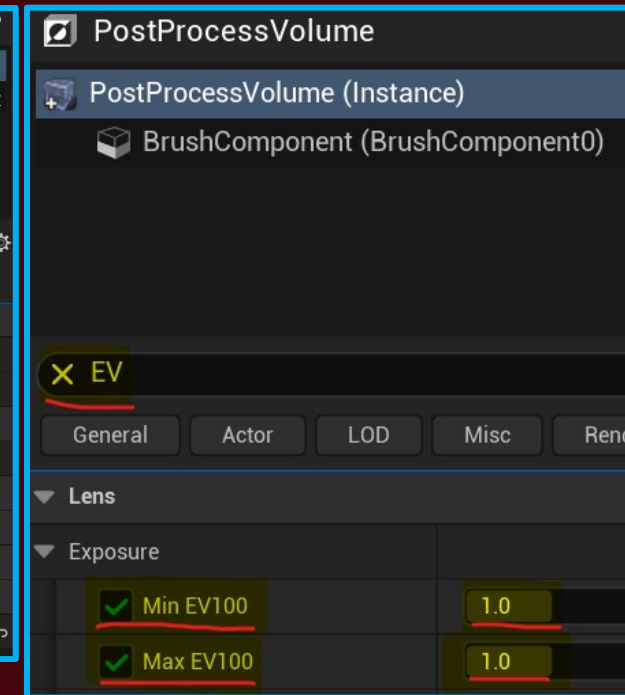
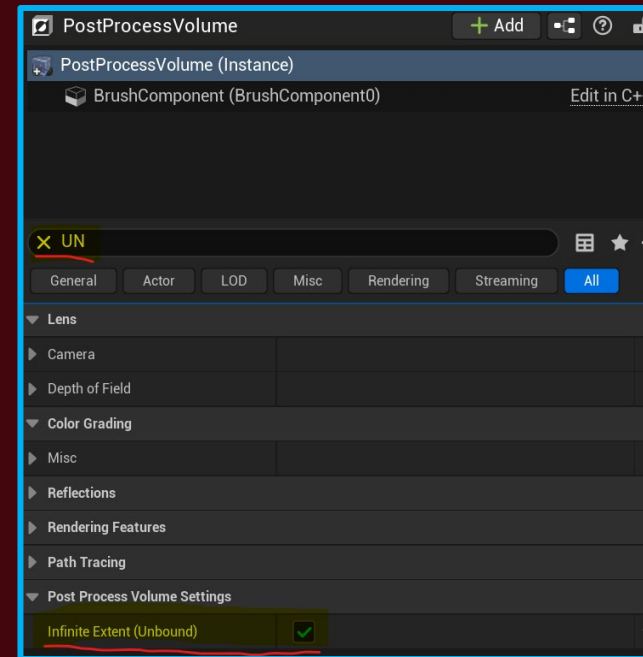
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Post Process Volume

Correcting Camera and Eye Exposure Levels:

1. With the post process volume selected, in the **outliner search "UN"** (for unbound).
2. Scroll down to the option **Post Process Volume Settings** and **enable Infinite Extent (Unbound)**.
3. Again, **in the outliner, search "EV"** (For Exposure).
4. **Enable both "Min EV100" and "Max EV100"** and set their **values to 1.0**.
5. **Rename your Post Process Volume** in the outliner to **"EV 0"**.





Basic Lighting

All Lights:

Main Light: The strongest light that defines the subject's basic shape and shading and sets the exposure.

Fill Light: A softer, less intense light that reduces harsh shadows from the key light.

Rim Light: A light placed behind the subject that creates a bright edge or “rim,” helping separate the subject from the background.

God Light: The god light is a soft overhead support light placed above the character that enhances surface curves and anatomy while adding a subtle warm or cool ambient tone without overpowering the main light.



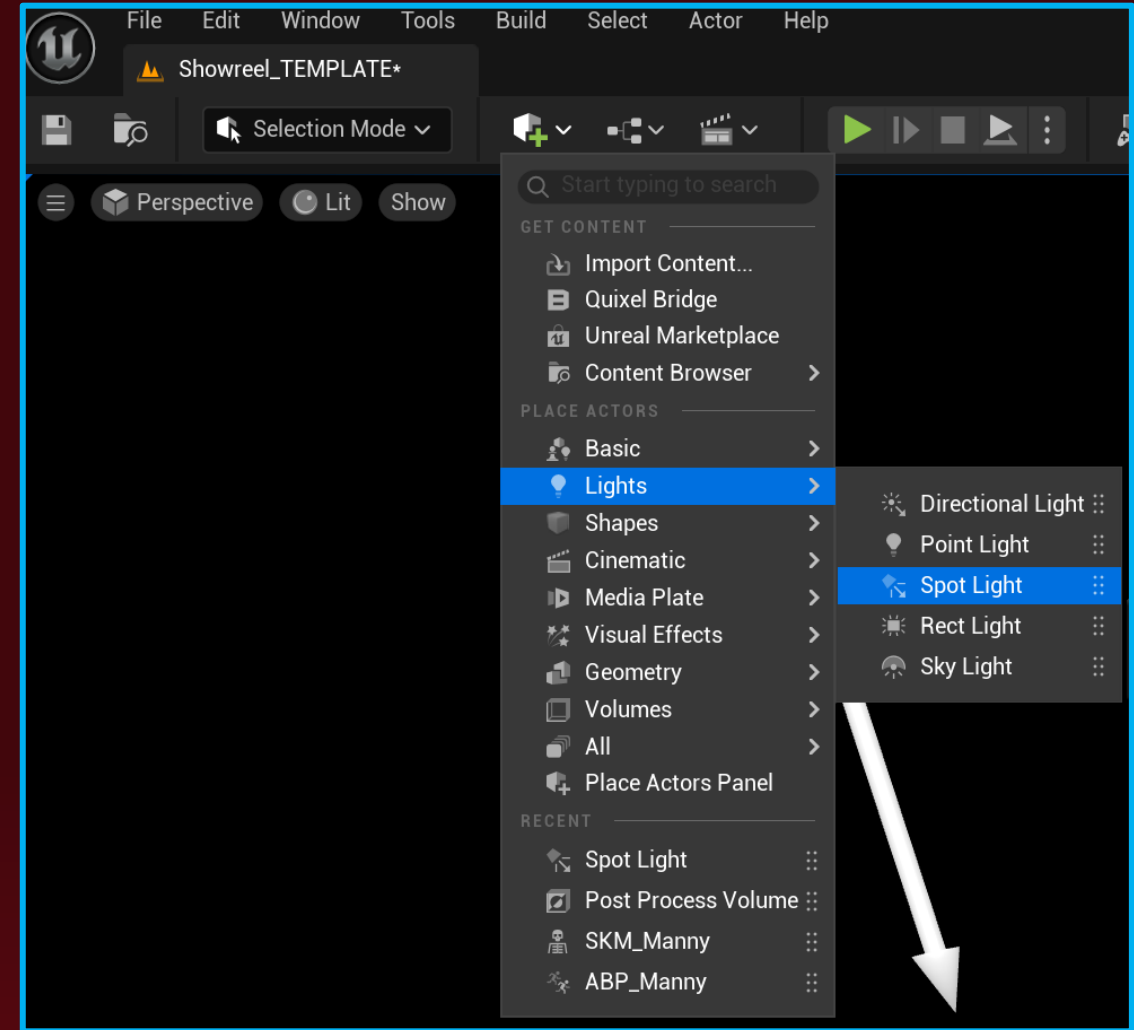
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Basic Lighting

Adding the Main Light:

1. Open quick add using the icon with a cube and a green plus.
2. Scroll down to lights.
3. Select spotlight.
4. In the outliner, name the spotlight “Main Light”.



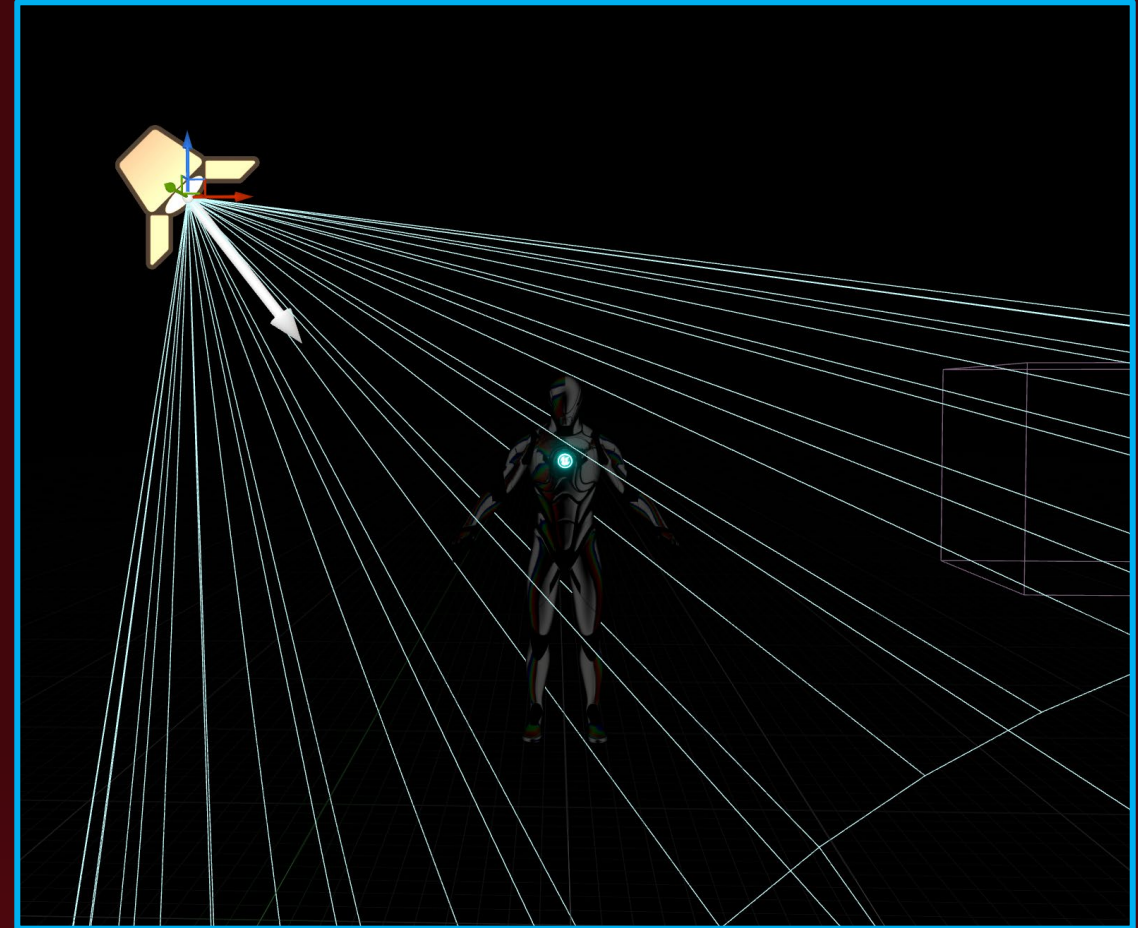


Basic Lighting

Setting the Main Light:

1. Place the **main light above the character**, raised into the air rather than at eye level.
2. **Rotate the light to an off-angle**, positioning it to the left or right of the model instead of directly in front.
3. **Angle the light downward toward the character**, allowing it to fall across the face and body.
4. **This setup ensures the light illuminates one side of the model**, creating clear highlights and shadows that define form, depth, and surface detail.

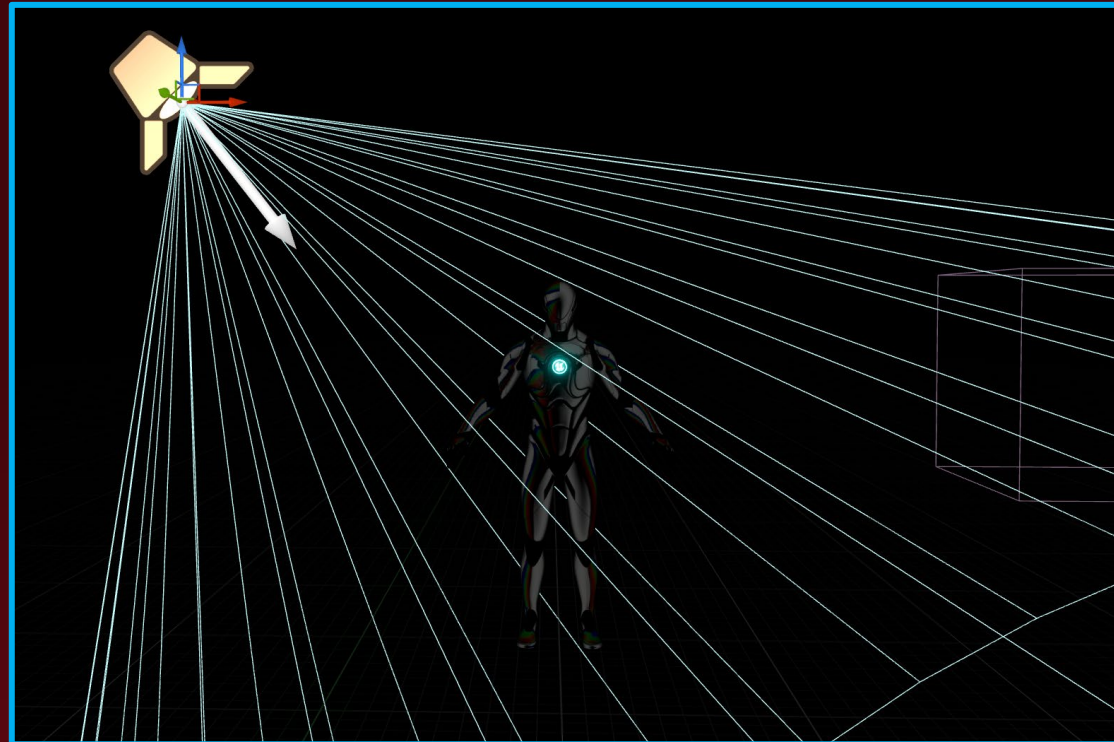
(Note: The light will be adjusted later, so don't spend too much time on this.)





Rendering Models In Unreal Engine 5

Camera Set Up





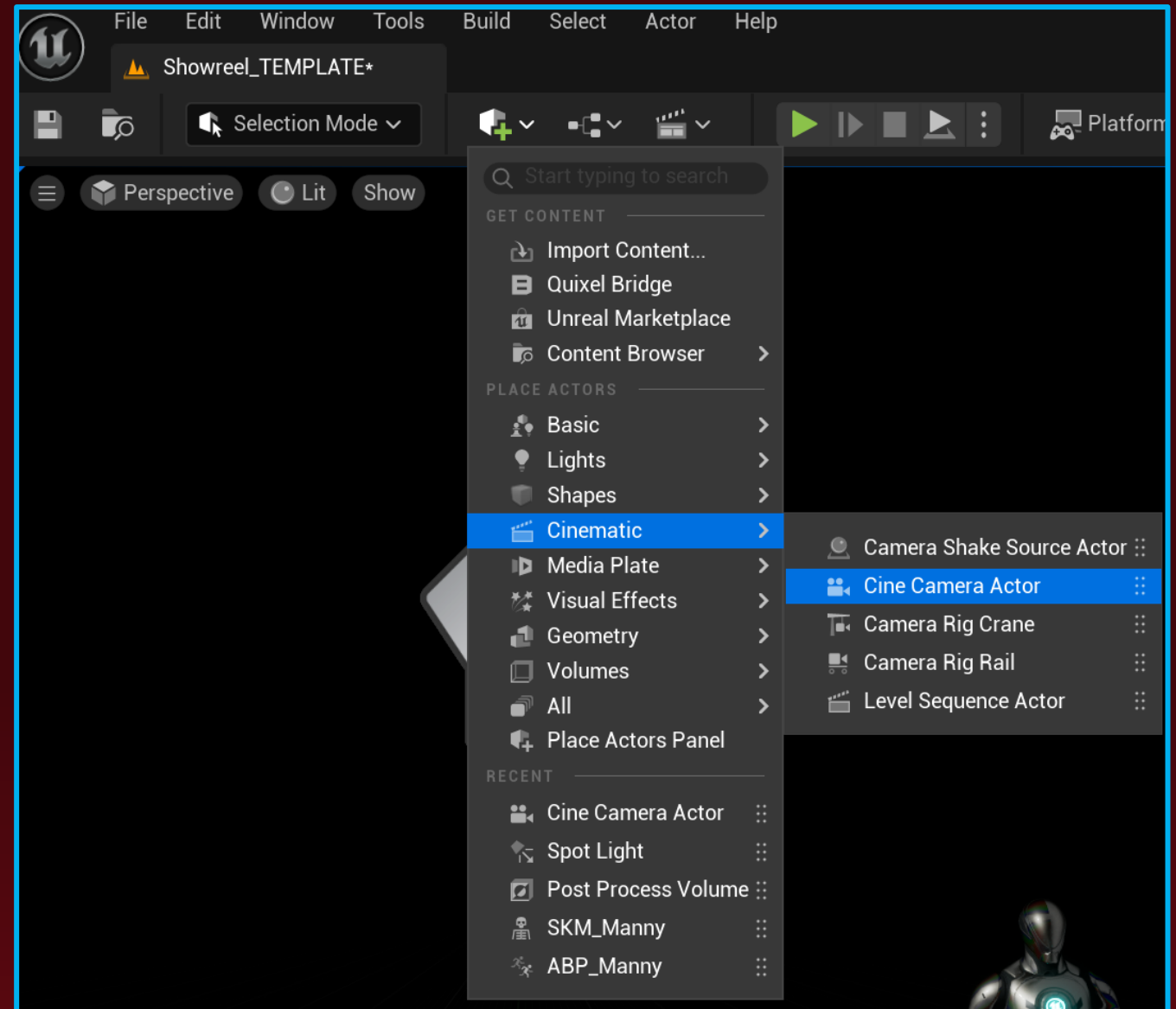
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Camera Set up

Adding the Camera:

1. Open quick add using the icon with a cube and a green plus.
2. Scroll down to Cinematic.
3. Select “Cine Camera Actor”.
4. In the outliner, name the CineCameraActor “Main Camera”.
5. Move the camera to a rough suitable location.





Personal Portfolio Development/Datblygu Portffolio Personol

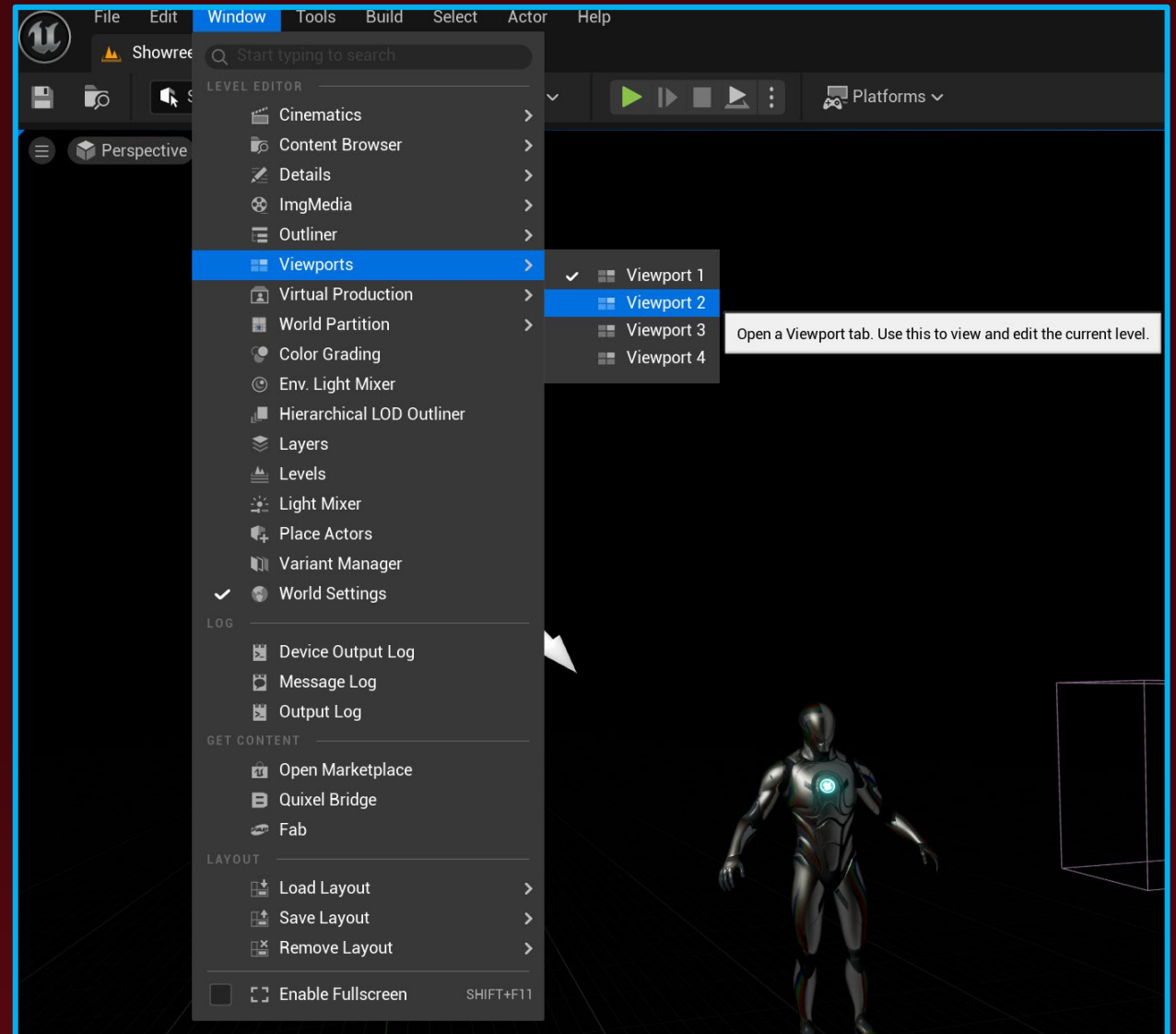
Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Camera Set up

2nd Viewport:

To aid with the camera placement, we need to add a 2nd viewport, specifically for our portfolio shot.

1. Go to Window in the Top Left.
2. Scroll down to Viewports.
3. Select Viewport 2, which will add a 2nd viewport.





Personal Portfolio Development/Datblygu Portffolio Personol

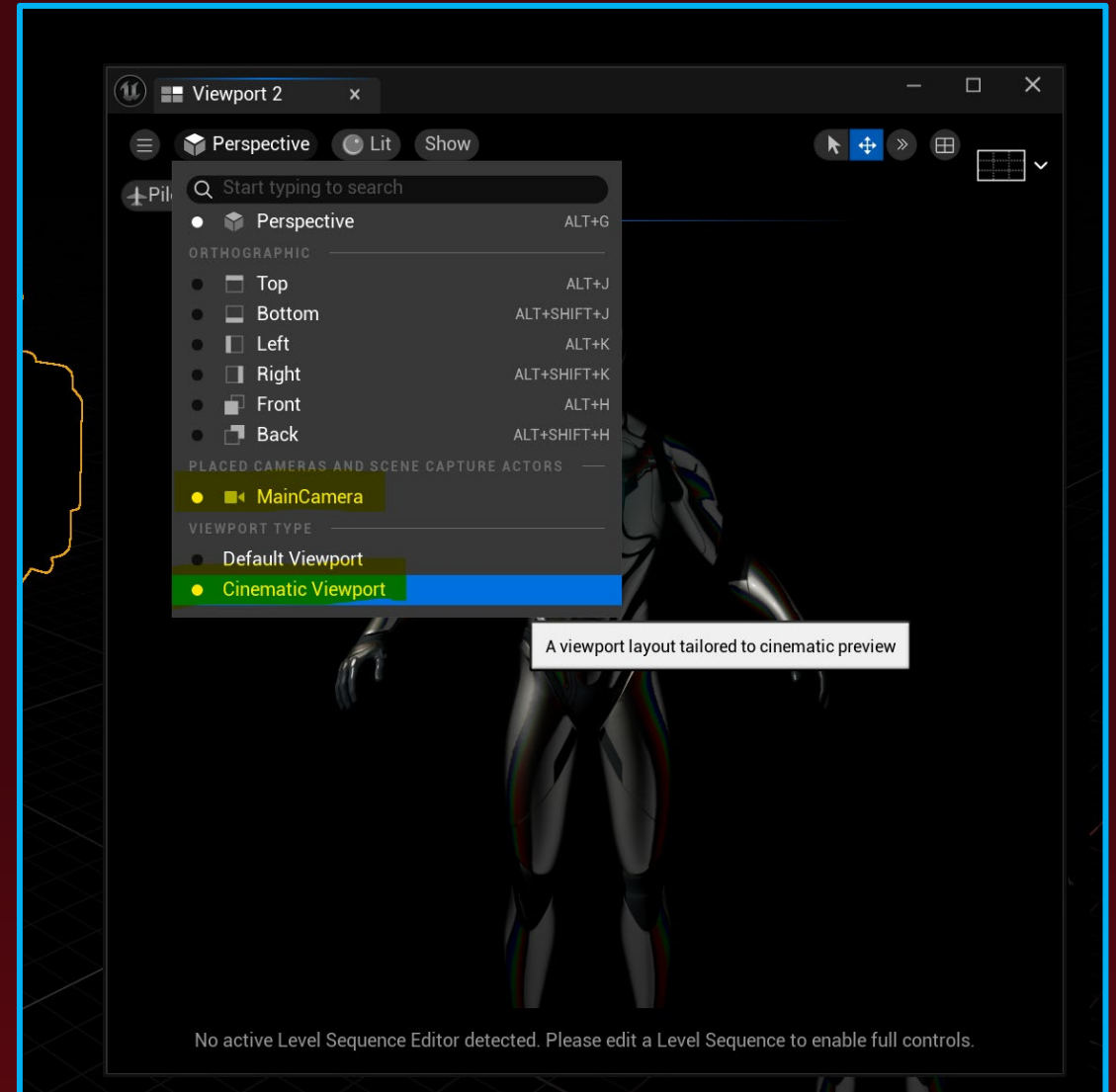
Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Camera Set up

Viewport 2 Settings:

Before modifying any camera settings, we must make sure Viewport 2 is set to display the main camera.

1. In Viewport 2, select perspective.
2. First change the viewport type to “Cinematic Viewport” (This must be done before selecting Main Camera).
3. For “Placed Cameras and Scene Capture Actors”, select Main Camera (This our renamed CineCameraActor).





Personal Portfolio Development/Datblygu Portffolio Personol

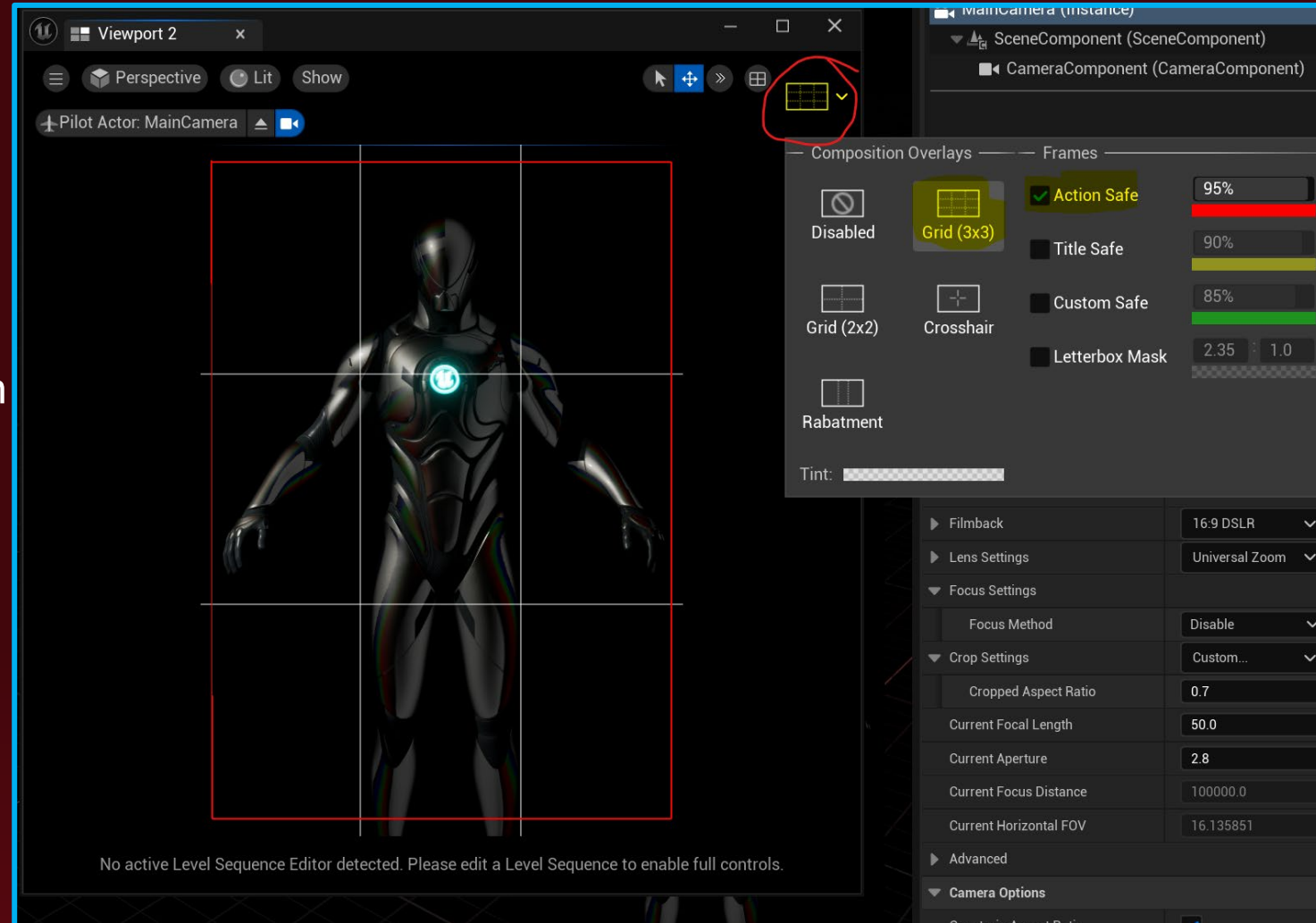
Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Camera Set up

Viewport 2 Settings:

Now we need to make sure we can add composition overlays to help set up our shot.

1. In Viewport 2, **select the grid icon** in the top right of the viewport.
2. Ensure **action safe is enabled** (This will show us where the frame gets cropped).
3. **Select the Grid 3x3** for a composition overlay.





Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Camera Set up

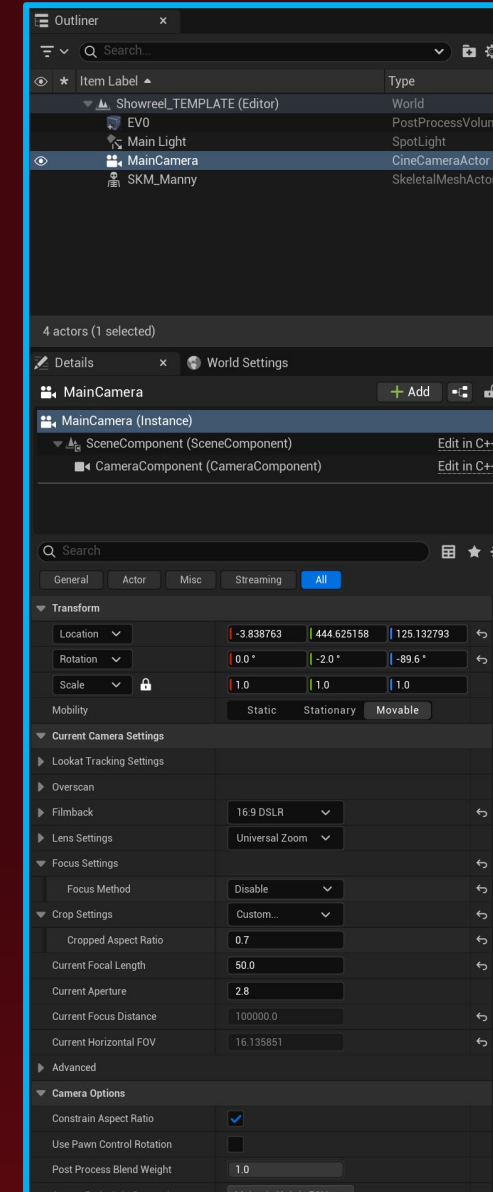
Finetuning the camera settings:

To ensure we have the best shot for our camera, we now need to adjust some settings.

1. Select MainCamera in the outliner.

Towards the bottom of the outliner, we'll see multiple settings.

(Note: Make sure to clear the search bar for all of the settings).





Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Camera Set up

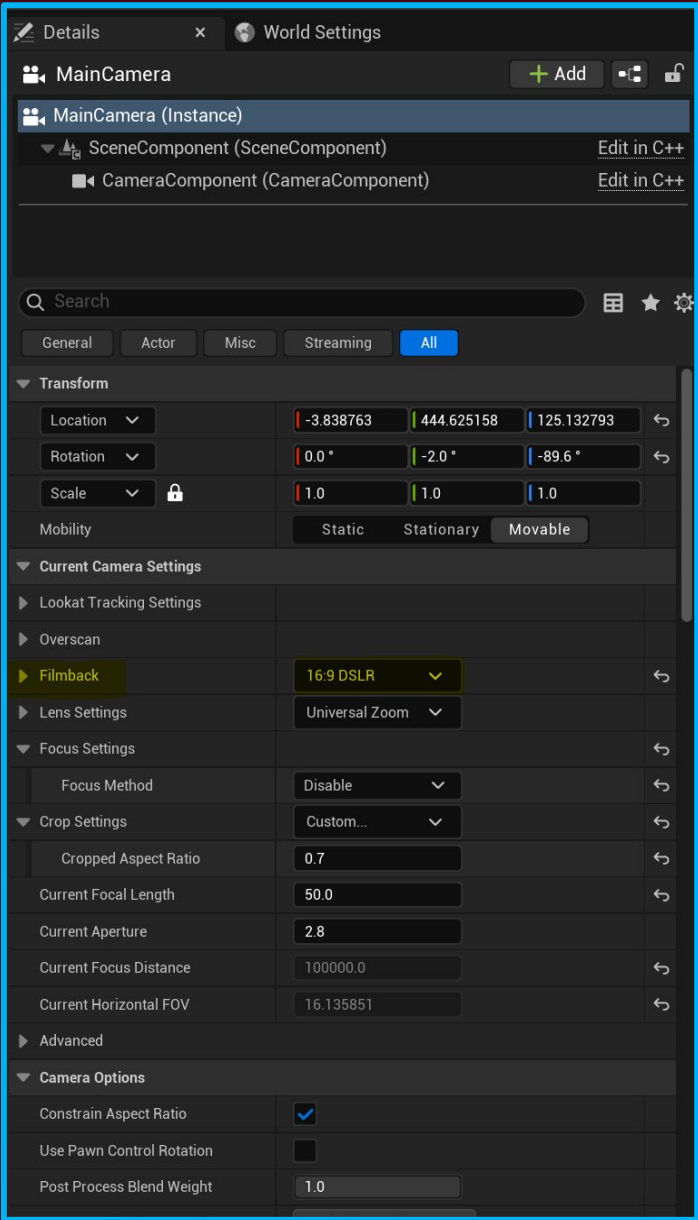
Finetuning the camera settings:

First settings that will be adjusted is “Filmback”.

1. Change Filmback to 16:9 DSLR

This will help Unreal try to match our camera to standard digital camera in real life.

We can also see settings for other cameras such as iMax etc.



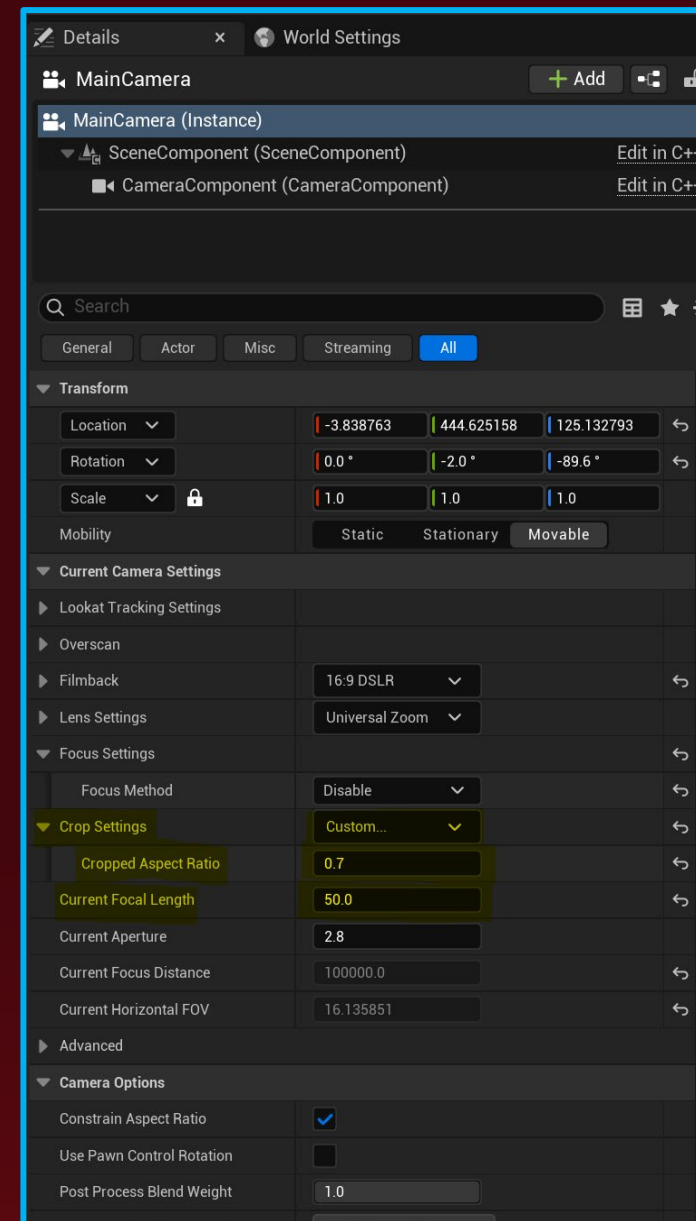


Camera Set up

Finetuning the camera settings:

Finally, we'll set our cameras frame using Crop Settings and Focal Length.

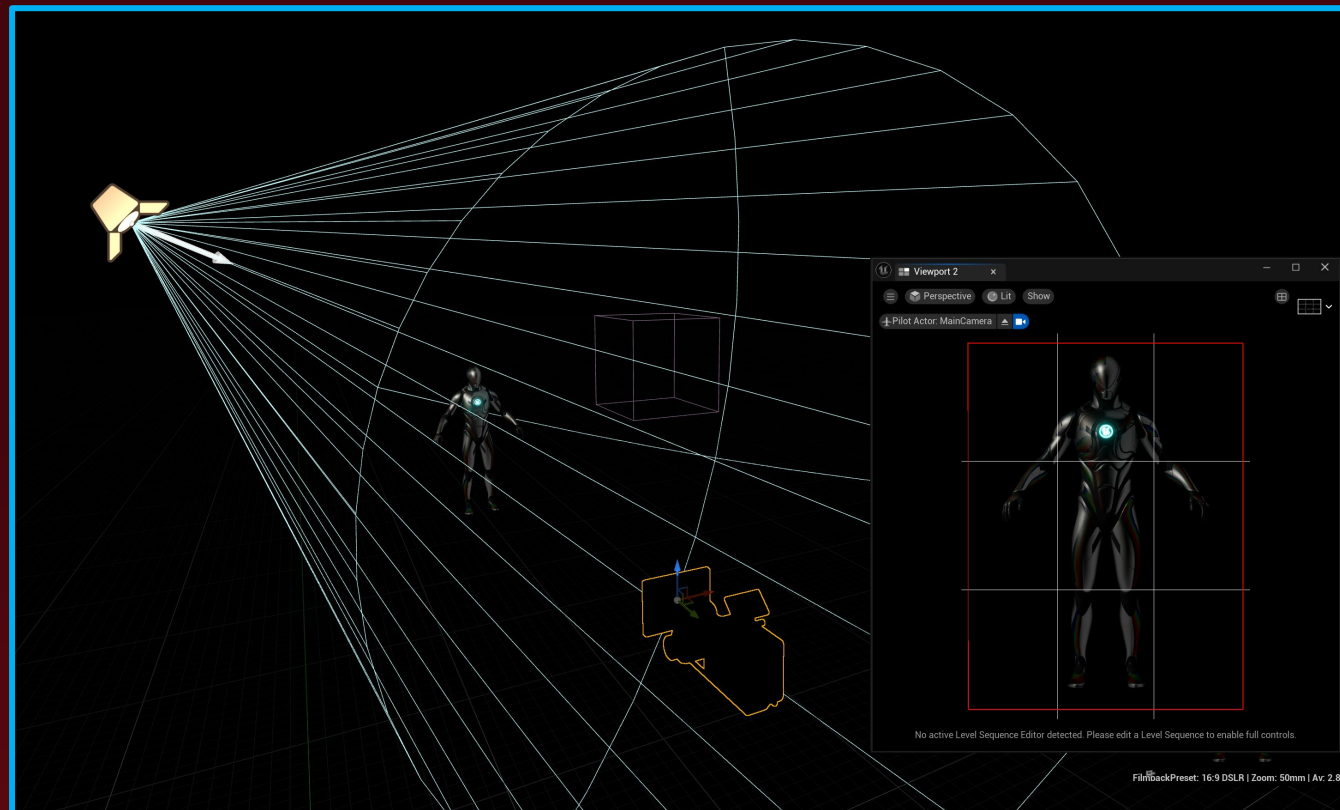
1. Under crop settings we'll find presets such as 4:3, which is usually used for Instagram posts. But as we're going for a full body render shot, **select Custom.**
2. Use the **Cropped Aspect Ratio** to now adjust the frame size.
3. Use **Current Focal Length** in conjunction to line up the perfect shot.





Rendering Models In Unreal Engine 5

Advanced Lighting





Basic Lighting

All Lights:

Main Light: The strongest light that defines the subject's basic shape and shading and sets the exposure.

Fill Light: A softer, less intense light that reduces harsh shadows from the key light.

Rim Light: A light placed behind the subject that creates a bright edge or “rim,” helping separate the subject from the background.

God Light: The god light is a soft overhead support light placed above the character that enhances surface curves and anatomy while adding a subtle warm or cool ambient tone without overpowering the main light.



Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

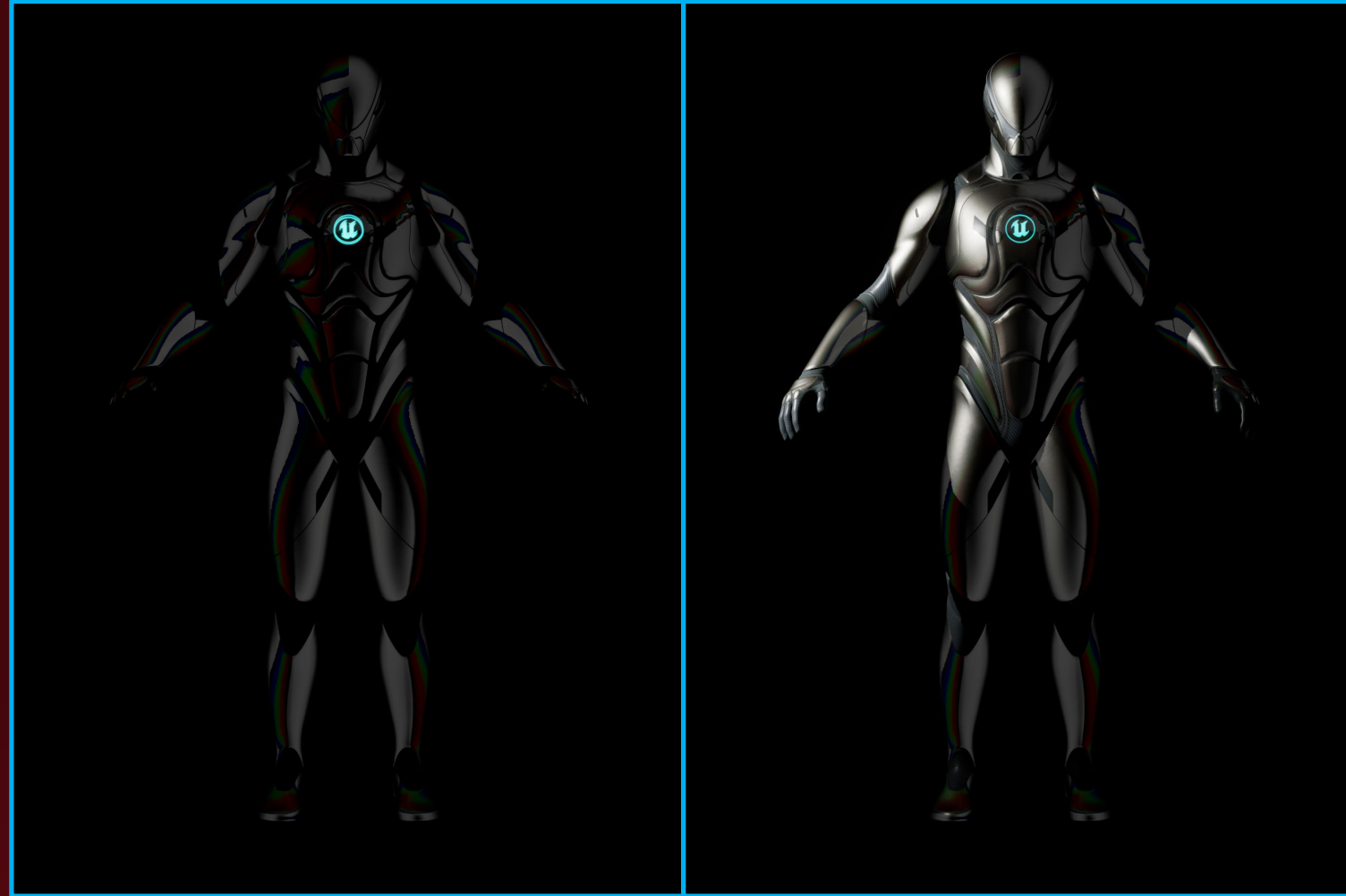
Advanced Lighting

Main Light Setup:

Using the camera setup and the second viewport as a visual guide, adjust the main light in the scene accordingly.

1. The **main light** must be **above the character**.
2. The main light must be angled so that **only 2/3 of the model is lit**.

The main light should come from the top left, gradually fading across the right side of the asset.



Before Main Light

After Main Light



Personal Portfolio Development/Datblygu Portffolio Personol

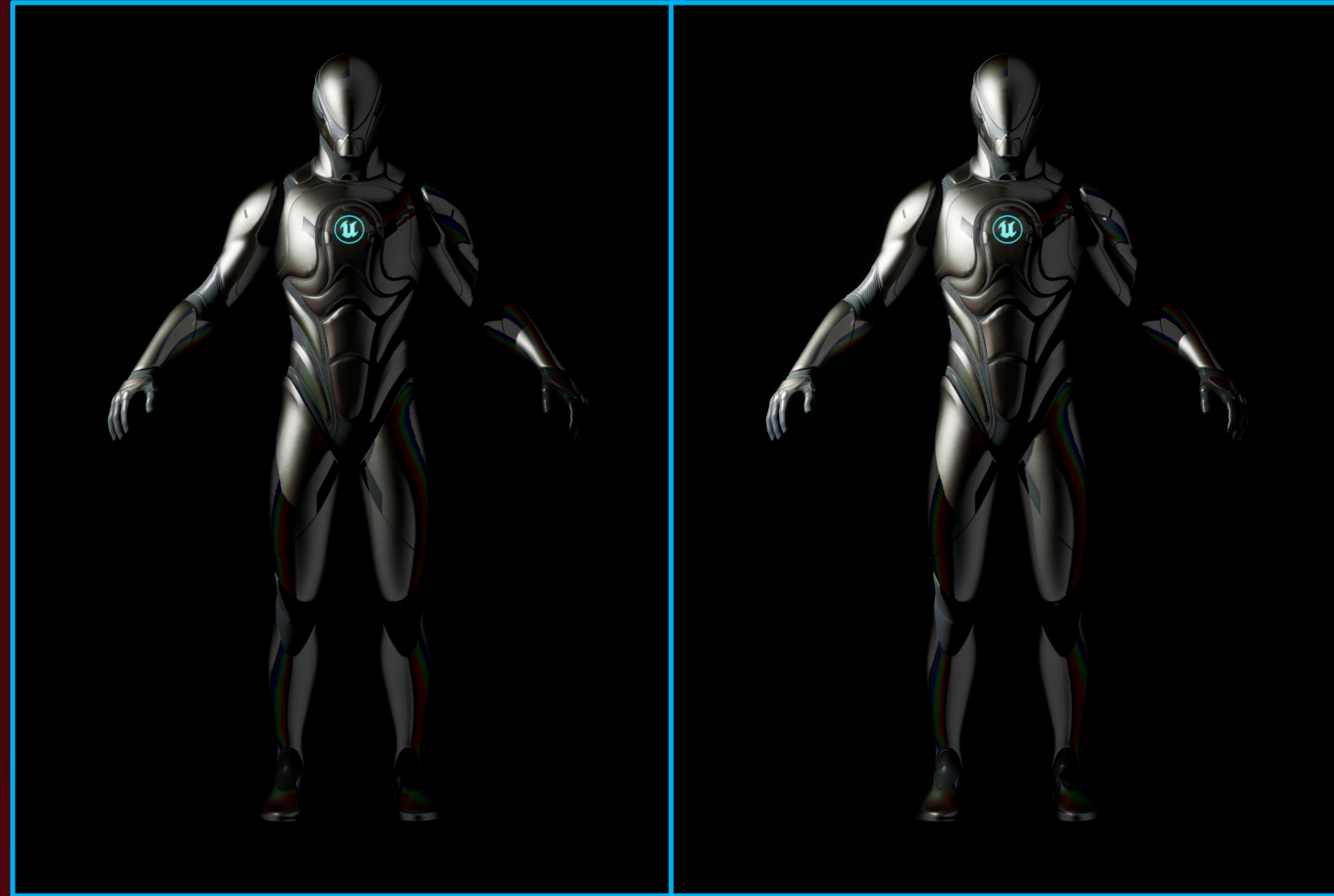
Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Advanced Lighting

Fill Light Setup:

On the opposite side of the model, we'll set up the Fill light. Looking for a softer, less intense light that reduces harsh shadows from the key light.

1. Duplicate the main light and take it to the right of the asset (Control+D).
2. Adjust the fill lights intensity to a **value of 1.0**.
3. Move the fill light to an appropriate location, so that **harsh shadows become softer**.



Before Fill Light

After Fill Light



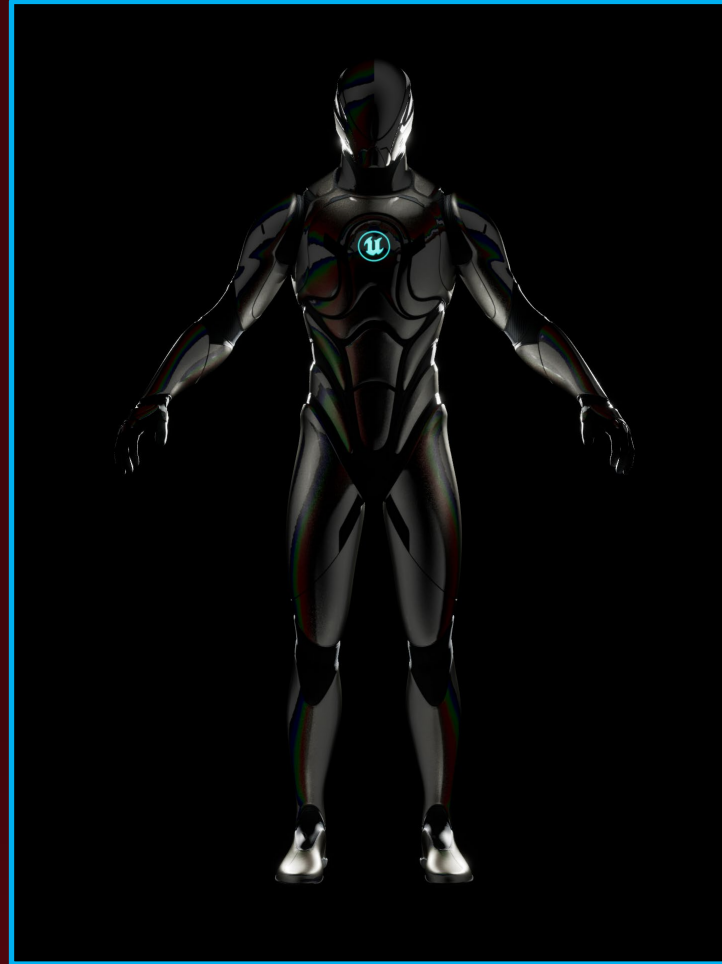
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Advanced Lighting

Rim Light Setup:

1. To set up rim lighting, first **hide the Main and Fill lights** by clicking the eye icon in the Outliner.
2. Duplicate the Main Light and rename it **RimLight1**, then move it behind the asset and increase the intensity to light one side.
3. Duplicate this light and place it on the opposite side to **create a bright rim around the entire model**, helping separate the subject from the background.



Rim Lights Only



Main, Fill & Rim Lights



Advanced Lighting

1. Import the **showreel backdrop FBX** file downloaded earlier from Moodle.
2. **Place the backdrop in the scene** behind the asset.
3. Set the backdrop's **XYZ scale to 0.005** and position it appropriately behind the asset.
4. The closer the backdrop is to the asset, the more light it will receive.
5. Adjust the **material colour** of the backdrop to better suit the asset.

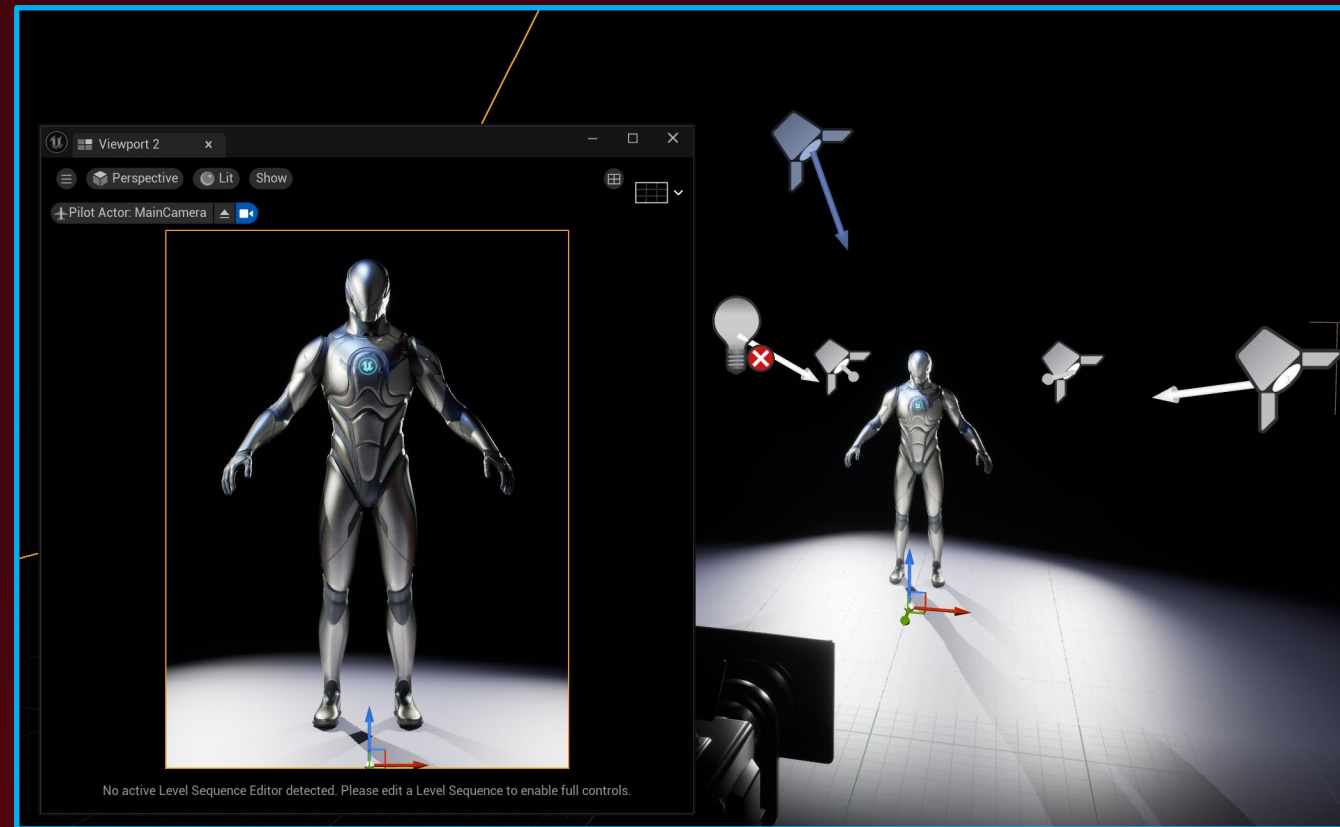




Advanced Lighting

God Light Setup:

1. Duplicate the Main Light and rename it GodLight.
2. Position the God Light above the character, facing downward, ensuring it supports the Main Light without overpowering or removing its shadows.
3. Adjust the colour of the God Light to enhance and support the mood of the asset.





Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering Models In Unreal Engine 5

Rendering





Personal Portfolio Development/Datblygu Portffolio Personol

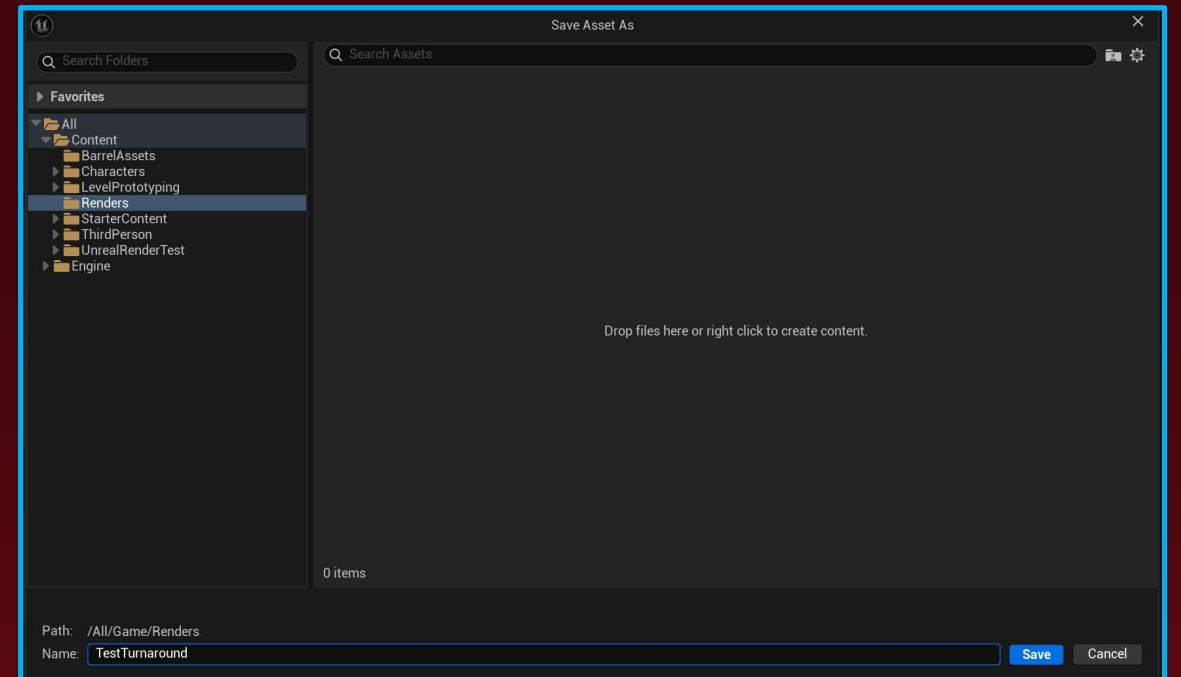
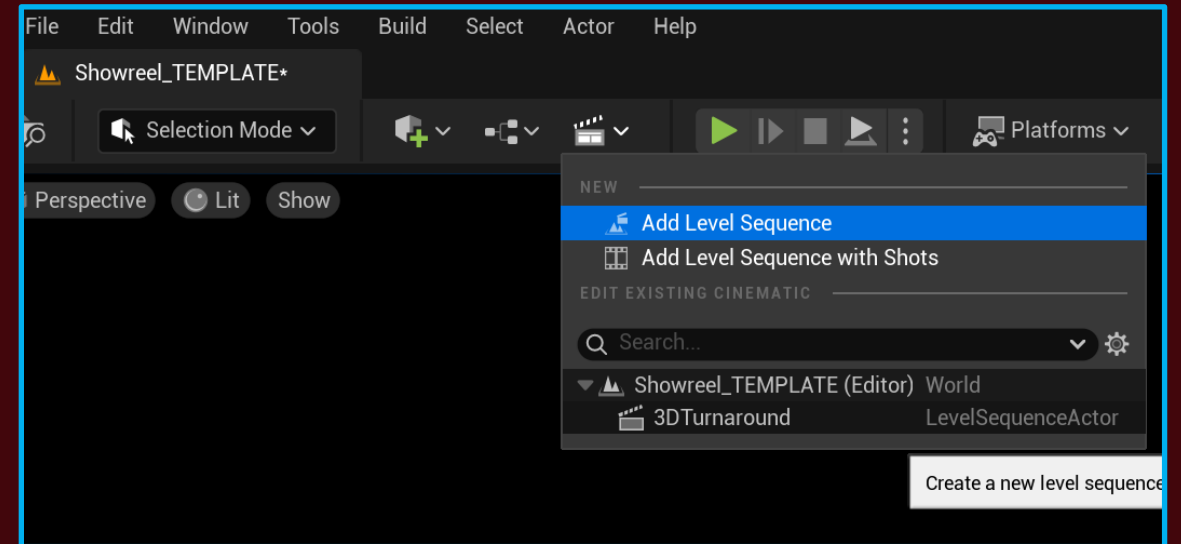
Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering

Setting Up a Level Sequencer:

To render a rotating model, first create a showreel timeline.

1. In the top hotbar, select the **Movie Clip**.
2. Scroll down and choose Add Level Sequence.
3. Create a folder named Renders and save the level sequence as TestTurnaround.





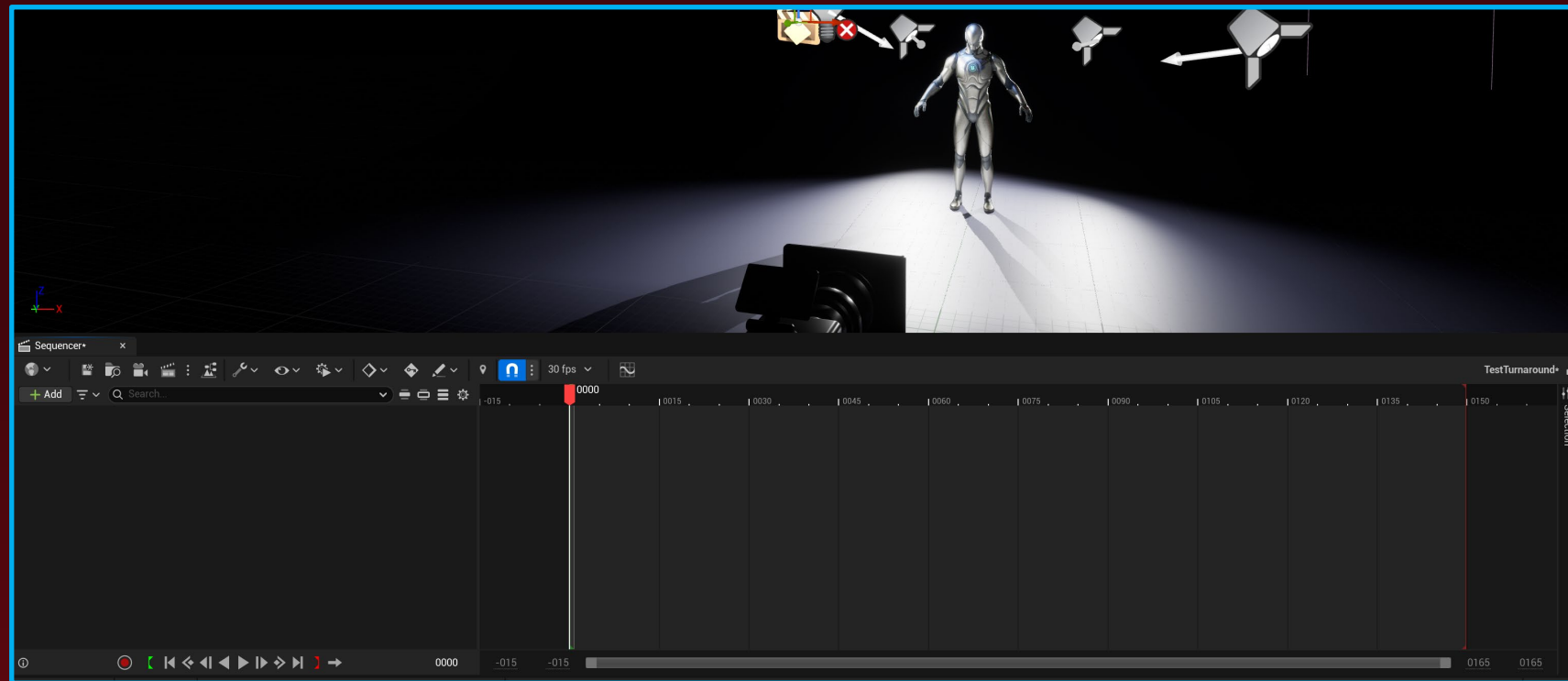
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering

Setting Up a Level Sequencer:

Now that the level sequencer is open, we can begin adding assets to our timeline.

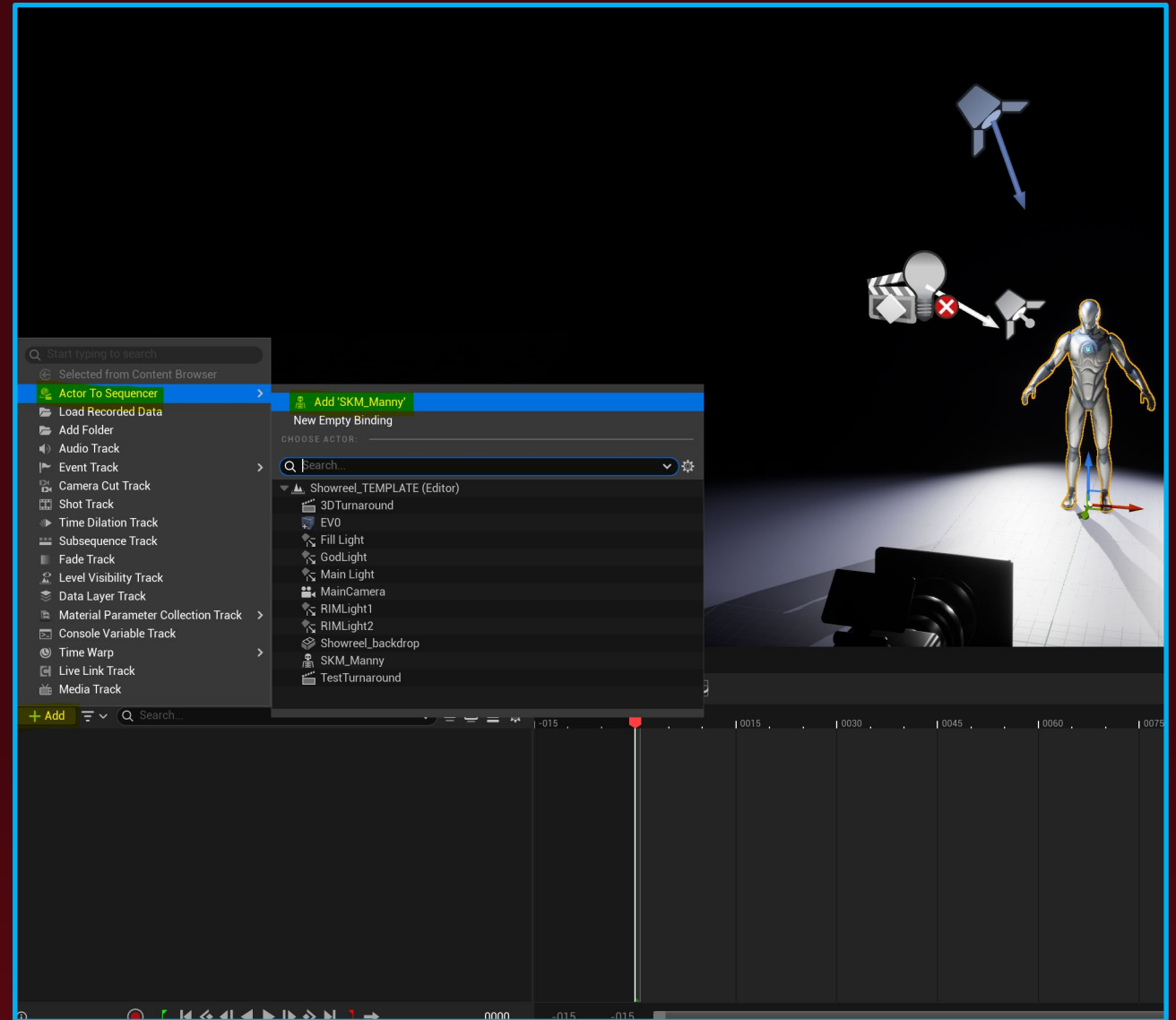




Rendering

Setting Up a Level Sequencer:

1. To add actors to the timeline, click the **Add button**.
2. Select **Actor to Sequence**.
3. With the **Manny character selected**, it should appear at the top of the list, click it.
4. Manny is now added to the sequencer.





Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

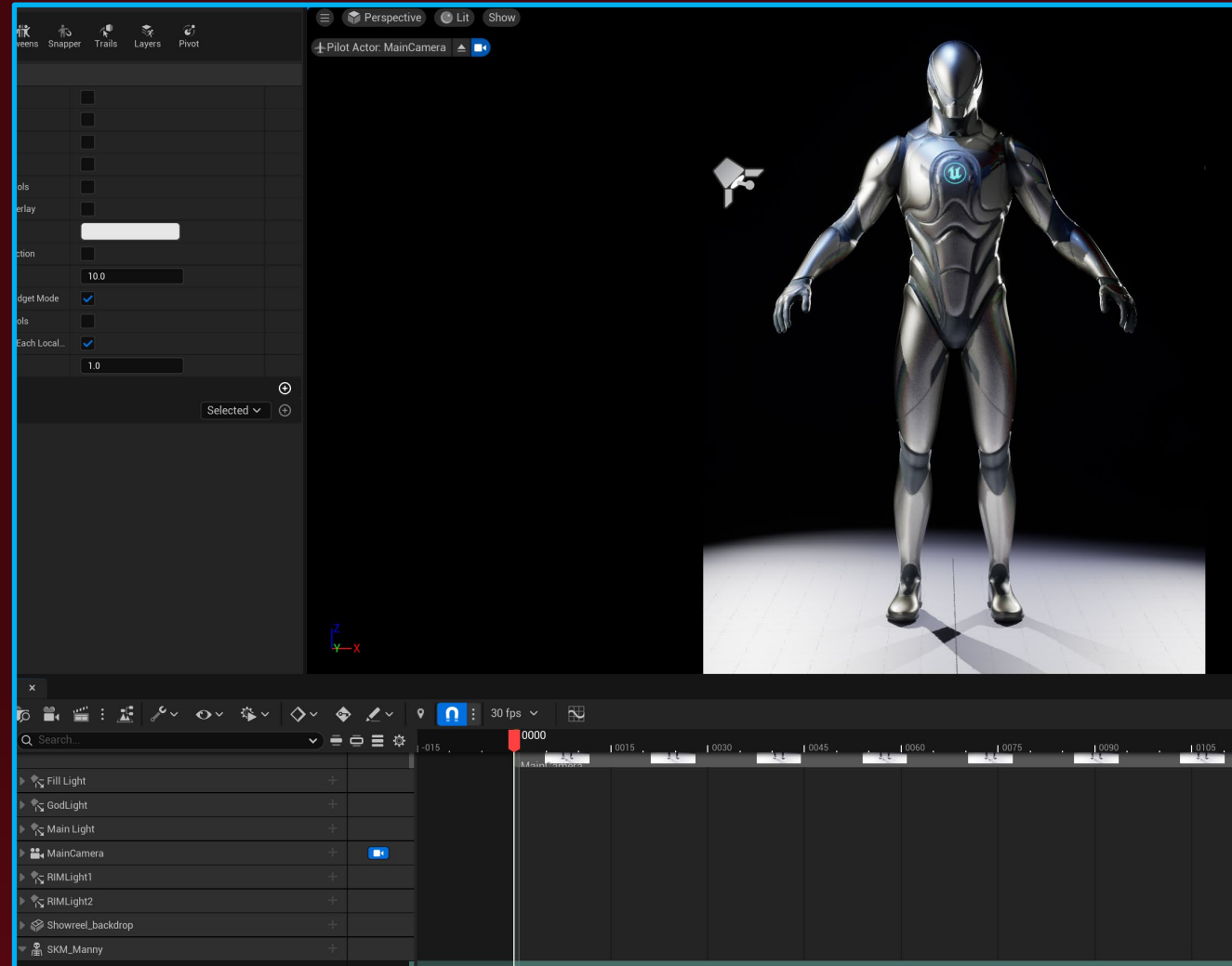
Rendering

Setting Up a Level Sequencer:

Repeat the actor-adding process, this time including the following:

- MainCamera
- Main Light
- Fill Light
- RimLight1
- RimLight2
- GodLight
- ShowreelBackdrop

*(Tip: You can **Shift + Click** all of these objects in the scene to add them to the Level Sequencer at once.)*





Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering

Setting Up a Level Sequencer:

1. In the Level Sequencer, **locate SKM_Manny**.
- 1.5. Change the **FPS to 60FPS**
2. Expand the **Transform tab beneath** it to access the model's Location, Rotation, and Scale.
3. Open Rotation and, with **Yaw set to 0**, **click the diamond with a plus (+)** to key the rotation.
4. Move the **sequencer slider to frame 300**.
5. Change **Yaw to 360** and **click the diamond with a plus (+)** again to key this rotation.
6. Press Play to **preview Manny's rotation** and check the speed.





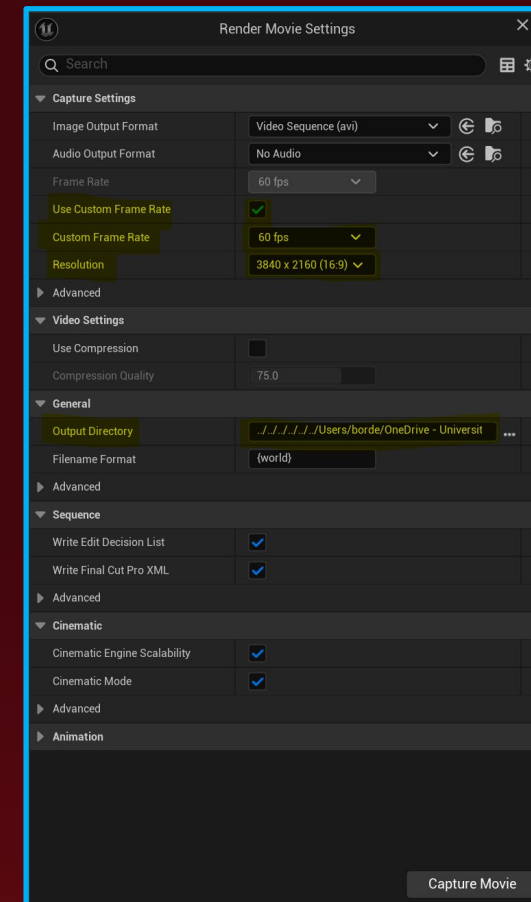
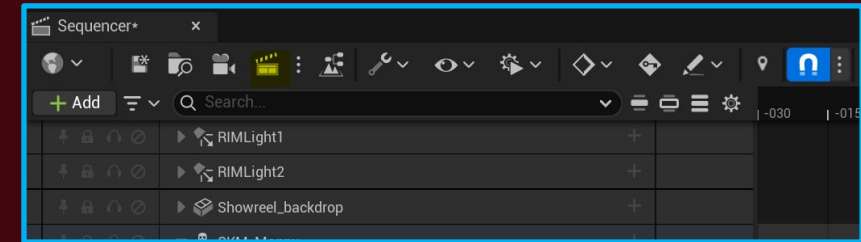
Personal Portfolio Development/Datblygu Portffolio Personol

Rendering 3D Models In Unreal Engine 5/Rendro Modelau 3D Mewn Unreal Engine 5

Rendering

Rendering the scene.

1. Click on the **Movie Clip/Clipboard** option in the **level sequencer** to prepare the scene for rendering.
2. In the Render Movie Settings, make the following changes:
 - Enable Custom Frame Rate
 - Set Custom Frame Rate to 60 fps
 - Set Resolution to 3840 x 2160 (4K)
 - Disable Compression
 - Set Output Directory to a safe location on your computer where you can easily find the rendered file
3. Once all settings are configured, **click Capture Movie** to start rendering your scene.





Final Render

