

Vocational Qualifications Pathway (VQP) for eSports Technology

Area Job Level	eSports Technology
Master Level	<i>The ICT practitioners at this level are mainly responsible for decision-making processes. They oversee the entire IT operations and strategic development direction in the organizations. The Professionals at this level are required to possess broad corporate perspective, good communication skills and in-depth technology knowledge.</i>
Relevant Job Titles	eSports Director
	Director of Production (eSports and Entertainment)
Specialist Level	<i>The ICT practitioners at this level are mainly involved in managerial processes. They may work with individual technical departments and manage those departments by applying their technical and managerial skills. The major tasks performed by the professionals at this level are to manage individual activities and project segments, and to lead the projects towards completion within the assigned budget and stipulated deadline.</i>
Relevant Job Titles	Event Manager (eSports and Entertainment)
	Digital Marketing Manager (eSports)
	Streaming Specialist
Practitioner Level	<i>The ICT practitioners at this level manage certain parts of technical processes depending on their subject matter expertise. The professionals at this level may be sub-degree graduates or those who possess certain work experience in the field.</i>
Relevant Job Titles	Media Content Creator
	Live Streaming Production Officer
	Game Programmer
Support Level	<i>The ICT practitioners at this level provide entry-level technical operation and support functions depending on their subject matter expertise. The practitioners at this level may be S6 graduates with relevant ICT skills and knowledge or those who possess little work experience in the field.</i>
Relevant Job Titles	Computer Operator
	User Support Staff
	Technical Support Staff (TSS)
	Field Technician
	Assistant Digital Content Creator

Proposed Competency Requirements (eSports Technology - Master Level)

Relevant Job Titles:

- eSports Director / Director of Production (eSports and Entertainment)

Area of Work / Cluster Name	Major Tasks	Competency Requirements	Units of Competency (UoCs) Number	Relevant Qualification for fulfilling Competency Requirements
eSports business plan and strategies	1. Development of strategic eSports and business plans	<ul style="list-style-type: none"> ▪ Formulate business strategies and policies ▪ Formulate digital marketing strategy ▪ Develop digital content delivery network strategy 	<p>111201L6</p> <p>111109L7</p> <p>111108L6</p>	Obtain qualification via training programmes (QF Level 6)
	2. Advise internal and clients teams on technical challenges and risks, costs and benefits, and alternative solutions for eSports events	<ul style="list-style-type: none"> ▪ Establish a business case for an IT investment ▪ Prepare a budget based on the IT plan ▪ Conduct solicitation planning ▪ Project the potential costs, benefits and ROI of IT project 	<p>ITSWG617A</p> <p>ITWSM504A</p> <p>111197L5</p> <p>111211L5</p>	
Management of eSports events	3. Manage eSports events including coordination with key stakeholders, cross functional teams, vendors and partners	<ul style="list-style-type: none"> ▪ Manage and maintain the profilio and relationship with business partners ▪ Review the emerging technologies and cross-functional strategies 	<p>ITSWG618A</p> <p>111207L6</p>	

Proposed Competency Requirements (eSports Technology - Specialist Level)

Relevant Job Titles:

- Event Manager (eSports and Entertainment) / Digital Marketing Manager (eSports) / Streaming Specialist

Area of Work / Cluster Name	Major Tasks	Competency Requirements	Units of Competency (UoCs) Number	Relevant Qualification for fulfilling Competency Requirements
Management and Planning of eSports events	1. Source and implement partnership development opportunities	<ul style="list-style-type: none"> ▪ Acquire and protect the copyrights and IP rights related to IT ▪ Conduct solicitation planning ▪ Evaluate and acquire appropriate tournament license for an eSports event ▪ Conduct source selection and/or contract development 	<p>111161L5</p> <p>111197L5</p> <p>111111L5</p> <p>ITSWPM523A</p>	Obtain qualification via training programmes (QF Level 5)
	2. Plan and Implement the whole eSports events	<ul style="list-style-type: none"> ▪ Manage and monitor IT service delivery of an eSports event ▪ Articulate the time and effort requirements needed for product-based planning ▪ Conduct project closure with respect to time ▪ Monitor, control and update project schedule ▪ Manage video streaming and broadcasting 	<p>111113L5</p> <p>ITSWPM503A</p> <p>111198L5</p> <p>ITSWPM504A</p> <p>111114L5</p>	
Management of digital marketing for eSports events	3. Oversee eSports marketing initiatives with internal units and external agencies	<ul style="list-style-type: none"> ▪ Formulate digital marketing analytics strategy ▪ Manage digital marketing tactics 	<p>108033L5</p> <p>108028L5</p>	

Proposed Competency Requirements (eSports Technology - Practitioner Level)

Relevant Job Titles:

- Media Content Creator / Live Streaming Production Officer / Game Programmer

Area of Work / Cluster Name	Major Tasks	Competency Requirements	Units of Competency (UoCs) Number	Relevant Qualification for fulfilling Competency Requirements
Creation of digital content for eSports events	1. Create and edit graphics & other digital contents to be used across all digital channels	<ul style="list-style-type: none"> ▪ Create digital character animation ▪ Create digital visual effects ▪ Create motion graphics ▪ Design animation visual effects ▪ Perform enhancement of digital video 	<p>107946L4</p> <p>107964L4</p> <p>107944L4</p> <p>107947L4</p> <p>107968L4</p>	Obtain qualification via training programmes (QF Level 4)
	2. Develop script program or game modules based on the project requirements.	<ul style="list-style-type: none"> ▪ Perform game programming ▪ Perform script programming 	<p>107935L4</p> <p>107936L4</p>	
Implementation of online live streaming for eSports events	3. Coordinate and arrange online live streaming event production	<ul style="list-style-type: none"> ▪ Analyze the technical requirements of setting up an streaming framework ▪ Carry out live streaming with various audio and visual components ▪ Setup the online streaming platform and application ▪ Prepare for live video and audio capture 	<p>111116L4</p> <p>111117L4</p> <p>111118L4</p> <p>111119L3</p>	

Area of Work / Cluster Name	Major Tasks	Competency Requirements	Units of Competency (UoCs) Number	Relevant Qualification for fulfilling Competency Requirements
Implementation of online live streaming for eSports events (continued)	4. Set up, configure, operate and troubleshoot during online live streaming events	<ul style="list-style-type: none"> ▪ Perform system testing against user, technical and hosting requirements ▪ Analyse the performance, latency and accessibility of systems ▪ Manage network infrastructure performance 	<p style="text-align: center;">111160L4</p> <p style="text-align: center;">111130L4</p> <p style="text-align: center;">111430L4</p>	

Proposed Competency Requirements (eSports Technology - Support Level)

Relevant Job Titles:

- Computer Operator / User Support Staff / Technical Support Staff (TSS) / Field Technician / Assistant Digital Content Creator

Area of Work / Cluster Name	Major Tasks	Competency Requirements	Units of Competency (UoCs) Number	Relevant Qualification for fulfilling Competency Requirements
Create 3D model and digital content for esports gaming	1. Create 3D model and digital content for esports gaming	<ul style="list-style-type: none"> ▪ Apply texture ▪ Create character model ▪ Create environment for digital animation ▪ Perform lighting ▪ Perform rendering of animation ▪ Produce basic 2D animation ▪ Produce basic 3D animation 	107953L3 107952L3 107955L3 107954L3 107956L3 107960L3 107961L3	Obtain qualifications via training programmes (QF Level 3)
Network Support	2. Network Support	<ul style="list-style-type: none"> ▪ Install and configure client/server application ▪ Configure WAN connection ▪ Troubleshoot network issues 	107882L3 107883L3 107884L3	Obtain qualifications via training programmes (QF Level 3) Or RPL Mechanism (QF Level 3 RPL Cluster: TOS010L3)
Network and Security Support	3. Network and Security Support	<ul style="list-style-type: none"> ▪ Build a small wireless LAN ▪ Install and configure network components/devices ▪ Install and configure client/server application ▪ Strengthen workstation protection ▪ Troubleshoot web browser and connection issues 	107879L2 107880L2 107882L3 107891L3 107909L3	Obtain qualifications via training programmes (QF Level 3) Or RPL Mechanism (QF Level 3 RPL Cluster: ITOS016L3)

Area of Work / Cluster Name	Major Tasks	Competency Requirements	Units of Competency (UoCs) Number	Relevant Qualification for fulfilling Competency Requirements
User Support	4. User Support	<ul style="list-style-type: none"> ▪ Provide support to mobile device users ▪ Troubleshoot client device hardware issues ▪ Perform remote support 	<p>107904L3</p> <p>107905L3</p> <p>107907L3</p>	<p>Obtain qualifications via training programmes (QF Level 3)</p> <p>Or</p> <p>RPL Mechanism (QF Level 3 RPL Cluster: ITOS012L3)</p>
System Security Support	5. System Security Support	<ul style="list-style-type: none"> ▪ Create and maintain user accounts on server ▪ Configure user access control on server ▪ Administer system security 	<p>107885L2</p> <p>107886L3</p> <p>107888L3</p>	<p>Obtain qualifications via training programmes (QF Level 3)</p> <p>Or</p> <p>RPL Mechanism (QF Level 3 RPL Cluster: ITOS009L3)</p>
Web Support	6. Web Support	<ul style="list-style-type: none"> ▪ Troubleshoot web browser and connection issues ▪ Maintain website performance ▪ Build simple web site using content management systems ▪ Maintain website 	<p>107909L3</p> <p>107910L3</p> <p>107911L3</p> <p>107912L3</p>	<p>Obtain qualifications via training programmes (QF Level 3)</p> <p>Or</p> <p>RPL Mechanism (QF Level 3 RPL Cluster: ITOS013L3)</p>

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Title	Build a small wireless LAN
Code	107879L2
Range	This unit of competency applies to junior IT personnel who are involved with construction of the organisation's network infrastructure. The main duties include installing, configuring of small wireless local area network (LAN) as well as performing user training on the use of the wireless LAN. However, during the planning and network design and sourcing of equipment for the wireless LAN he/she may be required to provide advice and assistance.
Level	2
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge to build a small wireless LAN: <ul style="list-style-type: none"> • Possess good communication and interpersonal skills • Possess good knowledge of basic training skills • Possess good knowledge of different network and wireless security risks • Possess good knowledge of wireless LAN components and their functions • Possess good knowledge of how to acquire technical manuals on wireless LAN equipment • Understand the network needs of users and the organisation • Possess good knowledge on use of network testing software 2. Building a small wireless LAN <ul style="list-style-type: none"> • Comprehend and assess the wireless LAN design diagram. Confirm and raise any concerns or suggestions with the designer or supervisor before purchase of equipment or install work. Area where he/she may assist include but not limited to the following: <ul style="list-style-type: none"> • Evaluate and/or selection of wireless equipment • Advice on any blind spots that affect the wireless signal • Site survey • Prepare for installation of wireless LAN <ul style="list-style-type: none"> • Identify the location of wireless router/Access Point and can be connected to the wired local network or to Internet service provider • Verify power availability for the wireless router • Verify Access Point (AP) has mounting space and signal are not obstructed that reduced transmission efficiency • Acquired network settings • All required equipment have been checked, verified working, and installation manuals are available • Install and configure the wireless router • Perform a wireless coverage test. Install wireless extension device to increase network coverage and remove blind spots, if needed • Configure security settings that conform to the network design and the organisation security policies • Install and configure wireless LAN cards on personal computers or join mobile client and smartphone to the wireless LAN then perform the following tests: <ul style="list-style-type: none"> • Test connection of the wireless network with user equipment to ensure general compatibility and access • Perform speed tests to ensure client connection is of expected performance • Perform security tests to ensure only authorised clients can connect to the wireless network • Label all wireless LAN equipment in accordance with the designed infrastructure plan/diagram • Provide instructions sessions and/or tutoring to users on use of wireless network, topics include: <ul style="list-style-type: none"> • Pairing with designated Service Set Identifier (SSID)

	<ul style="list-style-type: none"> • Logon arrangements • Use of wireless LAN equipment • Document all installation activities and record configuration and security settings details in accordance with the organisation's guidelines and procedures <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • All installation activities and preparation of documents were performed in accordance with organisation guidelines and standards • Always protect the organisation against unauthorised wireless connection and apply industry network security best practices • Follow the organisation's occupational health and safety guidelines and procedures when installing with network equipment
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Perform the necessary preparations before the installation of wireless LAN • Install, configure and test the wireless LAN and equipment in accordance with the organisation's requirements and standards • Provide sufficient and satisfactory training to users that enable them to access the organisation network resources
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Title	Install and configure network components/devices
Code	107880L2
Range	This unit of competency applies to support personnel who install and configure network components or devices in a small internal Local Area Network (LAN) environment. A small network would comprise of Internet connection with wireless and wired Internetworking devices such as switches, routers, wireless LAN Access Points (AP).
Level	2
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for installing and configuring network components/devices: <ul style="list-style-type: none"> • Possess basic network troubleshooting skills • Possess good knowledge of system and network monitoring equipment • Possess good knowledge of internetworking devices • Possess good knowledge of network concepts, such as: <ul style="list-style-type: none"> • Network types • Types of cables and distance limits • Wireless LAN • Possess good knowledge of the TCP/IP protocol • Possess basic knowledge of procedures for handling electrical devices 2. Installing and configuring network components/devices <ul style="list-style-type: none"> • Comprehend the installation requirements including: <ul style="list-style-type: none"> • Types of network component/device • Verify location is suitable for the installation work • Prepare for installation work <ul style="list-style-type: none"> • Assess network component/device power and cabling needs • Verify location is suitable for the installation • Acquire the network component/device • Acquire technical manuals and comprehend the installation and configuration instructions • Acquire network configuration information for the network component/device • Perform the installation of network component/device complying to the organisation and manufacturer's procedures • Configure and test the network component/device to ensure it complies with the organisation's network requirement • Clean installation site and return equipment to appropriate location • Document the installation and configuration according to the organisation guidelines and standards 3. Exhibit professionalism <ul style="list-style-type: none"> • Adhere to the organisation's occupational safety procedure • Well converse with industry's networking best practices
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Be well prepared for the installation work • Follow the work order and install the network component/device according to the manufacturer and the organisation procedures • Perform post installation procedures satisfactorily and well document the configuration details and installation work according to the organisation standard procedures
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Title	Install and configure client/server application
Code	107882L3
Range	This unit of competency applies to support personnel who install and configure client/server application at workplace. The installation may be for a fresh deployment of the organisation wide client/server application or re-installation when client/server application is having issues. The type of client/server application this UoC refers to is of "tightly coupled" type like POS (Point Of Sales) systems rather than "loosly coupled" type like web browser to web server (any). Also it is installed in an internal network.
Level	3
Credit	6
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for installing and configuring client/server application <ul style="list-style-type: none"> • Possess basic literacy skills to comprehend work orders and technical documents • Possess basic knowledge of networking concept • Possess good knowledge of client and server concept in particular • Possess good knowledge of common operating systems (server and client) • Possess good knowledge of testing and troubleshooting client/server applications 2. Install and configure client/server application <ul style="list-style-type: none"> • Develop installation plan for the client/server application requirements including but not limited to the following: <ul style="list-style-type: none"> • Identify what installation options are required from work order • Identify hardware requirement (i.e. server and client side) • Identify software requirement (i.e. database, middle ware, etc.) • Identify network requirements • Identify security requirements • Identify what data migration is required, if any • Preparing for installation <ul style="list-style-type: none"> • Upgrade hardware of server and client device, if required • Acquire the client/server application installation media • Familiarised with the client/server application installation instructions from vendor documents • Acquire associated settings for the client/server application, such as: <ul style="list-style-type: none"> • IP address of the server and client • Network settings • Authorised access account settings • Acquire all necessary technical manuals • Backup the server and client systems • Install and configure network protocol, middleware, database, if required • Install and configure the server side of the client/server application as required by the work order <ul style="list-style-type: none"> • Configure security and access settings to allow client to connect • Undertake restore or migration of data, if required • Perform appropriate tests • Install and configure client side of the client/server application as required by the work order <ul style="list-style-type: none"> • Configure security setting to enable access to the server side • Configure appropriate functions of the application • Perform tests to ensure client side is forming as required • Perform post installation procedures <ul style="list-style-type: none"> • Clean up work area and remove temporary work files and objects from the server and client device

	<ul style="list-style-type: none"> • Perform backup image of the server and client for system restore, when and if required • Return and store installation media in secure place as instructed by the organisation's guideline • Document the installation and configuration according to the organisation guidelines and standards <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Adhere to the organisation's occupational safety procedure • Well converse with industry's best work practices for installing client/server applications
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Perform the pre-installation activities and being well prepared to ensure the installation of the client/server application without any delay • Ensure the installation process was carried out efficiently without affecting other applications and/or services on the server and clients side • Perform post installation procedures that complied with the organisation guidelines and procedures
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Title	Configure WAN connection
Code	107883L3
Range	This unit of competency applies to IT support personnel who are responsible to configure the organisation's internal network to connect and communicate with the external Wide Area Network (WAN) or be connected to the Internet. The configuration will involve configuring the organisation's routers as well of internal hosts. Hosts in this UoC can be user client devices (PCs, mobile devices, tablets, wireless APs, etc.) or servers.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for configuring WAN connection: <ul style="list-style-type: none"> • Possess good literacy skills to interpret network diagram/plan, technical documents, equipment manuals and specifications • Possess basic network installation and configuration skills • Possess good knowledge of internetworking devices • Possess detailed knowledge of the TCP/IP protocol • Possess good problem solving skill • Possess basic knowledge of organisation guideline and safety procedures for handling electrical devices 2. Configure WAN connection <ul style="list-style-type: none"> • Prepare the readiness of the internal network to connect with the WAN, including the following: <ul style="list-style-type: none"> • Comprehend the organisation network plan and architecture, including: <ul style="list-style-type: none"> • Number of internal subnets • Routing settings of each subnet • De-Militarised Zone (DMZ) information • Load balancing for multi WAN connections • Acquire and install router as per required by manufacturer • Acquire internal network settings from network administrator and configure into the router • Liaise with WAN service provider to confirm switch-over date and WAN connection to be installed • Determine connection type (static IP or DHCP assigned) and configure with reference to the organisation's network plan. For static IP address connection to the WAN, acquire the network setting from service provider • Configure and test router with the given WAN IP address • Test the internal and external connection to ensure traffic can flow on both directions • Configure and test host connections • Document the installation and configuration details according to the organisation guideline and standards 3. Exhibit professionalism <ul style="list-style-type: none"> • Adhere to the organisation's occupational safety procedure • Well converse with industry's networking best practices

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: <ul style="list-style-type: none">• Liaise with WAN service providers to coordinate the cabling and installation of WAN modems into the premises that conform to the network diagram/plan• Configure and test router connection with the WAN connection• Configure all hosts of the internal network to enable them to communicate via the WAN connection
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Title	Troubleshoot network issues
Code	107884L3
Range	This unit of competency applies to junior IT personnel who are involved with troubleshooting network issues while in a network supporting role. These junior IT personnel is expected to troubleshoot operational wireless and wired network problems, such as device connection issues, software configuration issues, and network component failure issues. For this UoC devices could be: personal computers, notebooks, tablets, smartphones, internetworking components such as routers, switches, etc.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge to troubleshoot network issues:</p> <ul style="list-style-type: none">• Possess good communication and interpersonal skills• Possess good network troubleshooting skills• Possess basic knowledge of different network technologies• Have good understanding of network components and their functions• Possess good knowledge of how to acquire technical information from manuals, colleagues and Internet• Possess good knowledge in operating network testing equipment

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Network Support

Competency	<p>2. Troubleshooting network issues</p> <ul style="list-style-type: none">• Acquire details of network issues from problem reports or by communicating with users to understand symptoms of network issues• Attempt to reproduce the network issues on user's client device or network component, if possible• For wired network connection issues<ul style="list-style-type: none">• Inspect for loose cabling on the network devices, network clients, and network components. Reconnect and secure cables• Use cable testing equipment to test cable to ensure it is still functioning• For wireless connection issues<ul style="list-style-type: none">• Determine where the issues lie, at wireless client or Access Point side<ul style="list-style-type: none">• Verify the wireless access point is functioning using other devices or clients• Verify the wireless connection setting and the correct password is used at the client side• For software configuration issues<ul style="list-style-type: none">• Acquire network settings from network administrator• Verify the software configuration setting matched the network settings. Reconfigure if necessary• For network component issues<ul style="list-style-type: none">• Verify the device is receiving power<ul style="list-style-type: none">• Perform visual check if power cable is connected• Verify power adapter of the device is working and securely connected• Verify the device's power is on• Verify the device configuration setting is correct• Verify the device is transmitting and receiving signals• Document all troubleshooting activities and record all findings. Also complete problem report in accordance with the organisation's guidelines and procedures <p>3. Exhibit professionalism</p> <ul style="list-style-type: none">• All troubleshooting activities and preparation of documents were performed in accordance with organisation guidelines and standards• Follow the organisation's occupational health and safety guidelines and procedures when working with network equipment
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Prepare sufficiently for the troubleshooting job• Systematically perform troubleshoot tasks and find the network issues• Follow procedures and be able to prepare documents and complete problem reporting in accordance with organisation standard
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Title	Create and maintain user accounts on server
Code	107885L2
Range	This unit of competency applies to support personnel who administer the organisation's servers. A very important task for the administrator or the support personnel of servers is to create accounts of users that are allowed to access the system's resource. This UoC assumes servers are standalone and not in directory service environment
Level	2
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none">1. Knowledge for creating and maintaining user accounts on server<ul style="list-style-type: none">• Possess system troubleshooting skills• Possess good knowledge of system logs• Possess good knowledge of common server operating systems• Possess good knowledge of operating system's access control• Possess basic knowledge of information security• Possess knowledge of the organisation's user security procedures and guidelines

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Competency	<p>2. Create and maintain user accounts on server</p> <ul style="list-style-type: none">• Determine the needs of the accounts on server, such as:<ul style="list-style-type: none">• The role of the user (user, administrator, operator, etc.)• Which server, if there are more than one• Personal folder for the user• Access to server resources• Application settings• Access rights• Login to server with administrative account to create the new account and follow the organisation guidelines to setup security settings for the account based on the role of the user. Settings include but not limited to the following:<ul style="list-style-type: none">• Security role of the account• Directory and file permissions• Password length• Change password requirements and duration• Set temporary password and set user must-change-password on first login• Inform the user of new account details• Regularly use system tools or third party tools to determine security and usage of accounts, such as but not limited to the following:<ul style="list-style-type: none">• Accounts involved with unusual activities• Attempt to access unauthorised resources• Accounts locked out• Unused accounts• Handle unusual account activities in accordance to the organisation guideline, such as escalating to supervisor• Verify unused accounts and follow the organisation procedures to perform clean-up activities, such as remove account, revoke permission, etc.• Document and record all actions performed on user account in accordance with the organisation guidelines <p>3. Exhibit professionalism</p> <ul style="list-style-type: none">• Apply system administrator ethics and exercise due diligence when administering user accounts on servers• Exhibit security attitude but balance the needs of users with the organisation security needs when administering system user accounts, as well as securing the server
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Understand the needs for creating new accounts• Use appropriate system tools to create accounts, perform correct configurations, setup correct access rights to server resources and provide sufficient details and guidance to user that enabling him/her to access the server• Monitor account usage and account irregular activities and take corrective actions to maintain accounts current and secured on the server
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Title	Configure user access control on server
Code	107886L3
Range	This unit of competency applies to support personnel who administer the organisation's servers. To access resources on a server the user will need appropriate access rights which administrator will need to configure. Access control in modern servers has pre-configured access control in form of different roles or via traditional access rights.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for configuring user access control on server <ul style="list-style-type: none"> • Possess system troubleshooting skills • Possess good knowledge of system logs • Possess good knowledge of common server operating systems • Possess good knowledge of operating system's access control • Possess basic knowledge of information security • Possess knowledge of the organisation's user security procedures and guidelines 2. Configure user access control on server <ul style="list-style-type: none"> • Determine what role the user is allocated by the organisation, for example: <ul style="list-style-type: none"> • Administrator • Backup operator • Application administrator • Read only analyst • Use server management tools to assign the role to the user's account • Determine resource access permitted for the user, such as but not limited to the following: <ul style="list-style-type: none"> • Local logon • Internet access • Remote logon • Use server tool to configure user accounts with allowed access • Create a check list of access control setting for each shared resources and/or object, such as but not limited to the following: <ul style="list-style-type: none"> • Printers • Folders • Files • Applications • Configure the allowed access and level of access (Read, Write, Execute, etc.) to each object and shared resource • Document and record all user access setting and configuration for reference 3. Exhibit professionalism <ul style="list-style-type: none"> • Comply system administrator ethics and exercise due diligence when administering user accounts and access control on servers • Exhibit security attitude but balance the needs of users with the organisation security needs when setting user access control as well as protecting the server

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: <ul style="list-style-type: none">• Determine and setup the role of the user that matches his/her access on the server• Identify all the individual objects, shared resources on the server which the user requires access to• Setup and configure correctly the user's access control on the server
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Title	Administer system security
Code	107888L3
Range	This unit of competency applies to support personnel who administer the organisation's system security on client devices. The duties of support personnel includes installing various security applications, performing various system configuration and setting to protect the system from loss of information (user and organisation) and different network security risks. Client devices mainly refer to personal computers, notebooks and business tablets
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for administering system security <ul style="list-style-type: none"> • Possess good communication and interpersonal skills • Possess system troubleshooting skills • Possess good knowledge of system and network logs • Possess good knowledge of common operating systems • Possess broad knowledge on functions and features of network devices • Understand network security and system security risks • Possess knowledge of the organisation's security procedures and guidelines 2. Administer system security <ul style="list-style-type: none"> • Comprehend the organisation's system security requirements and system security plan, including but not limited to the following: <ul style="list-style-type: none"> • List of authorised personnel/users that can access the system • Level of access/tiered access, or what each user is allowed and not allowed to do on the system • Access control methods, or how users will access the system (user ID/password, digital card, biometrics) • System setting and application needed to strengthen the system and how weaknesses are handled • Which system required system backup and what type of backup procedure to apply • Network security settings and configurations • Install the required security application, such as: <ul style="list-style-type: none"> • Antivirus and spyware protection applications • Personal firewall • Malware protect application • Configure and set remote access and support function according to the organisation guideline and procedure • Configure network and firewal • according to the organisation's guideline • Create and setup user accounts in accordance with organisation security requirements • Review files security settings and modify access and read/write permissions to match user's role. • Regularly perform backups, system security checks, system updates • Monitor and record security checks • Document and record details of installed applications, configurations, settings, risks for system audit, maintenance and support purpose 3. Exhibit professionalism <ul style="list-style-type: none"> • Exhibit security attitude but balance the need of users with the organisation security need when administering system security

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: <ul style="list-style-type: none">• Comprehend the system security plan• Install the required security applications, correctly configure and perform appropriate setting that complied with the security plan• Perform scheduled system security checks, system update and document system changes in accordance with the organisation's guidelines and procedures
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Title	Strengthen workstation protection
Code	107891L3
Range	This unit of competency applies to support personnel who are responsible for securing client workstation. Workstations are vulnerable to local and external threats, they need to be protected from as much as these threats as possible. Most organisation will have different protection procedures which support personnel need to setup before allowing user to access the workstation. This UoC illustrates some of the protection tasks and it is by no means exhaustive.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for strengthening workstation protection</p> <ul style="list-style-type: none">• Possess system troubleshooting skills• Possess detailed knowledge of security features and functions of the organisation's operating systems• Possess good knowledge of system security concepts• Possess good knowledge of computer hardware and system software• Possess knowledge of the organisation's security procedures and guidelines

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Security Support

Competency	<p>2. Strengthen workstation protection</p> <ul style="list-style-type: none"> • Comprehend the organisation’s guideline for workstations protection to configure the user’s workstation. Systematically setup and configure protection features on the workstation • Setup physical security protection, including but not limited to the following: <ul style="list-style-type: none"> • Lock the CPU unit to prevent opening of the case • Affix a chain lock (Kensington lock) to secure position for notebooks • Setup password protection (hardware-level) for access to machine’s BIOS • Eliminate or disable unnecessary services. For example: remote access, Internet sharing, etc. • Remove unnecessary executables and registry entries to prevent attacker invoking disabled programs • Set user account to <ul style="list-style-type: none"> • “non-administrator” account, to prevent uncontrolled change of system settings • Avoid multi-user sharing same machine, if possible • Set system account policies <ul style="list-style-type: none"> • Minimum length of account password • Force change password • Set re-used policy • Setup screen save to turn off screen and power off system after a predefined period of no user activities • For systems holding confidential information, setup file encryption and access permission • Install and setup anti-virus, anti-spyware and anti-malware scanning and handling, such as: <ul style="list-style-type: none"> • Auto and scheduled update of virus definitions • Scheduled daily scan • Real time protection • Anti-virus application which starts on system boot • When virus or malware found, clean first (high risk) and quarantine second • Setup firewall protections • Setup auto and scheduled system updates • Create a backup image of the workstation before allowing user to use the machine • Document the system settings and configurations for internal record <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Exhibit security ethics and balance the need of users with the organisation security needs when setting and configuring security protection of user’s workstations
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Comprehend the organisation’s workstation protection guidelines and able to configure and setup required security protections • Complete documents of the security settings and configuration in accordance with the organisation’s procedures
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: System and Hardware Support

Title	Provide support to mobile device users
Code	107904L3
Range	This unit of competency applies to IT support personnel who are responsible for mobile device support to users. As organisations are joining the Bring Your Own Device (BYOD) bandwagon, users will need supporting in the work environment; IT support staff will need to have the necessary skills to support and educate users using mobile devices to access the organisation resources. This UoC concerned on area of general support including but not limited to: setup brand new devices to access organisation resources, assist logon and use of Mobile Device Management (MDM) system, protection of corporate information in event of loss of mobile devices, remote support access and support, change configuration and settings, etc.
Level	3
Credit	6
Competency	<p>Performance Requirements</p> <p>1. Knowledge to perform remote support:</p> <ul style="list-style-type: none">• Possess good communication, listening and interpersonal skills• Possess remote support skills capable to perform troubleshooting, provide instructions systematically and remote problem solving• Possess good knowledge of functions and features of the organisation's MDM system• Possess good knowledge of mobile device supported applications• Possess good knowledge of common mobile device platforms such as IOS, Android, Blackberry, Windows Phone, etc.• Well conversed with the organisation's BYOD guidelines and procedures• Possess good knowledge of virtual desktop technology and Virtual Desktop Infrastructure (VDI) for mobile device

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: System and Hardware Support

Competency	<p>2. Perform remote support</p> <ul style="list-style-type: none"> • Listen attentively and patiently to understand the user’s reported issues • Refer to the Trouble Ticket System (TTS)/problem reporting system to determine if similar issues and/or solutions exist • For brand new BYOD mobile devices, follow the organisation guidelines to perform some but not limited to the following tasks: <ul style="list-style-type: none"> • Ensure user understand, agree and accept the organisation policies, particularly when device is misplaced/lost • Install organisation MDM apps and organisation’s standard apps • Install mobile support apps, such as: Teamviewer for mobile, Remoty, GotoAssist, etc. • Configure network access setting such as VPN • Backup device • Turn on remote wipe function of the device • Install anti-virus/malware/spyware app • Create new access accounts on MDM server and test connectivity and accessibility to ensure device is function as expected • For troubleshooting or remote support, mobile support application or MDM apps should be used to remote access to the mobile device, to view and change setting, screen capture, direct communicating with user to provide instructions to resolve the issue • For misplaced/lost device, evaluate the risk of data loss and assist the user to use “find my phone/device/mobile” function or use MDM apps to trace, lock or wipe the device • Provide instructions and/or training to users on mobile devices usage and mobile security to protect organisation data • Create a new or update Trouble Ticket (TT)/problem report to record the activities transacted during the support session <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Possess customer service oriented attitude • Apply industry best practices for mobile support and being up-to-date with mobile technology trends
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Set up the users’ mobile devices to conform with the organisation’s mobile device policies • Use appropriate tools to troubleshoot mobile devices, resolve users experience issues and assist or advice users with correct solutions to resolve issues for providing effective support to users and protect the organisation data in the event of user loss • Take correct actions to protect the organsiation’s data in the event where users have lost mobile devices • Provide sufficient instruction or training to users on use of mobile devices that conform with the organisation policy
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: System and Hardware Support

Title	Troubleshoot client device hardware issues
Code	107905L3
Range	This unit of competency applies to IT support personnel who are responsible for providing support for client devices. Client devices ranging from personal computer to smart mobile device could experience hardware issues during its operation and support personnel are requested to fix the issues. This UoC concerns the identification of hardware issues before it can be fixed.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for troubleshooting client device hardware issues <ul style="list-style-type: none"> • Possess good troubleshooting and problem analysis skills • Possess good knowledge of operating client devices • Possess good literacy skills for reading technical manuals of client devices • Possess good knowledge of the organisation's procedures for troubleshooting client devices • Possess basic knowledge of hardware protection procedures, such as use anti-static straps, etc. • Possess basic knowledge of the organisation health and safety guideline 2. Troubleshoot client device hardware issues <ul style="list-style-type: none"> • Comprehend symptoms, if any, prior issues appeared from problem report and/or discussion with user. For example: <ul style="list-style-type: none"> • Nothing came on when power button pressed • Blank screen but CPU unit appears to be running • System running very slow and continuously rebooting or hanged • System not responding to mouse and keyboard • Review maintenance records of the device, to determine if maintenance work has contributed or caused the issues • Prepare for troubleshooting: <ul style="list-style-type: none"> • Acquire all necessary technical and user manuals • Acquire tools to open the client device and tools for troubleshooting • Acquire device components or spare parts • Analyse and formulate a troubleshooting plan • Without opening to inspect the inside of the client device, perform checks for loose connections, power sockets, battery, display device, etc. • View the BIOS error message display code or listen for the number beeps sounded and verify the given code with technical manuals to identify BIOS detected error. For example: <ul style="list-style-type: none"> • 1 = Loose memory module • 2 = CPU error repair/replace mother board • 3 = display memory error repair/replace display card • Next stage of checking is to verify connected components have not affected the functioning of client device, such as: <ul style="list-style-type: none"> • Keyboards/mouse (swap with a known working component) • Battery low power on mobile device (swap with a fully charged battery) • Hard disk failure (listen for unusual noise) • Power supply unit failure (verify cooling fan is functioning and/or system light is on) • For intermittent issues, such as "system hang" or "randomly rebooting" under heavy system work load, identify cause of issue using combination of techniques, including but not limited to the following: <ul style="list-style-type: none"> • System log messages • Reproduce the issues with monitoring tools • Incorrect BIOS settings

	<ul style="list-style-type: none"> • Overheating components • Purpose-built hardware analysis device • For mobile device, once verified it is not battery problem and still cannot be started, return the devices to vendor who will use manufacture’s hardware problem analysis devices to identify the issues • Once the cause of issues have been identified, formulate a rectification action plan and clean the work area • Document and record the findings in accordance with the organisation procedures and standards <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Follow organisation safety guidelines and procedures when performing troubleshooting of client devices
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Prepare well with troubleshooting work, having all the required tools and manuals for use during the troubleshooting process • Plan the troubleshoot work and systematically perform the troubleshooting to identify the issues or cause of issues • Follow the organisation safety procedures during the troubleshooting process
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: System and Hardware Support

Title	Perform remote support
Code	107907L3
Range	This unit of competency applies to support personnel who are responsible for providing remote support. In a structure support team this would be a Level 2 support personnel where Level 2 is normally the first point of escalation, provides guidance and instructions to Level 1. Level2 is where the support personnel take ownership of incidents where subject matter expertise and experience is required for diagnosis. However, this UoC concerned only remote support competencies and does not distinguish the organization level.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge to perform remote support:</p> <ul style="list-style-type: none">• Possess good communication and interpersonal skills• Possess remote support skills capable of performing troubleshooting and providing systematic instructions for remote problem solving• Possess good knowledge and operating remote support applications• Understand committed Service Level Agreement (SLA) and standards• Possess good knowledge of problem escalation procedures and guidelines• Possess basic knowledge of the organisation computer hardware, Operating System (OS), applications and network equipment

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: System and Hardware Support

Competency	<p>2. Performing remote support</p> <ul style="list-style-type: none">• Comprehend reported problem from Trouble Ticket system (TTS)/problem report system to understand symptoms and diagnostics from support desk colleague (level 1 support)• Search TTS/problem report system to determine if similar issues and/or solutions exist• Communicate with the customers/users to explain actions that will be performed to resolve the issue, such as:<ul style="list-style-type: none">• Need to collect more information related to the reported issue• Need to remote access to user's system• Will instruct the user to self-rectify the issue upon determination that the user is capable of self-rectification• If remote access/control is necessary, determine customer/user's comfort level to have remote access feature of the system turn on and installation of remote access software. To gain customer/user's support it is necessary to explain:<ul style="list-style-type: none">• How the remote access work compare with on-premise support• There are no security risks• Benefits of remote access/control• Perform troubleshoot and/or apply solution to correct the reported issue. If remote solution cannot fix the issue then offer to customer/user the on-premise support option• Confirm solution is acceptable with customer/user• Uninstall any application and/or reset configurations that were used for the remote support purpose and remind users to set off remote support functions on their system• Document all activities and record changed setting in the TTS/problem report. Where necessary, coordinate with other colleagues, such as requesting on-premise engineers to visit the customers/users <p>3. Exhibit professionalism</p> <ul style="list-style-type: none">• Possess customer service oriented attitude• Always keep customer informed of actions and status of the rectification process• Follow industry best practices to use best remote support application to provide remote support
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Comprehend the reported problem from the internal TTS/problem report system and able to update the appropriate record in accordance with the organisation's procedures after the completion of the remote support session• Persuade customers/users to allow remote access/control to their system for troubleshooting and/or correcting of issues• Perform the remote support to the satisfaction of customers/users
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Title	Troubleshoot web browser and connection issues
Code	107909L3
Range	This unit of competency applies to support personnel who are responsible for providing front line support on web browser usage to users on different client platforms, including desktops, notebooks, tablets and even smartphones. The web browser is one of the most used applications. Very often users will encounter many issues which will need assistance. Common issues encountered including but not limited to the following: cannot start browser, wrong security setting, incompatibility, malware, connection problem, unable to initiate download after click of links, etc. To assist users the support personnel will troubleshoot and provide a remedy. Additionally the support personnel should provide some basic tutorial to users to avoid repetition and facilitate self-help.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for troubleshooting web browser and connection issues:</p> <ul style="list-style-type: none">• Possess good communication and interpersonal skills• Possess good troubleshooting skills and capable of providing systematic instructions for remote problem solving• Possess good knowledge of functions of various web browsers on different platforms• Possess basic knowledge of operating different computing platforms• Possess basic knowledge of web browser development and trends such as: technologies, web browser features, malwares attacks, etc.• Possess basic knowledge of the organisation's network infrastructure

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Competency	<p>2. Troubleshoot web browser and connection issues</p> <ul style="list-style-type: none"> • Patiently listen to user describing issues and symptoms. Use appropriate questioning techniques to gather as much information to help troubleshoot the issue: <ul style="list-style-type: none"> • What are the types of issue user is experiencing, • What type of browser • What platform and OS environment the browser is operating on • Refer to history problem log to determine if similar problems and solutions exist • If web browser shows “cannot connect to server” or similar message, then troubleshoot network connection by verifying and correcting below items: <ul style="list-style-type: none"> • Verify the client is actually connected to the network (LAN or mobile) • Verify client has acquired a valid IP and DNS address • Verify correct proxy server setting • etc. • If displayed content is inconsistent with the new contents of the web site, then clear the cache of the browser • If downloads are not permitted or no activities after user clicked a link, then review and adjust the security settings that prevent certain risky functions and scripts from auto activated, such as: ActiveX, cookies and downloads. Any adjustment of security setting must be complied with the organisation security policies • If web browser cannot start then locate related error messages from system or application logs to determine the issue. If application is corrupted, and no alternative method of correcting the problem, then uninstall and reinstall the Web browser • If the browser consistently redirected to unwanted web site, this may be due to the browser being hijacked by malware. Use anti-malware software to detect and remove the malware • Explain the cause of issues and remedies applied to users and provide some basic training and advice to user on “best practices on using web browser and surfing internet” • Create or update problem log in accordance with the organisation’s procedures and issues and remedies performed <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Possess customer service attitude with desire to assist users with problems • Follow organisation safety guidelines and procedures when troubleshooting and/or reification of equipment
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Systematically apply web browser troubleshooting techniques to identify the cause of issues and provide remedies • Use correct level of technical language to gather information related to the Web browser issues and conduct tutorial to users • Complete the “after event” procedures in accordance with the organisation’s standards
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Title	Maintain website performance
Code	107910L3
Range	This unit of competency applies to IT support personnel who are responsible to maintain the performance of the organisation's website. One of the tasks of website maintenance is to ensure the site is running at an optimal speed that can provide a good user experience to visitors and a successful website with business.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for Maintain website performance <ul style="list-style-type: none"> • Possess good knowledge of various website performance testing tools, such as : Webpage analyser, Google's site tool and Google Page Speed, Yahoo's YSlow, etc. • Possess good knowledge of creating web contents • Possess basic knowledge of different web browsers • Possess good knowledge of the organisation basic network infrastructure • Possess good knowledge of the organisation website performance requirements 2. Maintain website performance <ul style="list-style-type: none"> • Work with supervisor and/or colleagues to identify the website response time required. Different types of responses for different types of contents • Verify the website performance using suitable performance testing/measuring tools • Study the website network and hosting server performance <ul style="list-style-type: none"> • If loading is high, consider off load some of the tasks from the server • If web server is hosted on a Cloud Server, consider using a different hosting service provider • Work with content developers to review and advice on some but not limited to the following: <ul style="list-style-type: none"> • Minimise size of webpage • Minimise the use of nested table • Avoid using oversized image file straight from camera. Resize image files to a match the purpose • Optimise programs, scripts and databases • Regularly run stress tests to ensure the performance of the website is within the organisation's standard • Document performance test results for reporting purpose 3. Exhibit professionalism <ul style="list-style-type: none"> • Possess quality of service attitude. Website performance affects the organisation image and business
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Work with supervisors or colleagues to identify the and formulate a performance standard for the organisation's website • Use performance measuring tools to determine the performance of the organisation website • Work with website developers to improve performance of the website to meet the organisation's performance requirement
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Title	Build simple web site using content management systems
Code	107911L3
Range	This unit of competency applies to IT personnel who are responsible for building a simple web site for the organisation. Most companies will want to have an Internet presence; having at least a simple web site and IT personnel are entrusted with building this web site. As Internet and web content management system (CMS) technologies are maturing, building web sites is almost as simple as creating "Office" documents. However, once the web site is built the IT personnel will need to provide tutorials to webpage designer on use of CMS editor to build webpages. This UoC assumes the web site is hosted by hosting service provider.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Knowledge for building simple web site using content management systems <ul style="list-style-type: none"> • Possess good communication and interpersonal skills • Possess good knowledge of web hosting concept and sourcing of hosting facilities • Possess detail knowledge of implementing web CMS systems • Possess detail knowledge of operating and administering the organisation's CMS • Possess basic knowledge of HTML • Possess some basic training skills 2. Build simple web site using content management systems <ul style="list-style-type: none"> • Work with supervisor and other stakeholders to identify the website technical requirements from, such as: <ul style="list-style-type: none"> • Type and usage of web site (dynamic, static, Internet store, etc.) • Performance required (response time) • Size of storage • Network speed • Identify suitable web CMS and web hosting company (unless for the organisation use, taking into various factors, including: <ul style="list-style-type: none"> • Prices • Backup service • Facilities offered (storage, network bandwidth, CPU speed, etc.) • Prepare purchasing document, in accordance with organisation procurement procedures, and recommendation for supervisor approval • Liaise with hosting service provider to setup DNS reference to the organisation's new web site and acquire hosting servers logon details to administer the CMS • Download and perform remote installation web CMS on hosting server • Access administrative functions of web CMS to perform following tasks: <ul style="list-style-type: none"> • Upload and install a template for the website • Upload company logo and other media (pictures and video) contents for the home page • Edit the home page with CMS editor • Test the web site with different web browsers to ensure compatibility • Create login accounts and provide tutorial sessions for web designers to use the CMS editor to create web pages on the web site 3. Exhibit professionalism <ul style="list-style-type: none"> • Be familiar with W3C web standards and ensure the CMS and web site are W3C compliant • Always look after the interest of the organisation when dealing with external parties

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: <ul style="list-style-type: none">• Fully comprehend the requirements of the type of web site the organisation is building and acquire sufficient technical details to subscribe to a web hosting service• Install the CMS on the hosting server and be able to use the CMS editing tools to create the web site's home page that is compatible with common web browsers• Provide sufficient tutorial and assistance to web page designers that enable them to construct other web pages without any difficulties
Remark	

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Title	Maintain website
Code	107912L3
Range	This unit of competency applies to IT personnel who are responsible to maintain the organisation's website. The website is the window of companies to the Internet world. It represents the organisation. Hence, it is essential to be always in operation and the contents are update without any embarrassing issues, such as customer cannot complete purchasing transaction or students cannot upload (hand in) projects or homework. This UoC concerned with the website maintenance of the content rather than the physical server which the website is hosted on.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for maintaining website:</p> <ul style="list-style-type: none">• Possess interpersonal and coordination skills• Possess basic knowledge of principles of website design and maintenance• Possess good knowledge of creating web contents• Possess basic knowledge of operating common web browsers• Possess good knowledge of operating website testing tools• Understand user feedbacks or complaints related to the website• Understand the organisation's website performance requirements• Possess basic knowledge of the organisation document standards and procedures

Specification of Competency Standards for ICT Operation and Support

Unit of Competency

Functional Area: Web Support

Competency	<p>2. Maintain website</p> <ul style="list-style-type: none"> • Coordinate with various parties in the organisation to implement new features, upload new contents to website • Create various channels to receive information related to the organisation’s website, included but not limited to the following: <ul style="list-style-type: none"> • Visitor feedbacks or user complaints • Results of website testing tools • Monitoring/log statistics • Alerts of website outage • Periodically perform tests including but not limited to the following: <ul style="list-style-type: none"> • Access to the website is still possible • Web contents are compatible with different browsers and different clients (mobiles and desktops) • No broken links • Software are updated • Access and download speed • Functions/features are operational as expected, such as: checkout, blog, forum, registration, upload, download, etc. • Correct or coordinate with appropriate parties to correct any detected issues and remove redundant contents • Collect visitor traffic statistic for security purpose and/or business use <ul style="list-style-type: none"> • Pages entered on and exited on • Time spent on the site • Bounce rate • Referring sites • Countries of visitors are from • Use monitoring tools for “Reputation management” of the organisation’s name, brands and contents of the website appeared on the Internet, such as Google alert • Apply backup strategies: <ul style="list-style-type: none"> • Perform scheduled backups • Perform drills for recovery, in the event of website corruption • Document and create reports that comply with the organisation’s standards and procedures for assisting website developers and management decision making <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Look after the interest and reputation of the organisation • Apply industry best practices and web technologies when maintaining website • Adhere to Intellectual Properties and copyright laws
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Use different tools to monitor and test organisation’s website • Liaise with appropriate parties to correct issues and ensure the website is fully functional, updated and tested with different browsers on different clients • Ensure the website is well backup according to the organisation’s planned schedules and can be recovered within the organisation standard
Remark	

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

Functional Area - Operations Management

Title	Perform game programming
Code	107935L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game programming. Programming is a broad topic involving many different kinds of programming languages, tools and techniques. This UoC is concerned with the development of program modules based on its game design documents, using specified programming languages, and following the organisation's coding standards.
Level	4
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for game programming</p> <ul style="list-style-type: none"> • Realise the philosophy and guidelines of the organisation towards game development • Master basic programming knowhow, concepts and techniques • Possess good understanding about the requirements of game specifications prepared by the development team • Possess good understanding about those programming techniques applicable to games, such as: <ul style="list-style-type: none"> ○ Windows programming ○ Interactive programming ○ Interfacing with multimedia development library, e.g. DirectX • Master popular languages commonly used for game programming, such as: <ul style="list-style-type: none"> ○ C++ ○ Objective-C ○ Java <p>2. Perform game programming</p> <ul style="list-style-type: none"> • Comprehend the structure and contents of various design documents and specifications, which may include: <ul style="list-style-type: none"> ○ Architecture design ○ Detailed level design ○ Game specification ○ Technical specification, etc. • Devise program modules and decompose different program modules into software components according to their design documentation • Conduct the programming work for games according to the above documents • Work on the following key elements in the programming process, if required: <ul style="list-style-type: none"> ○ Integration of game logic and media components ○ Integrate with social media Application Program Interface (API) ○ Integrate with payment gateway, for providing in-app purchasing ○ Perform network programming, for connection to the game server ○ Access to Database (DB) API, for retrieving or storing all game related information ○ Work with integrated script engine, for connection with tasks, missions, etc. ○ Perform Artificial Intelligence (AI) programming ○ Perform physics programming ○ Perform shader programming, which are graphics related 3-dimensional (3D) effects like: <ul style="list-style-type: none"> ▪ Animal fur

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

Functional Area - Operations Management

	<ul style="list-style-type: none"> ▪ Water effect ▪ Neon light • Carry out the following programming stages iteratively until completion of the specific program modules: <ul style="list-style-type: none"> ○ Coding ○ Testing ○ Debugging <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Always develop program modules with full effort and in an efficient and effective manner • Always develop program modules according to organisational and / or international standards, regardless of those personal preferences
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Complete the game programming work within required time frame and budget constraints; and • Develop system components based on designated design documents and specifications
Remark	

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

Functional Area - Operations Management

Title	Perform script programming
Code	107936L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in script programming. Script is a sequence of instruction carried out by another program but not the computer processor directly and is widely used in games for non-player character (NPC) behavior, quest, items, etc. This UoC is concerned with the development of script program modules based on its game design documents, using specified programming engines, and following the organisation's coding standards.
Level	4
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for script programming</p> <ul style="list-style-type: none"> • Realize the philosophy and guidelines of the organisation towards game development • Master basic programming knowhow, concepts and techniques • Possess good understanding about the requirements of game specifications prepared by the development team • Master languages engines commonly used for script programming, such as: <ul style="list-style-type: none"> ○ LUA ○ Python ○ C++ ○ BASIC, etc. • Possess good understanding about the essential features of those script programming engines, such as: <ul style="list-style-type: none"> ○ Variable declaration ○ Flow control ○ Mathematical calculation ○ String manipulation ○ Subroutine / function calls, etc. <p>2. Perform script programming</p> <ul style="list-style-type: none"> • Fully explore the advantages offered by those aforementioned script languages, such as: <ul style="list-style-type: none"> ○ Ease of understanding ○ Ease of maintenance ○ Ease of modifications ○ Low resources consumption, etc. • Plan for the usage of script languages facilities for game applications, such as: <ul style="list-style-type: none"> ○ Use variable declaration for dynamic text generation, such as showing names in a dialog ○ Use the initialization functions to define game elements such as: <ul style="list-style-type: none"> ▪ Player status and properties ▪ Player position and facing direction ▪ NPC details and positions ▪ Active spots and item spots, etc. ○ Use string functions for string copy, concatenation, conversion, and so on ○ Use flow control capabilities for NPC dialog, event movement, battle event, etc. ○ Use function calls to access different script files, etc.

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	<ul style="list-style-type: none"> • Judge on the pros and cons in using existing instead of self-developed scripts, based on considerations such as: <ul style="list-style-type: none"> ○ Existing scripts are well tested ○ There may be library support ○ But they can be more complicated for game designers, etc. • Conduct script programming according to the above understandings and considerations, such as: <ul style="list-style-type: none"> ○ Develop script for various NPC behavior ○ Develop script for battle artificial intelligence (AI) ○ Develop script for graphical user interfaces (GUI) ○ Make use of script tools to handle script data such as: <ul style="list-style-type: none"> ▪ Position in 3 dimensional coordinates ▪ Color value ▪ Movement data, etc. • Carry out the following programming stages iteratively until completion of the specific script programming modules: <ul style="list-style-type: none"> ○ Coding ○ Testing ○ Debugging <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Always develop script program modules with full effort and in an efficient and effective manner • Always develop script program modules according to organisational and / or international standards, regardless of those personal preferences
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Complete the script programming work within required time frame and budget constraints; and • Develop the script program modules based on designated program documents and specifications
Remark	

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Functional Area - Operations Management

Title	Create motion graphics
Code	107944L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the animation production work. Motion graphics in general use video footage or animation to create the illusion of motion and tend to transform on their own. The practitioners' task is to use motion graphics software or tools that will be able to combine video, text, audio, data visualisation, special effects and even 3D to create animations.
Level	4
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for creating motion graphics</p> <ul style="list-style-type: none"> • Possess good communication skills that can communicate effectively with various stakeholders • Possess good understanding of animation and design skills • Possess good knowledge on operating motion graphics software / tools • Process technical skills in motion graphics design, including behaviours, filters and generators; particles simulation; animating effects; creating text effects; templates and drop zones; layers, transitions and speed effect; colour correction and broadcast colour; alpha channels, mattes and keying; composite modes; titles and broadcast graphics; and adding audio <p>2. Create motion graphics</p> <ul style="list-style-type: none"> • Plan and organise the production work, including but not limited to the following: <ul style="list-style-type: none"> ○ Comprehend the scripts / synopsis / storyboards / creative direction / stylistic elements and other work requirements ○ Research and identify the purpose and functionalities of the motion graphics ○ Write a design brief supplemented with visual contents for the motion graphics based on idea generation / inspiration ○ Design graphics and animation to satisfy functional, aesthetic and creative requirements of the design brief ○ Schedule / monitor the motion graphics design pipelines • Determine appropriate software / tools for the required motion graphic work. For examples: <ul style="list-style-type: none"> ○ Photoshop or Flash for cell animation ○ After Effects, Illustrator or Flash for 2D, vector ○ Cinema 4D, Studio Max or Maya for 3D ○ Apple's Motion for 2D and 3D compositing for visual effects ○ Dragon Frame for stop motion • Import and interpret source material / footage using various assets (such as audio, video, still images, vector artwork, PDF files, and other formats) • Employ basic animation production techniques, including but not limited to the following: <ul style="list-style-type: none"> ○ Basic layer manipulation and animation through keying, motion tracking, and colour management ○ Key frame navigation ○ Animating scale / rotation ○ Motion control moves ○ Creating a flat vector look / fractured 3D type / movie trailer titles / retiming and tracking footage

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	<ul style="list-style-type: none"> ○ Dynamic camera movement ○ Creating / incorporating flying logos or music elements ● Perform motion graphics lighting with suitable technique. For examples: <ul style="list-style-type: none"> ○ Reflections, inherent colours and anisotropy ○ Projection textures, and totally matte: stylising textures ○ Compositing tags with reflection planes ● Undertake integration with other applications / diverse medium. For example: adding audio to motion graphics ● Perform testing and identify any imperfection of the motion graphics ● Converge files, and archive / export / render the output motion graphics work for use in the next stage of production work <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> ● Apply the industry's best practices of using knowledge and techniques for creating motion graphics for the animation production work ● Keep abreast of advancements in motion graphics and animation, contemporary trends in production design and popular music to deliver cutting edge work
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● Communicate with various stakeholders and fully grasp the motion graphics work requirements ● Apply appropriate techniques to plan, produce and output motion graphics work that satisfy the work requirements and comply with industry standard for use in the next stage of production work
Remark	

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Functional Area - Operations Management

Title	Create digital character animation
Code	107946L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the animation production work. Once the character model (pose) is ready it is the next stage of the production workflow. Animation is to apply the principles of animation, using software and tools, to bring the character to life. This is done by using suitable animation software and tools, creating key frames and moving bones in the character model to create the illusion of movement.
Level	4
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for creating digital character animation</p> <ul style="list-style-type: none"> • Possess detail knowledge of the principles of animation • Possess basic knowledge of storyboarding or thumbnail drawing • Possess good operation skills of animation software and tools that can control and manipulate character models • Possess basic artistic and acting knowledge • Possess good character animation skills <p>2. Create digital character animation:</p> <ul style="list-style-type: none"> • Comprehend the script/storyboard/character sheet/animation brief to understand the animation requirements, includes but not limited to the following: <ul style="list-style-type: none"> ○ What appears in the animation ○ Camera angle ○ Character poses ○ Timing • Plan and prepare the animation work <ul style="list-style-type: none"> ○ Animation method to use <ul style="list-style-type: none"> ▪ Key framing ▪ Skeleton ▪ Procedural ○ Select the animation software and tools for the animation work ○ Digital assets for the animation work • Load/import the character (in neutral pose) and audio tracks, if any • Use tools of the software to control the movements (Kinematic & Inverse Kinematic (IK)) the character to create key frames (key poses) for the scene • Using control tools to adjust character to give expressive (facial expression, lip sync, etc.) pose and to match audio tracks, if any. Adjustments include but not limited to the following: <ul style="list-style-type: none"> ○ Timing ○ Anticipation ○ Squash and stretch ○ Charisma of the character ○ Follow Through and Overlapping Action ○ Secondary actions ○ Exaggerations ○ Arc

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	<ul style="list-style-type: none"> • Render the animation work, if required, and package for delivery for next stage of production workflow <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Apply industry best practices to create animation work that meet industry standards
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Fully comprehend the animation requirements and be able to plan and prepare for the animation work • Use storyboard information that can enable him/her to accurately create and determine the number key frames (poses) for scene • Use the animation software/tools to manipulate the controls of the character to deliver the graceful movements and expressions as well as all the other desired effects that were required by the animation requirement specification
Remark	

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Functional Area - Operations Management

Title	Design animation visual effects
Code	107947L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the animation production work. When animating it is not just having the characters to move or perform the corrections. It also requires surrounding backgrounds, props and lightings to be correctly matched scene. For example: the animation of wind effects, adding of props with flapping materials in a storm scene, etc. Artists will need to design the effects required for the production work. This UoC may also apply to creating effects for games production or other areas of creative media production.
Level	4
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for designing digital animation visual effects</p> <ul style="list-style-type: none"> • Possess good literacy skills that can read and interpret relevant sources of information related animation work • Good communication skills to liaise with different parties during the designing phase and coordinate the production of the visual effects • Well conversed with different visual effect techniques • Possess good experience in creating special effects • Possess good animation concepts and techniques <p>2. Design digital animation visual effects</p> <ul style="list-style-type: none"> • Comprehend the script/story/project brief and work with appropriate stakeholders (such as director, supervisor, etc.) to understand requirements for the visual effects • Identify and clarify factors that may have on the design of the effects, such as: <ul style="list-style-type: none"> ○ Budget and scope ○ Production schedule/timeline ○ Type and complexity of the effects ○ Hardware/software constraints • Research and collect/generate design ideas on creating the required visual effects • Test and experiment various designs to determine suitability. For example, to create snowing effects with particle system by adjusting parameters: <ul style="list-style-type: none"> ○ Emitters ○ Spawn rate ○ Size ○ Colour ○ Life duration ○ etc. • Consult colleagues or relevant people to evaluate initial ideas and designs to select the most suitable one delivering the required visual effects. Also note areas for improvements or refinements • Document the draft design specification including development instructions and include research information, if applicable • Offer advices and assistance to the production team during the creation of the visual effects <p>3. Exhibit professionalism</p>

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	<ul style="list-style-type: none">• Apply industry best practices and standards to deliver the most effective design of the visual effect for the production work
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Fully comprehend and clarify design requirements of the visual effects• Perform various research, trials and experiments, and discuss with various people to identify the suitable design that meets the production need• Document and present the design to stakeholders for approval and acceptance
Remark	

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Functional Area - Operations Management

Title	Create character model
Code	107952L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the animation production work, particularly in 3D animation production. This UoC concerns creating a character model for mainly 3D animation from scratch, though it doesn't mean all character models are created from scratch. In fact many animators use existing models as a basis or use certain parts to create their new models.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for creating character model</p> <ul style="list-style-type: none"> • Possess literacy skills that can read and interpret relevant sources of information such as: the script, animatic characters and color model, soundtrack, etc. • Possess basic knowledge of storyboarding or thumbnail drawing • Possess good knowledge of different modelling representation, including: polygon modeling, curve (mathematical) modeling, digital sculpting, etc. • Possess detail knowledge on operating character modelling software • Possess good animation skills <p>2. Create character model:</p> <ul style="list-style-type: none"> • Comprehend the script/storyboard/character sheet/animation brief to understand the story and requirements of the animation • Preparing for modelling: <ul style="list-style-type: none"> ○ Select suitable modelling software ○ Acquire modelling materials such as: <ul style="list-style-type: none"> ▪ Scan (laser) or import character image (front, sides and back) ▪ From scratch – layout each vertex and draw all polygons for the model ○ Acquire details about the model, such as but not limited to the following: <ul style="list-style-type: none"> ▪ Finger count (full finger or mitten type) ▪ Polygon count ▪ Level of details required • Develop the model's body, leg and arm with relevant software <ul style="list-style-type: none"> ○ Extrude the base of leg cylinder and adjusting vertices to create the feet of the model ○ Use a cube and adjusting vertices to fit the general shape of the head of the reference character. Once done, weld the head to the neck which was created from another cylinder. Apply similar techniques to create general shape of other parts of the model and welding to the body ○ Once created the general shape of the model, using splitting of polygon and work with lines of edges to put finer details to different parts of the model until it matches the reference character ○ Attach the rig to the mesh to perform simple test and identify any imperfection of the model ○ Save or export the mesh character model for use or next workflow stage of production work. The final pose follows industry practices. For example: <ul style="list-style-type: none"> ▪ Arms - Out to the sides but slightly lowered (about 35 degrees) ▪ Elbows - Should be bent inwards at an angle of about 40 degrees

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	<ul style="list-style-type: none"> ▪ Hands and Fingers - Should be in a relaxed position with the fingers slightly bent. The palms should be facing forwards ▪ Legs - These should be slightly bent, as if the character is in a slight crouching position ▪ Face - The head should be in a rest pose, closed mouth and open eyes. <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Committed to produce high quality animation production • Apply industry best practices to create mesh characters for animation work
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Fully comprehend the requirements of the character model • Operate the animation software to generate new polygons and using character reference materials to create the general shape of the model. Then manipulate the model polygon to add finer details of the model until it satisfies the requirement • Complete and package the character model in the final pose position that comply with industry standard for next stage of production work
Remark	

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Functional Area - Operations Management

Title	Apply texture
Code	107953L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the animation production, particularly in 3D animation production. It is a process of putting details on the surface of the model object. Depending on the complexity of the model object, different techniques and tools are used.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for applying texture</p> <ul style="list-style-type: none"> • Possess literacy skills that can read and interpret relevant sources of information such as: modeling requirements, script, animatic characters, etc. • Possess good communication skills to work with different levels of production team • Possess detailed working knowledge of colour, art and design <p>2. Apply texture:</p> <ul style="list-style-type: none"> • Comprehend the model design • Plan out texture work on the model including gathering the work objects, such as: the texture objects (jpegs, png, bmp), the 3D model • Select a suitable texture tool for the texturing work, such as: <ul style="list-style-type: none"> ○ Digital sculpting <ul style="list-style-type: none"> ▪ Zbrush ▪ Mudbox ○ 3D painting <ul style="list-style-type: none"> ▪ Bodypaint 3D ▪ Mari ○ UV mapping <ul style="list-style-type: none"> ▪ Maya ▪ Roadkill UV Tool ▪ Diamant Modeling Tools ○ Map generation/baking <ul style="list-style-type: none"> ▪ XNormal ▪ Substance Designer • Import the work objects into the texture tool • For complex model objects create maps (projection or UV mapping) of whole object to tell the location of an object's surface on a 2-dimensional image plane • Apply the texture and materials (combined textures) with: <ul style="list-style-type: none"> ○ Wrap ○ Paint ○ Texture maps • Manipulate textures setting (via shaders parameters or with graphic editor) to achieve the desired detail required • Prototype the texture to determine the quality of work and save the completed object for next stage of production when it meets the requirement <p>3. Exhibit professionalism</p>

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	<ul style="list-style-type: none">• Committed to define, document and communicate standards and techniques for texturing that maximises efficiency and ensures a consistent quality under the technical specifications of the project• Apply current and best texturing technologies to achieve best results
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Grasp the required texture work from requirement specification or animation brief to produce an efficient work plan• Select suitable tool for the texture work• Use the correct texturing technique to complete the work with required quality
Remark	

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Functional Area - Operations Management

Title	Perform lighting
Code	107954L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with lighting in computer animation production. In order for scenes to come to life, they are lit in different ways that can give a feeling of happiness, of sorrow, of fear etc. Digital lights must be placed in the scene to illuminate models, exactly as lighting rigs on a movie set would illuminate actors and actresses. Additionally, adjusting the interior and exterior lighting with incorporation of other lighting options to bring the model or scene into life and effect that is needed.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for performing lighting</p> <ul style="list-style-type: none"> • Possess literacy skills that can read and interpret relevant sources of information such as: modelling requirements, script, animatic characters etc. • Possess good communication skills to work with different members of the production team, particularly texture colleagues • Possess good knowledge of light principles and application of lights in computer graphics • Possess good knowledge of the organisation guidelines for animation production <p>2. Perform lighting:</p> <ul style="list-style-type: none"> • Comprehend the project brief, storyboard, storyline and work with colleagues to understand the lighting requirements of the scene, particularly texture designers and lighting designer • Take into account the lighting needs of the scene to planning light effects, including but not limited to the following: <ul style="list-style-type: none"> ○ Illumination ○ Key light ○ Shadows ○ Interior shots ○ Exterior shots (sunlight) ○ Light entrance to a room ○ Direction of light • Determine the suitable lighting method to use for scene, such as: <ul style="list-style-type: none"> ○ Simulated light technique ○ Real physical lighting (photometric light) • Select appropriate lighting software and tools and load the model and/or scene to prepare for work • Select suitable technique to use, such as but not limited to the following: <ul style="list-style-type: none"> ○ Three point lighting ○ Radiosity ○ Light Tracer ○ Photon mapping • Manipulate and combine lighting options to achieve the required effects, include but not limited to the following: <ul style="list-style-type: none"> ○ Point/Omni light ○ Directional light

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	<ul style="list-style-type: none"> ○ Spot light ○ Volume light ○ Ambient light ● Adjust exterior or interior lighting of the scene to achieve the balance of day temperature and the mood, respectively which also direct attention of view ● Render and repeat adjustments of settings until it meets the requirement and export for next stage of production workflow <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> ● Apply industry best practices and use current technologies to create the right effects for scene or character model
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● Work with various stakeholders to comprehend the lighting requirements for the scene or character model and explore various options to create the desired lighting effects ● Inspect different and consider all aspects of the scene or character model to plan and select the right software and tools to produce the required lighting effects ● Select the correct lighting techniques and combined with various lighting options for the scene or character model to create the required effects
Remark	

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Functional Area - Operations Management

Title	Create environment for digital animation
Code	107955L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the games and animation production work. An animated scene would not be complete without good background and props. The task of the practitioner (environment artist) is to take a design from concept and create 3D models with texture, colour and lighting of structures.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for creating environment for digital animation</p> <ul style="list-style-type: none"> • Good communication skills to liaise with different parties during the creation of the 3D environment • Possess detail knowledge of art and graphic design • Possess good 2D texture creation skills • Experienced with different 3D modeling and visual effect techniques as well as operating different software applications for creation of 3D models • Possess basic knowledge of animation concepts and techniques. Additionally, games engine if for games production <p>2. Create environment for digital animation</p> <ul style="list-style-type: none"> • Comprehend the script/story/project brief and work with concept designer or supervisor to understand the environment design and requirements • Prepare for modeling <ul style="list-style-type: none"> ○ Acquire all digital assets to be used for the environment creation ○ Acquire reference material (e.g. pictures, drawings, etc.) ○ Select software that best suited for the production work, such as: <ul style="list-style-type: none"> ▪ Photoshop (manipulation reference images and textures) ▪ Maya, 3D Max (for 3D modeling) • Collaborate with designers/artist (level designers for games production) to map out scenery elements that drive the story. A pre-visualisation of the environment should be produced and agreed before modeling work begins • Using 3D animation software to create model objects based on the reference materials. May required some editing of reference material in 2D application before importing for 3D modeling use • Adjust and validate dimensions of the models and ensure spatial relationships meet the design requirements. Then apply textures • Create and incorporate matte painting as required to complete the environment • Refine all aspects of the 3D environment until required effects are achieved, such as: <ul style="list-style-type: none"> ○ Experiment with lightings ○ Camera angles ○ Texture and colours • Render output in required submission format • Create a backup and complete required work documentation, then package the completed environment for next stage of production <p>3. Exhibit professionalism</p>

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	<ul style="list-style-type: none">• Apply industry best practices and standards to create and deliver the required environment on time
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Work with different parties to comprehend the environment requirements• Planned and agree on a pre-visualisation of the environment with designers• Prepare and complete the creation of the environment as required by the design and as scheduled
Remark	

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Functional Area - Operations Management

Title	Perform rendering of animation
Code	107956L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with animation production particularly rendering animated content to a required output file format. This UoC mainly concerns rendering 3D animations to 2D video which can be performed by individual images (frame) or animation scene.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for performing rendering of animation</p> <ul style="list-style-type: none"> • Possess literacy skills that can read and interpret relevant sources of information such as: the script, animatic characters and colour model, soundtrack, etc. • Possess good knowledge of animation principles • Possess basic knowledge of computer operation • Good understanding of animation rendering process and workflow • Updated with trends of computer graphics and animation technologies <p>2. Perform rendering of animation</p> <ul style="list-style-type: none"> • Comprehend and grasp the animation work requirements, from: <ul style="list-style-type: none"> ○ Project/Production briefs ○ Storyboards and visual references ○ Design specification • Select suitable animation rendering software/tool for the job, such as: <ul style="list-style-type: none"> ○ 3Ds Max ○ Blender ○ Maya • Define setting in the rendering software, include but not limited to the following: <ul style="list-style-type: none"> ○ Render size (X/Y resolution and percentage slider) ○ Frame Range (start and stop position) ○ Frame rate ○ Pixel aspect ratio ○ Output location and file type • Perform rendering tests using low resolution setting, fix or adjust setting, and retest until satisfied with test resulted image • Perform rendering of high quality image until completion of all images or frames • Render the animation to the required video format, and store the output for use at next stage of production <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Apply industry best rendering techniques and use most appropriate rendering application to achieve the best result
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Perform the setup of rendering application for the image rendering task • Perform rendering tests, make adjustments to setting and correction until the test render satisfies the designed requirement

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	<ul style="list-style-type: none">• Complete render of all images to high quality output and to final video as required by the design specification
Remark	

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Functional Area - Operations Management

Title	Produce basic 2D animation
Code	107960L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners, who are involved in creating basic 2D digital animation in workplace either as a member in the team or as an individual. The 2D animation may be part of a large-scaled animation work or a short individual animation.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for producing basic 2D animation</p> <ul style="list-style-type: none"> • Possess literacy skills that can read and interpret work requirements from production brief • Understand animation principles, fundamental techniques and technologies • Possess the concepts in various stages of 2D animation production: pre-production, production and post production • Apply software knowledge skills with different tools, such as: Adobe Photoshop, Flash, HTML5 <p>2. Produce basic 2D animation</p> <ul style="list-style-type: none"> • Comprehend and clarify the 2D animation requirement from: <ul style="list-style-type: none"> ○ Project / Production brief / Design specification ○ Storyboard and visual reference • Comprehend the animation work including: <ul style="list-style-type: none"> ○ Select the most appropriate 2D animation software / tools, such as: Photo-shooting, stop motion, or computer generated, etc. ○ Apply the animation principles into motions, such as: squash and stretch, anticipation, etc. • Produce animated sequence, including: <ul style="list-style-type: none"> ○ Import or generate key drawings for required actions ○ Produce the sequence by applying different techniques, such as: various visual effects, combining or removing objects, adding frames, etc. ○ Integrate audio, where necessary • Produce the animation to the required output format for the next stage of production • Test the final output to confirm the quality complies with the project / brief requirement • Review output with relevant supervisor. Respond positively to feedbacks and make adjustment or refinements as required <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Apply the industry best compression technology to ensure digital media content production complied with the organisational standards
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Fully comprehend the design brief and production requirements as well as taking initiatives to clarify requirement ambiguities • Select the most suitable 2D animation software / tool to effectively produce the animation sequence within the production time schedule

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	<ul style="list-style-type: none">• Produce, test and review the 2D animation to ensure the quality meets the production requirement and the organisational standard• Package satisfactorily the completed production work as per specified by the production requirements
Remark	

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Functional Area - Operations Management

Title	Produce basic 3D animation
Code	107961L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners, who are involved in creating basic 3D digital animation in workplace either as a member in the team or as an individual. The 3D animation may be part of a large-scaled animation work or a short individual animation or 3D game productions. For this UoC, the DMT practitioners are working with 3D models have been provided.
Level	3
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for producing 3D animation</p> <ul style="list-style-type: none"> • Possess literacy skills that can read and interpret work requirements from production brief • Understand animation principles, fundamental techniques and technologies • Possess the knowledge of 3D animation software tools and applications, such as: Maya, 3Ds Studio Max, Blender, Lightwave, etc. • Updated with 3D animation technologies and trends <p>2. Produce 3D animation:</p> <ul style="list-style-type: none"> • Comprehend and clarify the 3D animation requirement from: <ul style="list-style-type: none"> ○ Project / Production brief / Design Specification ○ Storyboard and visual reference • Comprehend the 3D animation work including: <ul style="list-style-type: none"> ○ Select the most appropriate software/tools for animating in 3D spaces, such as: Maya, 3Ds Studio Max, Blender, Lightwave, etc. ○ Apply the animation principles into motions, such as: squash and stretch, anticipation, etc. • Produce animated sequence, including: <ul style="list-style-type: none"> ○ Create credible movement and performance onto the pre-modeled objects ○ Produce the sequence by applying different techniques (Key frame animation, path animation, dynamic effects etc.) ○ Create animations using given camera angles and lighting ○ Integrate audio, where necessary • Render the animation to the required output format for the next stage of production • Test the final output to confirm the quality that complied with the project / brief requirement • Review output with relevant supervisor. Respond positively to feedbacks and make adjustment or refinements as required <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Apply the industry best compression technology to ensure digital media content production complied with the organisational standards
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Fully comprehend the design brief and production requirements as well as taking initiatives to clarify requirement ambiguities

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	<ul style="list-style-type: none">• Select the most suitable 3D animation software / tool to effectively produce the animation sequence within the production time schedule• Produce, test and review the 3D animation to ensure the quality meets the production requirement and the organisational standard• Package satisfactorily the completed production work as per specified by the production requirements
Remark	

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Functional Area - Operations Management

Title	Create digital visual effects
Code	107964L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Visual Effects (VFX) are the processes by which imagery is created and manipulated outside the context of a live action shot. Depending on the size of the project, the work flow of visual effects normally starts at very early stage of the project, in the pre-production stage, with R&D and demos of the effects at production stage and finally most of the effects are added in post-production stage. This UoC concentrates on the competence involved in creating the visual effects without linking to the workflow or size and complexity of the visual effect
Level	4
Credit	6
Competency	<p>Performance Requirements</p> <p>1. Knowledge for creating digital visual effects</p> <ul style="list-style-type: none"> • Possess good communication skills to work and explore with stakeholders on creation and incorporation of VFX • Possess good literacy skills that can read and interpret work requirements • Possess good knowledge and experience of VFX techniques • Have detail knowledge of VFX programming development environment and programming skills for the VFX editing software • Possess good knowledge and skills to operate different VFX editing software and filters/plugin-ins <p>2. Create digital visual effects</p> <ul style="list-style-type: none"> • Comprehend the script/storyboard/project brief to understand the VFX requirements. It may require clarification with VFX supervisor, or other stakeholders • Identify what type of digital VFX can be used to create the required VFX, including but not limited to the following <ul style="list-style-type: none"> ○ Matte painting ○ Rotoscoping ○ Particle effects ○ Chroma keying, ○ Morphing ○ Computer graphics in lighting, texturing ○ CGI - 3D animation • Determine whether the required visual effect can be produced with existing repertoire of editing software, filters and plugin or new plugin needed to be modified or developed • For modified or newly developed plugin, the program development life cycle need to be applied, including: <ul style="list-style-type: none"> ○ Designing ○ Prototyping ○ Programming ○ Testing • Backup the original video footage • Work with the video footage and integrate the required visual effects, making fine adjustments until satisfied with outcome, where possible obtain opinions of the work with colleague and/or stakeholders and incorporate their feedbacks with adjustments of the VFX

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	<ul style="list-style-type: none"> • Export the completed video sequence with VFX and package with original video sequence for work sign off <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> • Apply industry's best practices and be current with VFX technologies and tools to create the required visual effects for video
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> • Grasp the required visual effects for the video production work and able to contribute ideas and recommendations to deliver the best visual effects • Determine if current available editing software and filters/plugins can create the required VFX and able to modify or develop new VFX plugins when no suitable tools can be found • Incorporate the VFX with the video footage and create the required effects to be signed off
Remark	

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Functional Area - Operations Management

Title	Perform enhancement of digital video
Code	107968L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Low video quality is not enjoyable to watch and it may take the viewer a while to figure out what is going on. Fortunately the overall quality of video can be enhanced and improved in the post production stage. The term “quality” implies many different factors and different levels. The practitioner needs to work with the director or supervisor throughout the improvement work from understanding the exact requirements of “quality” to whether the completed work have meet the “level” of quality.
Level	4
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for performing enhancement of digital video</p> <ul style="list-style-type: none"> • Possess good communication skills to work and explore with stakeholders on video enhancements • Possess good literacy skills that can read and interpret work requirement • Possess good knowledge and experience of digital video editing and enhancement techniques • Possess good knowledge and able to operate different enhancement filters/plugin-ins <p>2. Perform enhancement of digital video:</p> <ul style="list-style-type: none"> • Comprehend work order to determine work requirements of video enhancement, including but not limited to the following: <ul style="list-style-type: none"> ○ De-shake ○ Blur ○ Soften and smooth adjust ○ Brightness, contrast, hue or saturation ○ De-interlace • Work with stakeholders to identify the quality level requirements and contribute the expertise to advise where and what enhancement can be made with the video sequence • Prepare for video editing, <ul style="list-style-type: none"> ○ Acquire the original video ○ Acquire the appropriate hardware and editing software, including filters/plugins for the video enhancement ○ Ensure there are sufficient disk space for the editing work • Perform backup of the original video before editing • Review the whole video to identify where enhancement is necessary. It may require to walk through with stakeholders to confirm where and what enhancements can be performed in the video sequence. • Perform the enhancement work and making adjustments to settings of the filter/plugin to achieve a satisfactory quality. Seek other opinions on outcome, listen and take action on their advice • Export the completed enhanced video sequence and package with original video sequence for work sign off <p>3. Exhibit professionalism</p>

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Functional Area - Operations Management

	<ul style="list-style-type: none">• Apply industry best practices and use current video enhancement technologies to improve video quality
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Grasp the video enhancement requirements and contribute ideas to stakeholders on how to enhance the quality of the video• Be well prepared for the editing of the video, including performing a backup of the original video before enhancement work, having the correct software, filters/plugins, walking through the whole video to identify where enhancement to be applied, etc.• Enhance the video to an acceptable quality to be signed off
Remark	

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Functional Area - Marketing Management

Title	Manage digital marketing tactics
Code	108028L5
Description	This unit of competency applies to all digital marketing practitioners who manage the implementation of the organisation's digital marketing. Compared with traditional marketing, implementing digital marketing will often need new skills, new staff, new technologies, new processes for marketing and new challenges including: fast changing pace of digital media, large choices of digital marketing channels and technologies, controlling cost against ROI, managing right resources. Resources include internal staff, agency, tools and software, etc.
Level	5
Credit	6
Competency	<p>Performance Requirements</p> <p>1. Knowledge for managing digital marketing tactics</p> <ul style="list-style-type: none"> • Possess good project management and people management skills • Possess good knowledge of analytic skills and application of different analytic tools • Possess extensive and in-depth knowledge of planning and managing digital marketing tactics • Possess good knowledge of various digital marketing tools, channels, techniques and technologies, including: social media marketing, content marketing, visual marketing, viral marketing, mobile marketing, etc. <p>2. Manage digital marketing tactics:</p> <ul style="list-style-type: none"> • Evaluate and comprehend the vision and objectives for the organisation's digital marketing strategy • Comprehend the purpose of the marketing exercise such as banding, increase market share, gain greater sales of a product, etc. • Understand the pros and cons of the range of digital tools and approach for delivering the results and identify suitable digital marketing channels to achieve the objectives, including but not limited to the following: <ul style="list-style-type: none"> ○ Interactive web site ○ SEO (Search Engine Optimisation) ○ PPC (Pay Per Click) ○ Social media ○ Mobile ○ Email • Evaluate the impact on the team (skills, knowledge, content creation, etc.) and compare insourced vs outsourced for better results • Develop implementation plan for digital marketing activities, including but not limited to the following: <ul style="list-style-type: none"> ○ Identify budgets and ensuring activities ○ Create schedules of activities with checkpoints ○ Set Key Performance Indicators (KPIs) and tools to monitor activities ○ Coordinate content development ○ Assemble the team with right skills ○ Coordinate external resources ○ Integrate traditional and digital communications • Ensure the implementation plan is well received by all stakeholders • Regularly review the implementation plan and adjust to match changing factors, such as: technologies, new marketing channels, objectives, etc.

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Functional Area - Marketing Management

	<p>3. Exhibit professionalism</p> <ul style="list-style-type: none">• Be updated with current digital marketing technologies• Apply industry best practices to manage digital marketing activities to align with the organisation's overall marketing goals
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• Comprehend the organisation's business and overall marketing objectives• Select the correct digital marketing channel to support the marketing activities• Produce a complete and comprehensive plan, with tracking functions, for implementation of marketing activities• Successfully implement digital marketing activities in accordance with the organisation's standards
Remark	

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Functional Area - Marketing Management

Title	Formulate digital marketing analytics strategy
Code	108033L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating digital marketing analytics strategy. Digital marketing generates large quantity of data. By leveraging analytics on these data, organisations are enhancing their competitive advantages, improving data driven decision making, marketing efficacy and understanding, predicting and influencing consumer behaviour to maximise business objectives. Having a spot-on marketing analytics strategy is most desirable for all organisations to that extra competitive edge. This UoC concerns competency for formulating digital marketing analytics strategy.
Level	5
Credit	3
Competency	<p>Performance Requirements</p> <p>1. Knowledge for formulating digital marketing analytics strategy</p> <ul style="list-style-type: none"> • Possess good knowledge of different types of marketing analytics (operational, strategic and tactical) • Possess detail knowledge of business and marketing analytics as well as have good knowledge of the organisation's business and marketing strategies • Possess good knowledge of digital marketing and digital marketing analytic tools and techniques, including predictive analysis tools • Possess good knowledge of digital analytic methodology/model, such as: Online Analytics Maturity Model (OAMM) <p>2. Formulate digital marketing analytics strategy</p> <ul style="list-style-type: none"> • Determine what the primary business objectives and goals for marketing, such as: <ul style="list-style-type: none"> ○ increase sales revenue for products ○ improve conversions across different channels ○ increase visitor retention and improve customer satisfaction • Work with digital marketing team to develop guideline on formulation of Key Performance Indicators (KPIs) to measure business goals. The guideline may include for each goals or objectives and also a Solution Design Reference (SDR) that highlights the specific KPIs and categorising these metrics as events, conversion or traffic variables. • Pinpoint the digital marketing channels best suited for the organisation to be used to achieve the goals and objectives • Develop data collection and management plan that can acquires data effectively and efficiently, including but not limited to the following: <ul style="list-style-type: none"> ○ Leveraging on the modern analytic tool's ability to deliver real time data analysis. Such as Application Programming Interface (API) for social media data, web analytic for website ○ Determine the data analytic tools to measure the data available that are presented in measurable metrics ○ Identify analytics tools that are capable of filtering and organising the data collection by categories for easy retrieval and clearer marketing insights • Develop procedure to analyse collected data. For example: <ul style="list-style-type: none"> ○ Obtain data regarding the predictive behavior of target customers for persona data collection ○ Perform cluster analysis to understand specific or particular behaviour in groups/category behaviours which will be used to launch digital marketing campaigns directed to specific groups of consumers.

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	<ul style="list-style-type: none"> ○ Obtain and explore data according to the customer purchasing habits, behaviour and preferences which can be used to improve digital marketing techniques and improve customer experience ● Pinpoint skill factors required for interpretation and formation of actionable intelligence from the captured data. Also determine whether these required analytic skills are available internally. Recruit external experts to assist in data interpretation when and if required ● Develop training plans for developing internal skills to manage, analyse, and extract insights from the data gathered ● Work with various stakeholders to develop reporting requirements that can facilitate decision making, campaign optimisation, Customer Relationship Management (CRM) analysis, etc. The requirements may include: reporting format, layout, frequency, etc. <p>3. Exhibit professionalism</p> <ul style="list-style-type: none"> ● Adhere to industry best practices when collecting digital marketing data to ensure compliance with business ethics with social responsibilities ● Committed to deliver more targeted and meaningful strategies for stakeholders to more profitable organisation
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● Develop effective guidelines that can assist marketing team for converting organisations/marketing goals to measurable KPI that can be used to build analytic process ● Develop effective data collection plans and procedures that can capture meaningful data from multiple digital marketing channels and can be used for analytic purpose ● Develop effective training plan to develop internal team of required analytic skills and bring updated with new trend of digital marketing analytics ● Develop reporting procedures to create complete analysed reports that can serve the purpose of stakeholders
Remark	

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1. Title	Develop digital content delivery network strategy
2. Code	111108L6
3. Range	Develop the Content Delivery Network (CDN) strategy for the organization based on using CDN service provider rather than in-house built (remark)
4. Level	6
5. Credit	6 (For Reference Only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge for developing content delivery network strategy</p> <ul style="list-style-type: none"> ● Possess good project management skills and capable of formulating business strategies ● Possess in-depth knowledge of the organisation's digital media business ● Possess in-depth knowledge of digital media distribution technologies, including: <ul style="list-style-type: none"> ■ IP multicast streaming ■ Unicast streaming ■ Peer-to-Peer (P2P) ■ CDN ■ Podcasting ● Possess in-depth knowledge of IP network and CDN technologies ● Possess good knowledge of infrastructure network design and network risk management methodologies ● Understand CDN delivery requirements for different platforms, such as PC, mobiles, tablets, and Virtual Reality (VR) wearable devices, etc. <p>6.2 Develop content delivery network strategy for digital media business:</p> <ul style="list-style-type: none"> ● Determine performance needs and actors that the CDN needs to satisfy, including but not limited to the following: <ul style="list-style-type: none"> ■ Traffic type (video, online game, music, etc.) ■ File size ■ Customer size and demographic ■ Client devices ● Determine the best content delivery mechanism for organisation, such as: Unicast, Cache based, P2P (Peer-to-Peer), or Multicast ● Determine the type of CDN services best fit for the organisation, application-layer or network-based, based on the level of proactive control or knowledge of the network the organisation wishes to

	<p>have</p> <ul style="list-style-type: none"> ● Develop CDN service selection policy with following criteria: <ul style="list-style-type: none"> ■ Performance: deliver all contents to users/customers at expected performance ■ Control: <ul style="list-style-type: none"> ◆ Have visibility of CDN which the organisation can adjust to business needs ◆ Have the option of updating configurations (on-demand) ■ Availability: The CDN needs to demonstrate that it has different levels of resiliency to different network issues, and consequently its availability ■ Coverage: may prefer CDN that delivers world class performance in a thoughtful and responsible manner, with strategic locations and continual technology updates to ensure maximum efficiency ■ Customer support service ■ Good value for money ■ Security: strong encryption, transport layer security (TLS)/X.509, SSL, cloaking of original server, etc. ■ Content based optimization and front-end optimization ■ Time to market: how well and how fast CDN can be setup ● Define schedules for implementation, estimate of budget required, monitoring of CDN performance details, etc. ● Document strategy with reason for opting for CDN service providers approach rather than built in-house. For example: <ul style="list-style-type: none"> ■ Complex knowhow on building server nodes world wide ■ High cost of building and maintaining network ■ Specialized layer 3 tools for managing routing and optimizing network functions ● Present to senior management/board for support <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● Be updated with current CDN technologies and committed to ensure contents are delivered to the users/customers at the expected performance
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● define what performance needed from a CDN infrastructure ● define a complete CDN service selection policy that can be implemented and provide a ● clear guidance to implementers ● develop CDN strategy to meet the business need of the organisation and gain approval from management/board
8. Remark	<p>Content Delivery Network (CDN) includes: selecting the right performance, cost, security, bandwidth control, scalability (configurability), reliability, recoverability, etc.</p>

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1. Title	Formulate digital marketing strategy
2. Code	111109L7
3. Range	This UoC involves formulating a digital marketing strategy that is in sync with the overall marketing strategy of the organisation
4. Level	7
5. Credit	6 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge for formulating digital marketing strategy</p> <ul style="list-style-type: none"> ● Possess good project management skills and capable of formulating business strategies ● Possess extensive and in-depth knowledge of various digital marketing technologies ● Possess in depth knowledge analysis methodologies and tools such as SWOT (Strengths, Weaknesses, Opportunities and Threats), PESTLE (Political, Economic, Social, Technological, Legal and Environmental), etc. ● Possess good knowledge of the organisation’s business and overall marketing strategies <p>6.2 Formulate digital marketing strategy</p> <ul style="list-style-type: none"> ● Critically evaluate the business and corporate overall marketing objectives, such as building brand awareness, increasing sales and/or customer referrals, reducing churn rate, etc. ● Appraise current and past digital marketing strategies to determine strengths, weaknesses and its Unique Selling Proposition (USP) ● Appraise the organisational environment and identify key factors that will affect the new digital marketing strategy. For example: <ul style="list-style-type: none"> ■ Economic and budget ■ Use of digital channels to increase market share, aligned with business goals, improved customer communications, enhanced experience and service to retain customers and encourage repeat purchase ■ Targeted audiences, with matching compelling online value proposition to help positioning and differentiation of brands ■ Reach out to larger audience using desktop and mobile devices to get visibility and awareness ■ Implementation skills (for internal or/and outsourced) ● Formulate digital marketing tactics with original and creative methodology and policies for successful implementation of the digital strategy, such as: <ul style="list-style-type: none"> ■ Single channel techniques: Example:

	<ul style="list-style-type: none"> ◆ Banner ad, SEO (Search Engine Optimisation), SEM (Search Engine Marketing) ◆ Social media <ul style="list-style-type: none"> ■ Multi-channel (direct marketing + inbound marketing) ■ Ecommerce ■ Mobile platform (apps, mobile commerce, social media marketing, etc.) ■ Innovative techniques/technology (from special team): Example <ul style="list-style-type: none"> ◆ Growth hacking ● Define KPIs (Key Performance Indicators) and establish controls, with analytic tools, that can monitor all the deployed digital marketing activities ensuring it fulfills the organisation's marketing and business objectives ● Document the strategies and ensure it is disseminated to all stakeholders, including the implementation teams ● Regularly review strategies to ensure the organisation's marketing and business objectives still being met <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● Be updated with current digital marketing ethics ensuring digital marketing strategies are linked with business ethics with social responsibilities
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● formulate the original and creative digital marketing strategies to fulfill the organisation's business and marketing objectives ● define appropriate KPIs and establish sufficient controls that can monitor progress of digital marketing activities ● disseminate the strategies to implementation teams and ensure the strategies can be implemented successfully
8. Remark	

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1. Title	Evaluate and acquire appropriate tournament license for an eSports event
2. Code	11111L5
3. Range	Evaluate and acquire appropriate tournament license for an eSports event, understand the license application procedures
4. Level	5
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge of the licence models of eSports tournament</p> <ul style="list-style-type: none"> ● understand the roles and responsibilities of relevant stakeholders within an eSports tournament including players, teams, game publishers, tournament organizers ● understand different types of licences related to eSports e.g. <ul style="list-style-type: none"> ■ player license ■ team manager license ■ promoter license ● understand the extent of and limitations to the game publishers' intellectual property (IP) rights ● understand the ability and responsibility for the game publishers to take enforcement action when IP rights are infringed ● understand the implications of taking or failing to take enforcement action ● understand the law and/or regulations relevant to an eSports tournament <p>6.2 Arrange the eSports tournament licence application</p> <ul style="list-style-type: none"> ● prepare the documents and forms properly ● have the documents and forms approved by the appropriate authorities ● ensure all the relevant stakeholders are clear of the licence approval progress and results <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● ensure the licence application comply with the relevant laws and/or regulations
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to :</p> <ul style="list-style-type: none"> ● understand the licence model of eSports tournament ● carry out the licence application procedures in compliance with the relevant laws and/or regulations
8. Remark	

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1. Title	Manage and monitor IT service delivery of an esports event
2. Code	111113L5
3. Range	Manage the operations of service delivery in the context of performing service level management services for an esports event
4. Level	5
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge in IT service management and operational details of an esports event</p> <ul style="list-style-type: none"> ● understand IT service management (ITSM) framework, dictates the processes and resources involved in IT service delivery ● understand quality and IT service level requirements of esports event ● understand the importance and different approaches of stakeholder engagement <p>6.2 Outline the operational plan and estimate the required resources</p> <ul style="list-style-type: none"> ● review agenda and program of the esports event and outline the corresponding operational plan ● maintain effective communication channels to engage different stakeholder groups ● identify resource requirements, such as but not limited to: <ul style="list-style-type: none"> ■ Game consoles and/or gaming computers ■ Network equipment ■ Audio and visual equipment ■ Streaming servers and/or encoders <p>6.3 Manage the operations of IT service delivery in a professional manner</p> <ul style="list-style-type: none"> ● manage the operations of IT service delivery in accordance with the service level as well as any laws and regulatory requirements ● continuously improve the operations of IT service delivery
7. Assessment Criteria	<p>The integrated requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● ensure smooth operations of IT service delivery ● liaise with stakeholders in an efficient and effective manner
8. Remark	

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1. Title	Manage video streaming and broadcasting
2. Code	111114L5
3. Range	This UoC involves the three stages of digital audio visual production (pre-production, production and post-production).
4. Level	5
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge in video streaming and broadcasting</p> <ul style="list-style-type: none"> ● Identify resource requirements for self-hosted live streaming and Platform as a Service (PaaS) based live video streaming platforms. ● Possess in-depth knowledge of video streaming and broadcasting platforms, such as: <ul style="list-style-type: none"> ■ YouTube ■ Facebook Live ■ Twitch ■ Youku ■ Tencent Video ■ iQiyi ● Evaluate the characteristics of different live streaming platforms, such as content delivery networks and service areas. ● Identify the resources for post-production video storage. <p>6.2 Develop an implementation plan and identify resources for video streaming and broadcasting:</p> <ul style="list-style-type: none"> ● Workflow and operational plan ● Hardware and software tools ● Manpower <p>6.3 Manage the video streaming and broadcasting in a professional manner</p> <ul style="list-style-type: none"> ● Ensure that all stakeholders are satisfied with the workflow and operational plan ● Monitor the operations of live streaming and broadcasting with the appropriate service level and in compliance with any related laws and regulatory requirements ● Prepare contingency plans for emergency.
7. Assessment Criteria	<p>The integrated requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● Ensure smooth and uninterrupted live streaming and broadcasting ● Liaise with stakeholders in an efficient and effective manner
8. Remark	

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1. Title	Analyse the technical requirements of setting up a streaming framework
2. Code	111116L4
3. Range	This UoC involves identifying and evaluating the streaming solutions best suited for the organisation's online streaming requirements
4. Level	4
5. Credit	3 (for reference Only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Have knowledge in subject area</p> <ul style="list-style-type: none"> ● understand the hardware and software needed for streaming ● aware of the different available tools and options for streaming ● understand the organisation's needs, requirements and limitations ● aware of the industry benchmarks and standard practices <p>6.2 Analyse the technical requirements for streaming</p> <ul style="list-style-type: none"> ● quantify the organisation's requirements into technical requirements ● identify potential issues that might face during streaming, such as: <ul style="list-style-type: none"> ■ Audio-to-video synchronization ■ Hardware resources of equipment ■ Network latency ■ Video aspect ratio and resolution ■ Video compression standard ● provide solutions or contingency plans for the issues identified ● estimate the manpower needed to fulfil the organisation's requirements ● suggest streaming solution best suited the organisation's streaming needs <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● stay up to date with the new developments related to the media streaming industry ● comply with the organisation's guidelines and procedures as well as any (local and international) laws and regulatory requirements, if applicable
7. Assessment Criteria	The integrated outcome requirements of this UoC is the ability to suggest streaming solution best suited the organisation's streaming needs
8. Remark	

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1. Title	Carry out live streaming with various audio and visual components
2. Code	111117L4
3. Range	Carry out live streaming with different components such as overlays, lower-third and other visual effects to facilitate the production of online events.
4. Level	4
5. Credit	3 (For Reference Only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Have knowledge in applying effects and the rundown of the event</p> <ul style="list-style-type: none"> ● understand when to apply the audio and visual components ● know of the rundown of the streaming event ● know how to operate the equipment and tools needed for the different effects ● aware of the abilities and limitations of the tools and equipment in use <p>6.2 Carry out live streaming event with various audio and visual effects</p> <ul style="list-style-type: none"> ● able to apply the audio-visual effects when needed ● troubleshoot and fix the issues if there are problems with the different audio-visual effects ● communicate with the team to coordinate live stream audio-visual effects <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● stay up to date with the new developments related to the media streaming industry ● comply with the organisation's guidelines and procedures as well as any (local and international) laws and regulatory requirements, if applicable
7. Assessment Criteria	<p>The integrated outcome requirements of this UoCs are the abilities to :</p> <ul style="list-style-type: none"> ● apply the effect when needed ● troubleshoot if there are problems with the audio-visual effects
8. Remark	

Specification of Competency Standards
for the Information and Communications Technology Industry
Unit of Competency

1. Title	Setup the online streaming platform and application
2. Code	111118L4
3. Range	This UoC involves carrying out the initial installation, checking out and enabling the continuous operation of the online streaming platform
4. Level	4
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Have knowledge in the subject area</p> <ul style="list-style-type: none"> ● aware of the hardware and software needed to be installed ● know the requirements, abilities and limitations for the operations of the hardware, software and streaming platform involved ● Be able to know the characteristics of various streaming platforms <ul style="list-style-type: none"> ■ Point of presence (PoP) ■ Network latency ■ Streaming delay ■ Video and audio codec ■ Policies and regulations <p>6.2 Setup the online streaming platform</p> <ul style="list-style-type: none"> ● communicate with different departments in the organisation to minimise operation interruptions ● coordinate with the different parties involved to ensure installation is carried out in a timely manner and follow the installation plan ● prepare a backup plan to enable the streaming continuously <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● Perform tests and rehearsals in pre-production phase ● comply with the organisation's guidelines and procedures as well as any (local and international) laws and regulatory requirements, if applicable
	The integrated outcome requirements of this UoC is the ability to setup the online streaming platform such that it could operate smonnthly and continuously
8. Remark	

Specification of Competency Standards
for the Information and Communications Technology Industry
Unit of Competency

1. Title	Prepare for live video and audio capture
2. Code	111119L3
3. Range	This UoC concerns the competence for preparing the video and audio capturing of a live event, identifying the appropriate audio and video equipment and media, and understanding the limitations of the capturing equipment and process.
4. Level	3
5. Credit	6 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge for preparing for live video and audio capture</p> <ul style="list-style-type: none"> ● possess good knowledge of production workflows ● possess good administrative skills and experience in managing different production stages and workflows ● identify the appropriate audio and video equipment and tools ● able to operate live video and audio capture hardware and software ● understand the networking requirements for the live video and audio exercise ● aware of potential limitations ● possess good knowledge of the organisation standards and procedures on metadata for digital resource management <p>6.2 Prepare for live video and audio capture</p> <ul style="list-style-type: none"> ● comprehend the project brief to grasp the live capture requirements, included but not limited to the following: <ul style="list-style-type: none"> ■ Determine what content is needed to capture ■ Determine the digital requirements for the next stage of post-production work <ul style="list-style-type: none"> ◆ Where is it used: <ul style="list-style-type: none"> ➢ Internet/Web/Social media used ➢ Further editing/storage ➢ Streaming ◆ Compression bitrate/Streaming quality ◆ Type of CODEC for viewing/playback ◆ Latency, accessibility and capacity of the media ● plan the live capture work ● organise the captured contents in accordance with the project and organisation standards including: <ul style="list-style-type: none"> ■ Naming ■ Batch and sequence of work ■ Location

	<ul style="list-style-type: none"> ■ Storage ● commission and set up the appropriate hardware and software for the live capture, ensuring it can support the capturing requirements <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● apply industry best practices for live video and audio capturing and to ensure the preparation work is of the highest standard, meeting the organisation and industry standards
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to :</p> <ul style="list-style-type: none"> ● comprehend the production brief and understand all the requirements in preparation for the live video and audio capture process ● follow the organisation metadata standards and procedure to organise the contents before and after the capture process ● prepare the hardware and software correctly and effectively to enable no hindering of the capture process
8. Remark	

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

1. Title	Analyse the performance, latency and accessibility of systems
2. Code	111130L4
3. Range	This UoC involves analysing the performance, latency and accessibility of computer systems across multiple processing environment in accordance with the organisation's guidelines and/or requirements.
4. Level	4
5. Credit	3 (For Reference Only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Understand the attributes to measure the performance of computer systems across multiple processing environment, including but not limited to:</p> <ul style="list-style-type: none"> ● Availability ● Extensibility ● Interoperability ● Maintainability ● Reliability <p>6.2 Understand the effect of latency and accessibility of computer systems across multiple processing environment, including but not limited to:</p> <ul style="list-style-type: none"> ● Virtualization ● Distributed computing ● Data center Location ● Sensor and actuator network ● Streaming media ● Esports and online multiplayer games <p>6.3 Know the enhancement of accessibility and analyse the performance of computer systems across multiple processing environment to provide suitable strategies for the benefits of the organisation</p>
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● analyse the performance, latency and accessibility of computer systems across multiple processing environment for an organisation in accordance with its guidelines and/or requirements. ● provide suitable recommendations for the benefits of the organisation.
8. Remark	

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

1. Title	Perform system testing against user, technical and hosting requirements
2. Code	111160L4
3. Range	Identify all elements of the system that need to be tested against user and system requirements, including data that should be used to fully test the system.
4. Level	4
5. Credit	3 (For Reference Only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Have the knowledge to design and develop test plans and software/sensor simulator to facilitate different levels of testing</p> <ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ identify the requirements of test plans ■ identify the requirements of software/sensor simulator, if applicable <p>6.2 Perform various levels of testing, which may involve the use of a software/sensor simulator</p> <ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ design and develop software/sensor simulator, if applicable, to facilitate different levels of testing ■ perform the required testing activities of various levels of testing according to the corresponding test plans <p>6.3 Perform all testing activities in a professional manner</p> <ul style="list-style-type: none"> ● Be able to <ul style="list-style-type: none"> ■ perform the testing activities of various levels of testing in an efficient and effective manner ■ ensure that all such testing activities are complied with the organisation's guidelines as well as any (local and international) laws and regulatory requirements, if applicable
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● develop appropriate software/sensor simulators, if necessary, for testing purposes; ● perform various levels of testing; and ● document all testing activities in test reports.
8. Remark	Various levels of testing include unit testing, integration testing, system testing – functional testing and performance testing, and user-acceptance testing.

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

1. Title	Acquire and protect the copyrights and IP rights related to IT
2. Code	111161L5
3. Range	This UoC involves acquiring and protecting the copyrights and IP rights related to IT in the context of risk management within an organisation
4. Level	5
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Know of copyrights and IP rights</p> <ul style="list-style-type: none"> ● understand the copyrights and IP rights issues involved in the organisation related to the usage of IT ● understand the processes of acquiring copyrights and IP rights ● review the adoption and impact of new IP requirements to the digital economy development <p>6.2 Acquire and protect the copyrights and IP rights</p> <ul style="list-style-type: none"> ● identify the needs of copyrights and IP rights ● acquire the necessary copyrights and IP rights identified ● take actions to protect the copyrights and IP rights acquired by the organisation <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> ● identify and acquire the necessary copyrights and IP rights according to the standards and guidelines of the organisation ● take actions to protect the copyrights and IP rights acquired by the organisation after proper consultation with appropriate internal stakeholders and/or external legal professionals ● ensure that all issues concerning copyrights and IP rights of the organisation are properly managed and under control
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to</p> <ul style="list-style-type: none"> ● ensure that the organisation will not infringe on copyrights and IP rights in the usage of IT ● properly manage and enforce the copyrights and IP rights related to IT owned by the organisation
8. Remark	

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

1. Title	Conduct solicitation planning
2. Code	111197L5
3. Range	This UoC involves preparing and specifying tender details for an organisation to outsource a particular project (whole or some of its part)
4. Level	5
5. Credit	3
6. Competency	<p>Performance Requirements</p> <p>6.1 Have knowledge in the market condition</p> <ul style="list-style-type: none"> ● Be able to collect information about the products and services available in the marketplace <p>6.2 Understand the procurement cycle for outsourcing a particular project (whole or some of its part)</p> <ul style="list-style-type: none"> ● Be able to understand the outsourcing activities for a procurement cycle <p>6.3 Prepare complete procurement documents</p> <ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ design structured procurement documents that are used to solicit proposals from prospective sellers such as <ul style="list-style-type: none"> ◆ invitation for Bid (IFB) ◆ request for Proposal (RFP) ◆ request for Quotation (RFQ) ◆ initiation for Negotiation ◆ contractor Initial Response ■ ensure the documents can facilitate accurate and complete responses from prospective sellers as well as rigorous enough to ensure consistent, comparable but flexible responses to allow sellers to make suggestions for better ways in achieving the requirements <p>6.4 Be able to define evaluation criteria for rating or scoring proposals including the bidders'</p> <ul style="list-style-type: none"> ● background ● financial capability ● past track record ● technical knowledge/skill ● resources availability <p>6.5 Form a tender board</p> <ul style="list-style-type: none"> ● Be able to formulate the tender board with suitable members for

	the tender evaluation process
7. Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: <ul style="list-style-type: none">● develop effective procurement documents for the tender bidders submitting bid/quotation; and● set up an accurate evaluation process for rating and scoring the submitted bids.
8. Remark	

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

1. Title	Conduct project closure with respect to time
2. Code	111198L5
3. Range	This UoC involves conducting project closure in the context of Project Time Management
4. Level	5
5. Credit	1 (For Reference Only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Understand the boundary of project phases</p> <ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ recognise the terminal activity of a project phase ■ know the outputs from the last activity ■ understand the post-closure follow-up for relationship management and next version/iteration improvement <p>6.2 Conduct project closure with regard to time</p> <ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ document lessons learned, including causes of activities leading to schedule changes, types of schedule changes, reasons for selecting specific corrective actions ■ classify schedule change causes for further analysis ■ perform review based on context, process description, responsibilities, information needs and key criteria with respect to the time related project elements and commitment <p>6.3 Review activities performed in the project phases</p> <ul style="list-style-type: none"> ● Be able to critically review project elements and commitment based on context, process description, responsibilities, information needs and key criteria with respect to the time
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none"> ● consolidate causes and solution to time variance project closure ● review actual time schedule against planned schedule to aid better time management in subsequent projects.
8. Remark	Co-Requisites: ITSWPM606A, ITSWPM608A, ITSWPM612A, ITSWPM615A, ITSWPM518A, ITSWPM620A

Specification of Competency Standards
for the Information and Communications Technology Industry
Unit of Competency

1. Title	Formulate business strategies and policies
2. Code	111201L6
3. Range	Formulate the business strategies and policies for an organisation in alignment with its approved vision and mission statements by considering the potential impacts and implications of both current and emerging technologies
4. Level	6
5. Credit	6 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Understand business objectives and envisioned future of an organisation</p> <ul style="list-style-type: none"> ● Be able to <ul style="list-style-type: none"> ■ articulate the core values and purpose of an organisation ■ articulate the current trends of business and the envisioned future of an organisation <p>6.2 Understand issues related to both business and IT perspectives of the industry</p> <ul style="list-style-type: none"> ● Be able to <ul style="list-style-type: none"> ■ understand the issues related to both business and IT perspectives of the industry ■ have insights of technology trends and viability of technology products under market forces ■ understand the potential impacts and implications of current and new technologies in the fields related to the organisation ■ think of possible ways to utilise new technologies in the organisation operation and marketing strategy. <p>6.3 Understand the current development trends of a business</p> <ul style="list-style-type: none"> ● Be able to summarise the business trends related to the organisation ● Aware of the business profile and positioning of the organisation ● Understand and state up to date with the business field related to the organisation <p>6.4 Understand the ICT applications related to a business</p> <ul style="list-style-type: none"> ● Be able to summarise the ICT applications related to the operational aspect of the organisation ● Consider and make suggestions on updating current or adopting new technologies to enhance the operation and governance aspect of the organisation

	<p>6.5 Analyse the strengths, weaknesses, opportunities and threats (SWOT) of an organisation</p> <ul style="list-style-type: none"> ● Be able to perform a SWOT analysis for an organisation to develop business strategies and policies that bring reasonable and acceptable return of investment (ROI) <p>6.6 Formulate strategies and policies for the sustainability of the business</p> <ul style="list-style-type: none"> ● Be able to <ul style="list-style-type: none"> ■ formulate the strategies and policies for the long-term sustainability of the business taking into consideration Business-IT alignment and enablement ■ formulate partnership/alliance strategies with external partners like vendors/suppliers, investors, distributors to win the market ■ carry out the above in accordance with the organisation's business goals, objectives, policies and guidelines as well as any (local and international) laws and regulatory requirements, where applicable <p>6.7 Formulate ideas where IT can help the growth of the business</p> <ul style="list-style-type: none"> ● Be able to identify and think of ways to update and implement technologies that could strengthen the operational goal and governance of the organisation
7. Assessment Criteria	<p>The integrated requirements of this UoC are the abilities to :</p> <ul style="list-style-type: none"> ● formulate business strategies and policies for an organisation in alignment with its approved vision and mission statements to support its sustainable development ● suggest updates to current technologies and adaptation of new technologies that could assist the development and governance of the organisation
8. Remark	<p>Some examples of emerging ICT technologies are:</p> <ul style="list-style-type: none"> ● Artificial intelligence and machine learning ● Cloud computing ● Internet of things ● Security and automation

Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

1. Title	Review the emerging technologies and cross-functional strategies
2. Code	111207L6
3. Range	Review cross-functional strategies to enable an organisation to identify suitable emerging technologies for supporting its business strategies
4. Level	6
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Understand issues associated with emerging technologies</p> <ul style="list-style-type: none"> ● evaluate the values of the emerging technologies with respect to business-technology alignment and enablement of the organization ● understand the deployment procedures of the emerging technologies ● keep updated of the application development areas of various emerging technologies, including but not limited to: <ul style="list-style-type: none"> ■ Artificial intelligence and machine learning ■ Cloud computing ■ Internet of things ■ Security and automation ■ Streaming technologies ● aware of the data security and privacy concerns in the domains of various emerging technologies <p>6.2 Review cross-functional strategies for deploying and managing the emerging technologies</p> <ul style="list-style-type: none"> ● review the organization business strategies, and conduct a mapping between the possible application areas of emerging technologies with the business strategies ● setup a clear digital strategy, if necessary, to <ul style="list-style-type: none"> ■ identify the appropriate technology applications for different operations of the organization ■ prioritize projects that require cross-functional collaboration ■ setup the project management team for cross-functional projects
7. Assessment Criteria	<p>The integrated outcome requirements of this UoCs are the abilities to</p> <ul style="list-style-type: none"> ● conduct a mapping between the possible application areas of emerging technologies with the business strategies ● setup digital strategy to support the deployment and management

	of cross-functional projects
8. Remark	

Specification of Competency Standards
for the Information and Communications Technology Industry
Unit of Competency

1. Title	Project the potential costs, benefits and ROI of IT project
2. Code	111211L5
3. Range	This UoC involves preparing and assembling a preliminary cost model so that an IT project can be completed within an approved budget and achieve the target Return On Investment (ROI)
4. Level	5
5. Credit	3 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Understand the budget planning of IT project</p> <ul style="list-style-type: none"> ● understand the structure of an IT budget plan ● identify the existing available resources of the company ● identify the resources requirements of the IT business plan ● compute the cost of extra resources to acquire for budgeting ● conduct amortization of the current resources and factor the cost into the budget <p>6.2 Review the existing business strategies and policies against the business trends and business performance of the organisation</p> <ul style="list-style-type: none"> ● examine the business performance against the identified performance indicators of the organisation ● analyse the effectiveness of the existing business strategies and policies in achieving business performance and matching with the business trends ● perform a SWOT analysis for an organisation to develop business strategies and policies that bring reasonable and acceptable Return of Investment (ROI) <p>6.3 Formulate an IT budget plan</p> <ul style="list-style-type: none"> ● analyse the resource requirement above according to the IT plans ● develop and present a coherent budget plan according to industry standards ● regularly review the budget plan in accordance with the organisation's business goals as well as compliance requirements, and make adjustment whenever appropriate
7. Assessment Criteria	The integrated outcome requirement of this UoC is the ability to prepare a coherent budget plan according to IT business models and IT plans of the organisation
8. Remark	

Specification of Competency Standards
for the Information and Communications Technology Industry
Unit of Competency

1. Title	Develop a plan to monitor network infrastructure performance
2. Code	111430L4
3. Range	This UoC involves developing appropriate plan and procedures to monitor network infrastructure performance.
4. Level	4
5. Credit	6 (for reference only)
6. Competency	<p>Performance Requirements</p> <p>6.1 Knowledge in monitoring network infrastructure performance, such as:</p> <ul style="list-style-type: none"> ● various network technologies and protocols ● organisation's infrastructure architecture, network diagrams and traffic controls ● components affecting high network performance: links, switching equipment and software employed at the nodes and switches ● cloud technologies/services, such as: <ul style="list-style-type: none"> ■ IAAS – Infrastructure As A Service ■ SAAS – Storage As A Service and Software As A Service ■ PAAS – Platform As A Service ● public cloud service platforms (e.g. AWS, GAE, Azure, etc.) ● network problem solving and public cloud configuring management skills ● network and cloud performance monitoring tools ● vendor management skills <p>6.2 Developing monitoring plan and procedures</p> <ul style="list-style-type: none"> ● knowledge in the industry benchmark and standards on network performance ● know the organisation's network performance requirements ● plan for periodic review of the performance monitoring procedures ● identify and quantify key performance factors <ul style="list-style-type: none"> ■ Network latency ■ Network congestion ■ Infrastructure parameters (QoS, filtering, routing and load balancing) ■ Hardware resources of equipment ● set performance targets for the network ● identify and acquire tools and equipment needed for network monitoring <p>6.3 analyse the network performance</p>

	<ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ follow the monitoring plan to analyse the network performance ■ identify issues and problems that cause the network unable to meet the required standards ■ make suggestions to rectify any problem identified ■ communicate with vendors if external services (such as cloud) are used to enhance network performance ■ ensure the network is performing up to standard <p>6.4 Exhibit professionalism</p> <ul style="list-style-type: none"> ● Be able to: <ul style="list-style-type: none"> ■ apply industry best practices to monitor the network infrastructure performance ■ comply with the organisation's guidelines and procedures as well as any (local and international) laws and regulatory requirements, if applicable
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to :</p> <ul style="list-style-type: none"> ● develop appropriate monitoring plan and procedures ● follow the plan to monitor the network infrastructure performance
8. Remark	

**Information and Communications Technology Industry Training Advisory Committee
Software Products and Software Services (SW) branch
Unit of Competencies**

1. Title	Establish a business case for an IT investment	
2. Code	ITSWG617A	
3. Range	Establish a business case for an IT investment for the organization including the assessment criteria [Generic Skills – Financial Management]	
4. Level	6	
5. Credit	11	
6. Competency	<p>6.1 Have good mastery on basic investment concepts</p> <p>6.2 Establish business cases</p> <p>6.3 Develop assessment criteria</p>	<p><u>Performance Requirement</u></p> <p>Be able to</p> <ul style="list-style-type: none"> ▪ comprehend qualitative finance and investment concepts ▪ master basic quantitative finance techniques and ratios <p>Be able to</p> <ul style="list-style-type: none"> ▪ identify the development as either an infrastructure groundwork or application development ▪ understand the importance / benefits of IT development toward organizational objectives ▪ develop the storyline for the business case <p>Be able to</p> <ul style="list-style-type: none"> ▪ list the qualitative benefits to the organization ▪ quantify the benefits wherever possible ▪ establish baseline ratios for assessment
7. Assessment Criteria	The integrated outcome requirements of this UoCs are the abilities to: (i) establish the business case for the software/system development; and (ii) develop assessment criteria and their baselines.	
Remark		

**Information and Communications Technology Industry Training Advisory Committee
Software Products and Software Services (SW) branch
Unit of Competencies**

1. Title	Manage and maintain the portfolio and relationship with business partners	
2. Code	ITSWG618A	
3. Range	2. Manage and maintain the portfolio and relationship with business partners in the context of relationship management in an organisation [Generic Skills – Relationship Management]	
4. Level	6	
5. Credit	4	
6. Competency	<p>6.1 Understand the interests of business partners</p> <p>6.2 Communicate effectively and efficiently with various types of stakeholders such as customers, colleagues, vendors/suppliers, industry peers, and business partners</p> <p>6.3 Maintain a professional relationship with various business partners</p>	<p>Performance Requirement Be able to know the needs and interests of business partners (such as stakeholders, customers, colleagues, vendors/suppliers, and industry peers)</p> <p>Be able to</p> <ul style="list-style-type: none"> ▪ communicate effectively and efficiently with various types of business partner such as customers, colleagues, vendors/suppliers, industry peers, and business partners ▪ sense, feel and identify the difficulty and bottom line of the business partner ▪ know how to simulate or motivate the business partner <p>Be able to</p> <ul style="list-style-type: none"> ▪ maintain a professional relationship with various business partners with mutual interests ▪ manage and maintain the portfolio and relationship with stakeholders, customers, colleagues, vendors/suppliers, and industry peers in order to establish mutual respect and trust
7. Assessment Criteria	The integrated outcome requirements of this UoCs is the ability to manage and maintain the portfolio and relationship with business partners while upholding mutual interests and establishing mutual respect and trust.	
Remark		

**Information and Communications Technology Industry Training Advisory Committee
Software Products and Software Services (SW) branch
Unit of Competencies**

1. Title	Articulate the product-based planning as needed for time and effort requirements	
2. Code	ITSWPM503A	
3. Range	Communicate time and activity relationship in order to ensure timely completion of a project [Project Management – Project Time Management]	
4. Level	5	
5. Credit	1	
6. Competency	6.1 Understand proper presentation format	<u>Performance Requirement</u> Be able to <ul style="list-style-type: none"> ▪ comprehend the required format and characteristics of inputs and outputs to activities ▪ identify the appropriate tool for different activities
	6.2 Formulate product-based planning	Be able to <ul style="list-style-type: none"> ▪ produce a product breakdown structure ▪ identifying products and key criteria ▪ writing product descriptions ▪ producing a product flow diagram
	6.3 Properly specify schedule	Be able to clearly state the time and effort relationship in a format meets general practice
7. Assessment Criteria	The integrated outcome requirement of this UoCs is the ability to demonstrate project time management via the use of different tools in conjunction with activity based planning for the project.	
Remark		

**Information and Communications Technology Industry Training Advisory Committee
Software Products and Software Services (SW) branch
Unit of Competencies**

1. Title	Monitor, control and update project schedule
2. Code	ITSWPM504A
3. Range	Monitor and control project schedule, and update the project schedule accordingly, in order to ensure timely completion of a project [Project Management – Project Time Management]
4. Level	5
5. Credit	2
6. Competency	<p style="text-align: right;"><u>Performance Requirement</u></p> <p>6.1 Understand the critical path in schedule Be able to know the possible critical path in a schedule and the corresponding control factors</p> <p>6.2 Conduct Schedule Control Be able to</p> <ul style="list-style-type: none"> ▪ define the procedure by which the project schedule may be changed ▪ implement a schedule change control system ▪ integrate schedule activities with the overall change control system ▪ determine the need for a schedule change ▪ determine the magnitude of the schedule change and the need for re-establishing the baseline ▪ determine overall plan adjustments resulting from schedule updates ▪ determine the need for schedule fast tracking or crashing ▪ initiate corrective actions to ensure that additional schedule changes are minimized ▪ integrate approved schedule changes with other project control processes <p>6.3 Control progress in respect to the plan Be able to define/Monitor/Review/Measure tolerance, product descriptions, work package authorization, quality control, project issues, project change control, risk log, checkpoints, and so on</p>
7. Assessment Criteria	The integrated outcome requirements of this UoCs are the abilities to: (i) monitor project progress; and (ii) exercise adaptive controls to minimize time variance.
Remark	Co-requisites: ITSWPM605A, ITSWPM607A, ITSWPM508A, ITSWPM510A, ITSWPM520A

**Information and Communications Technology Industry Training Advisory Committee
Software Products and Software Services (SW) branch
Unit of Competencies**

1. Title	Conduct source selection and/or contract development	
2. Code	ITSWPM523A	
3. Range	Conduct source selection and further contract development in project outsourcing [Project Management – Project Procurement and Contract Management]	
4. Level	5	
5. Credit	5	
6. Competency		<p>Performance Requirement</p> <p>6.1 Have knowledge of various evaluation methods Be able to apply an appropriate evaluation system to the received proposals such as weighting system, screening system and independent estimates.</p> <p>6.2 Identify contract concerns Be able to rely upon methods to identify:</p> <ul style="list-style-type: none"> ▪ project warranties ▪ liabilities ▪ indemnity ▪ insurance clause-related activities <p>6.3 Rank order to all proposals professionally Be able to make ranking to each proposal according to the criteria as listed in the procurement management plan</p> <p>6.4 Make contract negotiation with the bidder according the rank sequence Be able to clarify any unclear points in the received proposal from the bidders and negotiate with them on the terms and conditions according to the local law</p> <p>6.5 Reach mutually agreement with the bidder Be able to make agreement on the structure and requirements of the contract prior to the signing of the contract (see remark)</p>
7. Assessment Criteria	The integrated outcome requirements of this UoCs are the abilities to: (i) make a fair selection for a successfully bidder; and (ii) get consensus and understandings on those important terms with the successful bidder for drafting the contract.	
Remark	Subjects covered generally include, but are limit to, responsibilities and authorities, applicable terms and law, technical and business management approaches, contract financing and price.	

**Information and Communications Technology Industry Training Advisory Committee
Software Products and Software Services (SW) branch
Unit of Competencies**

1. Title	Prepare a budget based on the IT plan
2. Code	ITSWSM504A
3. Range	Prepare a budget based on the IT plan for budget planning of the organization overall [Strategic Management – IT Planning and Budgeting]
4. Level	5
5. Credit	6
6. Competency	<p style="text-align: right;"><u>Performance Requirement</u></p> <p>6.1 Have good knowledge of IT budget planning</p> <p style="margin-left: 40px;">Be able to</p> <ul style="list-style-type: none"> ▪ understand the importance of documenting an IT budget plan ▪ understand the structure of an IT budget plan <p>6.2 Identify the elements and information for preparing for an IT budget</p> <p style="margin-left: 40px;">Be able to</p> <ul style="list-style-type: none"> ▪ identify the existing available resources of the company ▪ identify the resources requirements of the IT business plan ▪ compute the cost of extra resources to acquire for budgeting ▪ conduct amortization of the current resources and factor the cost into the budget <p>6.3 Formulate an IT budget plan</p> <p style="margin-left: 40px;">Be able to formulate plans for</p> <ul style="list-style-type: none"> ▪ analyse the resource requirement above according to the IT plans ▪ develop budgetary estimates according to historical figures and lessons learnt in previous years, if available ▪ present a coherent budget plan according to industry standards
7. Assessment Criteria	The integrated outcome requirements of this UoCs is the ability to prepare a coherent budget plan according to IT business models and IT plans of the organization.
Remark	