

<b>TSC Category</b>	Engineering Design Management					
<b>TSC</b>	3D Modelling					
<b>TSC Description</b>	Generate 3D models using a variety of modelling software to represent characteristics of a real-world system					
<b>TSC Proficiency Description</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
		<b>EGS-DES-2032-1.1</b>	<b>EGS-DES-3032-1.1</b>	<b>EGS-DES-4032-1.1</b>	<b>EGS-DES-5032-1.1</b>	
		Use 3D modelling software to create basic three-dimensional models for engineering equipment, components and systems	Use multiple 3D modelling software to create advanced three-dimensional models for engineering equipment, components and systems	Analyse 3D models and conduct scenario visualisation to validate engineering plans and design quality	Drive new engineering and maintenance processes that adopt 3D modelling technologies to enhance efficiency and effectiveness	
<b>Knowledge</b>		<ul style="list-style-type: none"> <li>Engineering drawing principles</li> <li>Fundamentals of engineering graphics</li> <li>Principles and practices of the international graphic language for engineering</li> <li>Concepts and principles of 3D Modelling</li> <li>Mathematical frameworks for 3D modelling</li> <li>Basic 3D modelling strategies and techniques</li> <li>Fundamentals of computer-aided design (CAD) software</li> <li>3D CAD software tools and functionalities</li> <li>International Standard Organisation (ISO) and Singapore Standards (SS) standards</li> </ul>	<ul style="list-style-type: none"> <li>Engineering drawing principles</li> <li>Fundamentals of engineering graphics</li> <li>Principles and practices of the international graphic language for engineering</li> <li>Advanced 3D modelling strategies and techniques</li> <li>Types of 3D computer-aided design (CAD) software</li> <li>International Standard Organisation (ISO) and Singapore Standards (SS) standards</li> </ul>	<ul style="list-style-type: none"> <li>Engineering project plans</li> <li>Engineering analysis tools and techniques</li> <li>Visualisation tools and techniques</li> <li>Simulation models and tools</li> <li>Principles and techniques of animation</li> <li>Modelling concepts for Virtual Reality (VR)</li> <li>International Standard Organisation (ISO) and Singapore Standards (SS) standards</li> </ul>	<ul style="list-style-type: none"> <li>Organisation's products and processes</li> <li>Organisational quality and Workplace Safety and Health (WSH) guidelines</li> <li>Impact of 3D modelling on engineering and maintenance processes</li> <li>Methods to influence adoption of 3D modelling technologies</li> <li>Industry best practices and applications of 3D modelling technologies</li> <li>International Standard Organisation (ISO) and Singapore Standards (SS) standards</li> </ul>	
<b>Abilities</b>		<ul style="list-style-type: none"> <li>Create basic 3D models using CAD software</li> <li>Comply with ISO and SS standards for 3D models</li> <li>Apply mathematical frameworks in modelling 3D objects</li> </ul>	<ul style="list-style-type: none"> <li>Apply advanced modelling strategies and techniques to create complex designs</li> <li>Utilise multiple 3D CAD software and tools</li> </ul>	<ul style="list-style-type: none"> <li>Review and analyse 3D models with the use of engineering analysis tools</li> <li>Identify areas of improvement pertaining to the engineering plan</li> </ul>	<ul style="list-style-type: none"> <li>Determine potential uses of the 3D models</li> <li>Establish modelling responsibilities for the various scopes of work</li> <li>Establish work breakdown structure for engineering design</li> </ul>	

**SKILLS FRAMEWORK FOR ENGINEERING SERVICES  
TECHNICAL SKILLS & COMPETENCIES (TSC) REFERENCE**

		<ul style="list-style-type: none"> <li>Apply basic modelling strategies and techniques to create basic designs</li> </ul>	<ul style="list-style-type: none"> <li>Select suitable 3D modelling software for design creation</li> <li>Ensure models are created in adherence to the International Standard Organisation (ISO) and Singapore Standards (SS) standards</li> </ul>	<ul style="list-style-type: none"> <li>Conduct scenario visualisation for 3D modelling</li> <li>Run simulations to test 3D models</li> <li>Test what-if scenarios</li> <li>Validate engineering plans</li> <li>Test feasibility of designs</li> <li>Identify problems with design quality</li> <li>Ensure engineering plans and design compliant with relevant International Standard Organisation (ISO) and Singapore Standards (SS) standards</li> <li>Explore and apply key animation principles and techniques to create 3D animation for VR optimisation</li> </ul>	<ul style="list-style-type: none"> <li>Create schedule that identifies key modelling activities</li> <li>Develop conflict resolution processes</li> <li>Drive new engineering and maintenance processes that adopt 3D modelling technologies</li> <li>Ensure procedures and operations are implemented according to plan and WSH requirements</li> <li>Assess efficiency and effectiveness of 3D modelling to the engineering and maintenance processes</li> </ul>	
--	--	---	---	--	--	--