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| Title | **Customise rendering, materials and lights** | | |
| Level | **3** | **Credits** | **16** |

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| Purpose | The competency standard is designed to learn the application of Rendering, its environment and background, and advance features. Use of different Materials and Lights are highlighted for 3D drawings. |

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| Classification ISCED | 0611 Computer use |

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| Available grade | Competent / Not yet competent |

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| Modification history | N/A |

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| **Competency Unit** | **Performance Criteria** | **Knowledge and Understanding** |
| **K1: Execute Rendering** | **The trainee will be able to:**  **P1.** Create a photorealistic or realistically shaded image of a three- dimensional wireframe or solid model using “Render” commands:   * Destination * Quality * Selection * Crop * File.   **P2.** Determine the output site that the renderer uses to display the rendered image using “RPERF” command and selecting “Destination”.  **P3.** Determine the output quality that the renderer uses to display the rendered image using “RPERF” command and selecting “Quality level”.  **P4.** Controls the parts of the model that gets processed during rendering for following three settings;   * View * Crop * Selected | **The trainee will be able to: K1.** Explain Render command  **K2.** Recognize environmental features. |

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|  | **P5.** Render Cropped window using “RPERF” command and selecting “Procedure”.  **P6.** Execute the process to Render to File and Turn off Render to File.  **P7.** Use environmental features (Render, Gradient) and background (Solid, Image) to set up atmospheric effects or background images using “RENDERENVIRONMENT” command.  **P8.** Apply following Backgrounds:   * Single color * Multi-color gradient * Bitmap image   using “View” command and later selecting “New”.  **P9.** Define settings that affect how materials are handled by the renderer as:   * Apply Materials * Texture Filtering * Force 2-Sided   **P10.** Execute how renderer control sampling by allocating values to:   * Min Samples * Max Samples * Filter Type * Filter Width and Filter Height * Contrast color * Contrast Alpha | **K3.** Explain advance features of Rendering as Sampling, Shadow, Ray Tracing, Illumination, Diagnostic processing.  **K4.** Define how effects illuminate scene |
|  | **P11. Apply settings that affect how shadows appear in the rendered image in Simple, Sort, or Segments modes.**  **P12. Experiment advance features of Rendering as:**   * **Sampling** * **Shadow** * **Ray Tracing** * **Illumination** * **Diagnostic processing**   **P13. Apply settings that affect the shading of a rendered image (Ray tracing) with following options:**   * **Enable** * **Max Depth** * **Max Reflection** * **Max Refraction**   **P14. Configure the affects that illuminate scene with following option:**   * + **Enable**   + **Radius**   + **Max Depth**   + **Max Reflection**   + **Max Refraction**   **P14. Associate with “Diagnostic” and “Processing” features.** | K5. Explain “Diagnostic” and “Processing” features. |
| K2: Apply/Configure materials | **The trainee will be able to:** | The trainee will be able to: |

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|  | **P1.** Add Material to drawing using “Materials” or “Marbrowseropen” commands.  **P2.** Apply Material layers using “MATERIALATTACH” command.  **P3.** Create own Material e.g. photo, Shapes.  **P4.** Achieve Material mapping of photo or shapes using “MATERIALMAP” command.  **P5.** Configure “Cutout Materials” procedure.  **P6.** Apply “Bump Map” option of the Material command.  **P7.** Execute “\_VSMATERIALMODE” command to On/Off Materials. | **K1.** Explore different methods to add/edit Materials to 3D drawings.  **K2.** Define how to adjust Material scale/layer.  **K3.** Understand the Material mapping (Photo, Shapes).  **K4.** Explain how to purge Materials from objects. |
| **K3: Apply Lights** | **The trainee will be able to:**  **P1.** Turn On/Off the default Lighting using “DEFAULTLIGHTING” command.  **P2.** Execute command “POINTLIGHT” that radiates light in all directions from its location.  **P3.** Execute command “SPOTLIGHT” that emits a directional cone of light.  **P4.** Modify Lights in a drawing using “LIGHTLIST” command.  **P5.** Customize Photometric:   * Light energy | **The trainee will be able to:**  **K1.** Categorise point and spot Lights.  **K2.** Understand Lights tool palette. |

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|  | * Light for lighting units * Luminaries * Weblight * Halogen effect * Candela intensity, etc.   **P6.** Apply the available functionality of Lights tool palette by pressing CTRL+3. SUNPROPERTIES’ command.  **P7.** Display uniform parallel light rays in one direction only using “DISTANTLIGHT” command and mentioning from and to points.  **P8.** Incorporate natural light based on climate into the drawing by specifying the latitude and longitude of a location for the sunlight using “GEOGRAPHICLOCATION” command.  **P9.** Adjust the Sun properties using the “SUNPROPERTIES” command | **K3.** Describe geographic location settings for a particular object.  **K4.** Observe how to handle the Sun properties for Light issues. |