Information and Communications Technology Industry Digital Media Technology

Specification of Competency Standards

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Contents

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Preface

About Specification of Competency Standards

The Specification of Competency Standards (SCS) for an industry mainly comprises the competency standards required at various levels of the Hong Kong Qualifications Framework (HKQF). These competency standards represent the industry benchmarks for the skills, knowledge and attributes required to perform a job at a certain level. The competency standards may be grouped together to form qualifications at a particular level. The assessment guidelines for the outcome standards are also stipulated in the SCS. Details about HKQF and the levels are provided in Chapter 2 of this document.

Summary of Content

This document contains the set of SCS for the Digital Media Technology (DMT) Branch of the Information and Communications Technology (ICT) Industry. This SCS has been endorsed by the ICT Industry Training and Advisory Committee (ITAC).

Chapter 1 – Introduction highlights the business, technology and manpower trends in the DMT Branch of the ICT industry. The present situation and the future potential of DMT are also discussed.

Chapter 2 – Qualifications Framework provides an overview of what Qualifications Framework (QF) is about and how it may facilitate lifelong learning. The building blocks of QF, such as the 7-level hierarchy and the Generic Level Descriptors (GLD) are introduced.

Chapter 3 - Specification of Competency Standards (SCS) describes how the competency standards have been worked out for the 6 functional areas of the DMT Branch of the ICT industry: Operations Management, Marketing Management, DMT Generic Competencies, DMT Architecture, Content Security, and Strategic Management. A diagram is depicted to assist the reader in seeing how the functional areas are broken down into sub-functional areas which eventually are detailed in Units of Competency (UoC).

Chapter 4 - Units of Competency (UoC) starts with the Competency Matrix which tabulates the UoCs by functional areas and sub-functions at different QF levels. It can serve as a quick index to locate any UoC of particular interest to the reader. The Competency Matrix is followed by a full list of UoCs.

Chapter 1

Digital Media Technology in Hong Kong

Section 1   Introduction

Hong Kong still ranked 7th in the "Global Competitive Index 2015-2016", since 2013-2014 which were up 2 places from 2012-2013. One important factor that enables Hong Kong to achieve this status is its technological readiness. Also, Hong Kong has one of the world's most advanced Internet infrastructure and high mobile connectivity, and ranked the top in the Asia Cloud Readiness Index in 2016. Coupled with R&D and an abundant supply of creative and technological talents, Hong Kong has become a hub for innovative digital media product development and now a home to a wide range of digital entertainment companies churning out games software, mobile apps, computer animation and digital effects for the entertainment industries.

Like most other countries in the world Hong Kong is coming to terms with the digital age in business and in day to day life activities. In business, "Almost nine out of ten employers (89%) consider their employees' digital skills are more important now than five years ago. This is mirrored by 86% of employees who say these skills will become increasingly important in their positions", stated by Peter Yu, Director and General Manager of Randstad (an international staffing and HR services firm), Hong Kong in the article "Employers want a skilled digital and social workforce"[1] in 2013. In day to day live the population are grasping with various digital media technologies such as: digital TV, Internet, digital radio, smartphones, mobile devices, etc.

Since 2008 the Digital Media Technology sector of the ICT industry has contributed a significant amount to Hong Kong's GDP (see Section 2.1) which has been rising every year and at 2013 has contributed almost 40.3 billion dollars to the GDP which is more than double that of 2008.

To nurture and promote the continuing development of competencies in digital media technology in Hong Kong, the Information & Communications Technology Industry Training Advisory Committee (ICT ITAC) of the Hong Kong Qualifications Framework commissioned the development of the Specification of Competency Standards (SCS) for the Digital Media Technology (DMT) Branch of ICT Industry in October 2014. Together with the existing SCSs for the Software Development and Software Services Branch and the Communications and Information Services Branch, there will be three sector specific SCSs for the ICT industry. In addition, a Specification of Generic (Foundation) Competencies (SGC) for Information Technology and SCS for Information & Communications Technology Operation and Support have also been developed.

Digital Media refers to audio, still and video image, as well as interactive media for recording contents in digital format.   DMT refers to the technology of hardware, software, network and systems that are used to produce and deliver Digital Media contents to the consumers through a broad range of devices such as smartphones, computers, games consoles, as well as video and animation tools.   The scope of

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[1] Randstad -
http://www.randstad.com.hk/workforce360/jobs-the-economy/employers-want-a-skilled-digital-and-social-workforce/39

DMT does not include the creative and artistic aspects in the production of Digital Media contents.

There are different streams of Digital Media content production. The SCS for the DMT Branch have taken references from the training packages of Australian QF[2] and England's NVQ[3] training course syllabuses and concentrates on competencies relevant to 4 main streams of Digital Media content production that are most common in Hong Kong:

    a) Computer games production
    b) Computer animation production
    c) Digital audio and visual production
    d) Interactive media production

Section 2   DMT Sector Environment

This section provides a general analysis of the DMT Sector and examines various factors that are critical to the development of the sector in Hong Kong.

2.1   Contributions to Hong Kong Economy

There is no exact mapping of "Digital Media" within the statistics compiled by Census and Statistic Department of the Hong Kong SAR government.   The sector is included in the "Software, computer games and interactive media" domain, which is one of 11 domains of the culture and creative industries (CCI). According to statistics from the Census and Statistics Department (June 2017, covering statistics up to 2015), Culture and Creative Industries contributed $108.9 billion (4.7%) to Hong Kong's GDP, which is an increase of 21.6% on 2011. The "Software, computer games and interactive media" domain achieved 5 consecutive years of positive growth since 2011. DMT is also supporting growth of other CCI domains in different levels.

(Figures in the following table are in million HK dollars)

CCI Domains	2011	2012	2013	2014	2015
Art, antiques and crafts	10,142	11,446	13,633	12,199	10,157
Cultural education and library, archive and museum services	1,137	1,161	1,246	1,465	1,289
Performing arts	872	932	876	954	1,196
Film, video and music	3,239	3,643	3,524	3,106	3,469
Television and radio	7,322	7,043	7,986	6,431	7,174
Publishing	13,329	14,066	14,112	13,894	12,602

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[2] Australian training packages (http://training.gov.au)
[3] UK NVQ and competence-based qualifications Creative and Digital Media
(http://qualifications.pearson.com/en/qualifications/nvq-and-competence-based-qualifications/it-telecoms-digital-industries/creative-and-digital-media-l3.html)

CCI Domains	2011	2012	2013	2014	2015
Software, computer games and interactive media	**32,663**	**37,755**	**40,265**	**44,387**	**46,141**
Design	3,615	3,310	3,711	4,080	4,146
Architecture	8,537	9,261	9,762	11,058	10,724
Advertising	7,128	7,322	8,682	9,254	9,182
Amusement services	1,566	1,899	2,253	2,852	2,840
Cultural and creative industries	**89,551**	**97,837**	**106,050**	**109,680**	**108,920**
% of Gross Domestic Product (GDP)	**4.7%**	**4.9%**	**5.1%**	**5.0%**	**4.7%**

Ref : The Hong Kong Monthly Statistic Digest of Statistics (June 2017) – The Cultural and Creative Industries of Hong Kong

2.2 Stakeholders' Views

In order to analyse the industry environment and activities of the DMT sector in Hong Kong, as well as to identify its core functional areas and competency needs, consultation with different stakeholders of the industry were carried out. The findings, so far are summarised as follows:

- Manpower for programming is significantly insufficient
- Training is mainly done "on-the-job"
- Salaries are generally unattractive
- Employers consider the capabilities of candidates as of prime importance. No particular preference is given to academic qualification (e.g. whether undergraduate or sub-degree).
- There is keen competition from the Mainland and other parts of the world on the manpower market for DMT
- Positive characteristics of local DMT personnel:
  o Global perspective
  o Outgoing personality
- The progression pathway is still mainly the traditional one: Programmer → System Analyst → Project Manager, etc.
- Career advancement opportunities for specialists in DMT are generally not available

2.3 Manpower

In terms of manpower, according to Appendix 24 of the 2016 Manpower Survey Report on the Information Technology Sector published by VTC's Committee on IT Training and Development (CITTD), the closest grouping category is "Multimedia", which includes 1,379 Web Designer / Developer and 1,248 Computer Game Designer / Artist / Developer. Moreover, according to the Hong Kong Digital Entertainment Industry Survey[4] conducted in Jan 2016 published by the Hong Kong

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[4] Hong Kong Digital Entertainment Industry Survey

Digital Entertainment Association, 94.1% and 63.5% of companies in the Game industry and Computer Animation industry find difficulty in recruiting staff respectively, and 70.0% and 50.0% of companies in the Game industry and Computer Animation industry foresee an increase in the number of employees in the coming 3 years.

2.4   The Way Forward for the Digital Media Technology Sector

Based on the visits and desktop research so far, the finding related to the way forward for the DMT sector is summarised as follows:

- Shortage in the supply of personnel with DMT specialist skills needs to be resolved
- Various issues involved in seeking manpower relief from other places such as the Mainland, Taiwan, Vietnam and even India
- The demand for 3D artists in particular has been on an increasing trend
- There is fast change and growth in interactive media technology, in particular, Augmented Reality (AR), Virtual Reality (VR) and even the latest trend in Mixed Reality (MR), Substitutional Reality (SR), and Cinematic Reality (CR), etc.
- Digital marketing with analytics and innovative use of digital media is essential to be competitive
- Marketing digital media products and breaking into the Mainland China Market has proved to be challenging with difference in culture, Internet restrictions and different business environments
- Formal training programmes are needed to replace the apprenticeship-like mode of learning at present

Note:
- Not much statistics and no formal reports on the DMT sector is readily available

(http://hkdei.hk/doc/Survey%20on%20Hong%20Kong%20Digital%20Entertainment%20Industry_Annex%201_Questionnaire%20Survey%20Results.pdf)

Chapter 2

Qualifications Framework

Section 1   The Need for Qualifications Framework (QF)

The QF has seven levels, from level 1 to level 7, where level 1 is the lowest and level 7 the highest. The outcome characteristic of each level is depicted by a set of generic level descriptors (GLD) (Appendix 2). The GLD specifies for each QF level its generic complexity, demand and challenges in the four dimensions below:

       a. Knowledge and intellectual skills;

       b. Process;

       c. Application, autonomy and accountability; and

       d. Communications, IT skills and numeracy.

The UoCs (See Chapter 4) are benchmarked to the QF levels in accordance with the GLD.   It is worth noting that competency elements in a UoC may fall in some or all of the GLD dimensions as what it naturally should be. The QF level assignment is essentially a holistic judgement on the unit's integrated outcome requirement.

QF levels are discrete. That is, there cannot be assignment of UoC in-between QF levels.   Also, UoCs that may not fully match the characteristic requirement of one or more dimensions of a level would be "rounded" to the level below.

Chapter 3

Specification of Competency Standards

Section 1   Application of Specification of Competency Standards

1.1   Introduction

The SCS for Digital Media Technology (DMT) branch of the ICT Industry is intended for use by employers, training providers, employees, those who are interested in the jobs, and any other industry stakeholders. It also provides a blueprint to promote lifelong learning for ICT personnel. For instance, by reference to this SCS, employers and HRM professionals can draw up competency-based job specifications for recruitment, performance management and in-house training. Employees can pursue programmes of study and acquire relevant work experience based on the SCS for the purpose of obtaining QF-recognised qualifications. The SCS can also help prospective entrants understand the competency standards and performance requirements of DMT jobs in the ICT industry. The UoCs also provide the competency building blocks for setting out the progression pathway in different job categories within the ICT industry.

1.2   Technological Changes

Development of the SCS fully acknowledges the scale and fast pace of changes in all parts of the ICT industry – software, communication, operation & support and digital media technology. For this reason, as far as possible, competences defined in the SCS focus on functions, independent of technology, products and in particular commercial brands. However, in order to facilitate understanding of the context in which the functions and competences apply, illustration by way of reference to technology or even products is inevitable.

The SCS is not a signpost of the latest in technological developments. UoCs reflect both current as well as some legacy technology and products. They may not show the cutting edge because some of that could enter the mainstream while others are only transient. "Maturing" technology could also rejuvenate and re-enter the mainstream.

Technological developments impact competency standards in several ways. There were new branches of competency within the ICT sector, such as DMT that were not prevalent in the early days of SCS development. New functional areas or sub-areas within a branch, e.g. interactive media, emerged during the drafting of the SCS for DMT. Both new UoCs and new knowledge, skill and attitude within a UoC come into demand. The ITAC and the SCS project respond to all these changes, as evident in the SCS development programme. It relies heavily on feedback from industry players.

Users are reminded that it is important to take their respective operating environment into consideration when they apply the competency standards, and consult industry experts if necessary.

Section 2   Major Functional Areas for the Digital Media Technology Branch

The SCS for the DMT Branch focuses on competencies relevant to the following 4 streams that will be riding on the technology side of Digital Media and will avoid artistic design competencies, unless they are for completeness purpose. However, practitioners of the DMT Branch are expected to be able to appreciate that artistic design stages are part of the development life cycle of Digital Media.

The SCS for the DMT branch focuses mainly on competencies from the below 4 streams:

a) Computer games production – mainly cover competencies that facilitate development of online games, mobile games, Web games and console games, etc.
b) Computer animation production – mainly cover competencies that facilitate 2D and 3D development of moving images for various industries such as entertainment and advertising industry
c) Digital audio and visual production – mainly cover creation and editing of digital audio and visual contents
d) Interactive media production - Interactive media will mainly cover the integration of multimedia with user interaction through different input/output devices and interfaces.

The Units of Competency (UoCs) within the 4 streams are categorised into 6 functional / competency areas, namely, Operations Management, Marketing Management, DMT Generic Competencies, DMT Architecture, Content Security, as well as Strategic Management :

1.   Operations Management

Digital contents are the soul of DMT which covers a broad spectrum of multimedia. Digital contents need to be created and managed. Hence, in this functional area, competencies are grouped into 2 sub-areas namely "Production Management" and "Content and Media Management".

1.1. Production Management

DMT practitioners work with a rich spectrum of multimedia contents, such as:

• Web based and app-based media and applications
• 2D/3D modeling and animation
• Interactive media
• Digital games
• Videography
• Digital audio and music

The production of multi-media contents requires teamwork involving different skills, including understanding the user requirement, story creation, technical editing, and iterative design reviews. Like software development, multi-media content development goes through a development life cycle.   The stages are as follows:

- Planning
  - Determination of key parameters (target market, technology (such as platform, graphic style, scalability of Web server and game server) and tools, architecture (such as network architecture for online game, Java or PHP for Web production), distribution (of product and patches), licensing policy, etc.)
  - Resources management
  - Production team management
  - Schedule planning
  - Workflow management
  - Production control and QA
- Pre-Production
  - Script writing (production of script with tools)
  - Pre-visualisation (Story boarding with tools, animatic, user experience)
  - Development of game editor and tools
- Production
  - Digital media capture (moving images, video and audio) and creation
  - Rendering
  - Audio/visual effect and compositing
  - Digital game development
    - Game design (UI design, level design, game balancing)
    - System design and programming (maintainability and expandability, shader development, game client development, database design, game server development)
    - Graphics (visual effect development, modeling and animation, texturing)
  - Web development (Web page development, Web programming)
  - Interactive media development (User interaction development, multimedia development, integration between multimedia and user interaction through different input/output devices and interfaces)
  - Production team management
- Post-Production
  - Editing
  - Audio mixing, applying CODEC
  - Digital media encoding/transcoding
  - Publishing
  - Testing (product testing, streaming and delivery testing, browser testing, etc.)
  - Support (technical, marketing, internal/external customer)
- Documentation and specifications

1.2. Content and Media Management

The multimedia contents are the assets of organisations. It must be managed in terms of:

- Classification or cataloging of contents
- Contents distribution: locally and/or remotely
- Digital media storage
- Digital media compression
- Digital media management

- o Digital Asset Management (DAM)
- o Digital Right Management (DRM)
- o Digital broadcasting technologies (Digital TV and Radio)
- o Digital media indexing
- Risk assessment and management (e.g. Fire, etc.)

2. Marketing Management

With the emergence of digital technologies, marketing, in particular advertising, has gone through major transformation from the traditional media to new media.   The new business environment calls for new competencies particularly those concerning digital marketing and social media marketing (a component of digital marketing). This area focuses mainly on digital marketing competencies as well as the management of digital marketing campaigns for DMT products. Branding and corporate marketing strategies will be covered in the Strategic Management area.

- Market analysis
  - o Data analytics and techniques
- Digital marketing
  - o Integrated marketing (integration of on-line/off-line marketing)
  - o Trans-media in advertising
  - o Push and Pull Marketing
  - o Multi-channel digital marketing
  - o Social media marketing

For more details, please refer Appendix 4 : Relationship diagram for UoCs under Functional Area *"Marketing Management"*

3. DMT Architecture

This functional area covers competencies required for commissioning and using the tools involved in the production and distribution of digital media contents. As digital media production organisations are being more conversant with cloud technologies, they are in the trend of concentrating on seeking service partners to provide efficient and speedy content delivery rather than building their own infrastructures. Hence, this functional area will not cover competences of traditional networking.

Some of the competencies in this functional area are similar to other Branches (e.g. the Software Branch) of the ICT industry. Appropriate pointers will be made to the relevant SCSs where applicable:

- Content hosting
- Server
- Network
- Streaming architecture with consideration of scalability
- Transmission
- Client device
- Download architecture
- Peer-to-peer operation

The pictorial representation of DMT Architecture is depicted in Appendix 5.

4. Content Security

Compared with its analogue predecessor, digital content is easier to access and maintain.   This also brings about management and control issues. Digital content, being the valuable asset of the organisation, must be well protected against theft, illegal copying, and intentional or accidental destruction, by way of ensuring that access is authorised.

This functional area focuses on content security related to DMT, concentrating on the protection of rights of access to the content. As securing and handling digital media contents is very similar to data and software, to avoid duplication, appropriate pointers will be made to the relevant SCSs where applicable:

- Content security policies
- Content security practices and procedures
- Cloud disaster recovery strategy and implementation

5. Strategic Management

The digital revolution has affected the traditional media industry, forcing both affected and less affected organisations to rethink their business and operation strategies to stay competitive.

This area will mainly focus on operational level strategies related to DMT. For competencies in this functional area which are similar to other industries, such as corporate strategies, a reference or redirection will be made directing readers to other SCSs such as the Software and CIS Branch of the ICT Industry:

- Marketing strategies
    - Domain-specific client management
    - Digital game publishing agency management
- New media strategies
- Technology strategies

6. DMT Generic Competencies

This competency area focuses on competencies that are common across DMT streams of functional areas (e.g. games or animation, operation or strategic management). They include both DMT skills and soft skills. Some of the competencies are also applicable to other Branches of the ICT Sector.
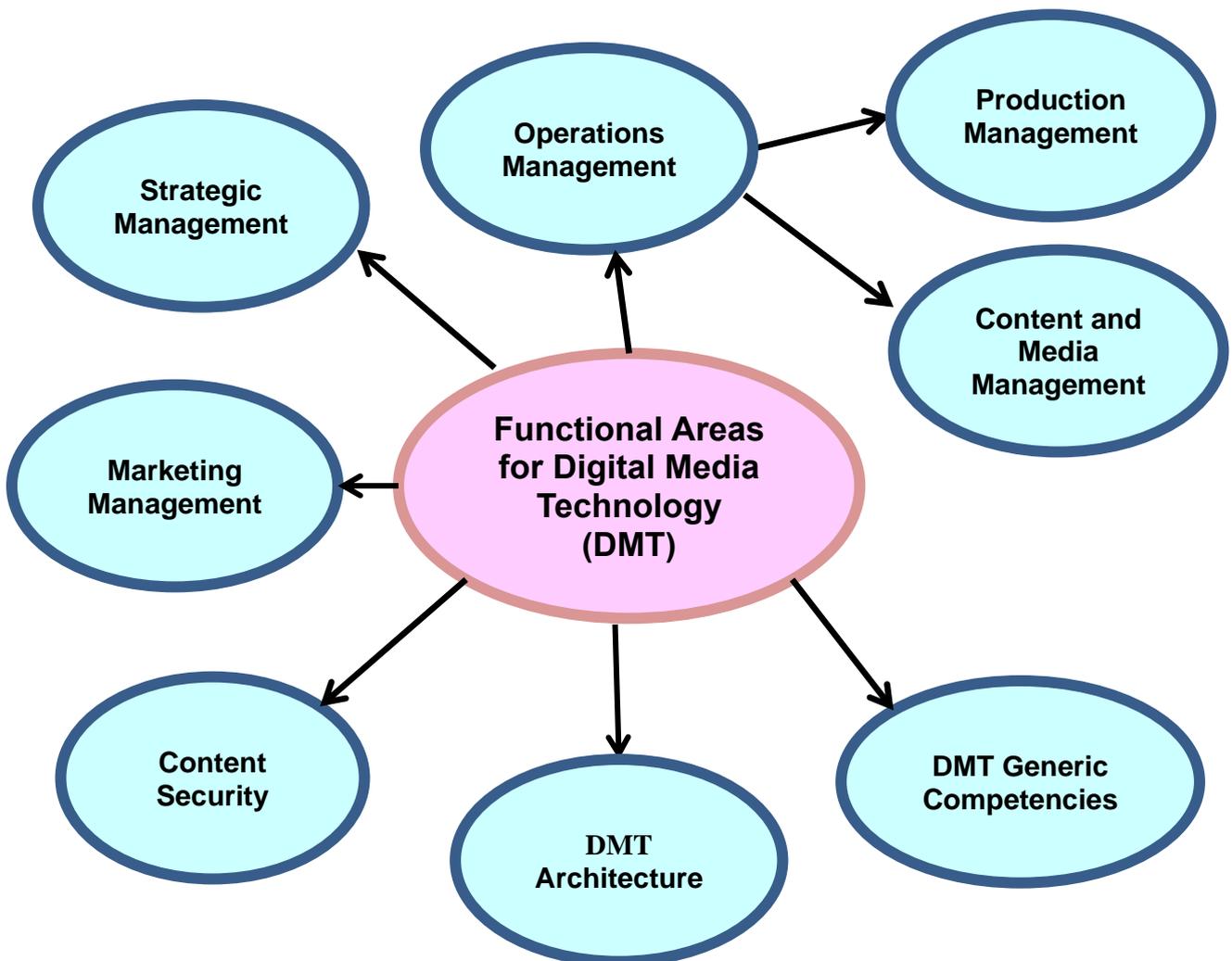
Under this category, there are (a) Generic DMT skills which are related to the technology aspects of DMT jobs; and (b) Generic Soft Skills which are essential to all service functions in all sectors and related to the attitude and basic understanding of human interaction as well as professionalism that are normally expected of a DMT practitioner.

Example UoCs are listed in Appendix 6.

Chapter 4

Units of Competency

Section 1   Functional Map Showing the Digital Media Technology Branch

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                                    Operations              Production
      Strategic                     Management  ───────▶   Management
     Management
                                                    ───────▶   Content and
                                                                Media
                                                               Management
     Marketing  ◀───    Functional Areas
    Management           for Digital Media
                          Technology
                            (DMT)

      Content                  DMT              DMT Generic
      Security               Architecture       Competencies
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Pictorial representation of major Functional Areas

Streams / Competency		Computer games production	Computer animation production	Digital audio and visual production	Interactive media production
Major Functional Areas		Examples			
Operations Management	Production Management	Capture, editing and production of different digital media elements. (text, digital images, graphics , digital audio, animation and digital video)			
		Design and production of multimedia elements			
		Multimedia programming			
		Web based media production (design and programming)			
	Content & Media Management	Digital media content management (storage, distribution, indexing, cataloging)			
		Asset management			
		Content distribution management			
Strategic Management		Digital media marketing strategies Technologies strategies Refer to SCS of SW and CIS Branch as appropriate			
Marketing Management		Integrated marketing (on-line/off-line marketing) Social media marketing Data analytics/analysis Multi-channel digital marketing			
DMT Architecture		Streaming architecture Refer to SCS of SW and CIS Branch as appropriate			
Content Security		Content security practices and procedures Cloud disaster recovery strategy and implementation Refer to SCS of SW and CIS Branch as appropriate			
DMT Generic Competencies		Generic DMT Skills Generic Soft Skills Refer to SCS of SW and CIS Branch as appropriate			

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
7						Formulate global and local business strategy 108015L7 Credit: 6 P.3-199	Formulate digital marketing strategy 107914L7 Credit: 3 P.3-219		
6	Manage game development 107915L6 Credit: 6 P.3-1			Manage interactive media projects 107978L6 Credit: 3 P.3-127		Formulate uptake of disruptive technologies 108016L6 Credit: 3 P.3-201	Formulate content marketing tactics 108025L6 Credit: 3 P.3-221	Develop content delivery network strategy for digital media business 108052L6 Credit: 3 P.3-275	Formulate Digital Rights Management (DRM) strategy for business 108060L6 Credit: 3 P.3-291
				Plan implementation of interactive media projects 107979L6 Credit: 3 P.3-129		Formulate risk management strategy 108017L6 Credit: 3 P.3-203	Formulate digital marketing strategy for Mainland China 108027L6 Credit: 3 P.3-223	Formulate cloud strategy for digital media content 108053L6 Credit: 3 P.3-277	
				Formulate Human to Machine (H2M) requirements for interactive media projects 107980L6 Credit: 3 P.3-131		Formulate commercialisation of Intellectual Properties strategy 108018L6 Credit: 3 P.3-205			

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
6				Manage interactive media projects with Agile approach 107981L6 Credit: 3 P.3-133		Formulate content management and distribution strategy 108019L6 Credit: 3 P.3-207			
5	Perform game design 107916L5 Credit: 6 P.3-3	Manage animation development 107943L5 Credit: 3 P.3-57	Manage digital AV production 107962L5 Credit: 3 P.3-95	Coordinate software development of interactive media projects 107982L5 Credit: 3 P.3-135	Commissioning a Content Management System (CMS) 108001L5 #% Credit: 3 P.3-173	Formulate conducive customer centric environment and delivery 108020L5 Credit: 3 P.3-209	Formulate inbound marketing strategy 108026L5 Credit: 3 P.3-225	Develop a business case for selecting infrastructure for DMT project 108054L5 Credit: 3 P.3-279	Develop cloud disaster recovery strategy 108061L5 Credit: 3 P.3-293
	Create game specification 107917L5 Credit: 3 P.3-5		Perform compositing 107963L5 #* Credit: 6 P.3-97	Manage synchronisation of augmentation data and real life data in AR application 107983L5 Credit: 3 P.3-137	Implement a Digital Asset Management (DAM) system 108002L5 Credit: 3 P.3-175	Formulate human resource strategy 108021L5 Credit: 3 P.3-211	Manage digital marketing tactics 108028L5 Credit: 6 P.3-227		Formulate DRM implementation plan 108062L5 Credit: 3 P.3-295
	Perform technical feasibility study 107918L5 Credit: 3 P.3-7			Coordinate the development of Human to Machine (H2M) interface 107984L5 Credit: 3 P.3-139	Formulate media content storage procedure 108003L5 Credit: 3 P.3-177	Manage information strategy to facilitate product development and marketing 108022L5 Credit: 4 P.3-213	Identify marketing strategies for digital media products 108029L5 Credit: 3 P.3-229		Establish content security policies 108063L5 Credit: 5 P.3-297

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
5	Create game development environment 107919L5 Credit: 3 P.3-9					Formulate innovative use and adoption of DMT to enhance market share capability 108023L5 Credit: 3 P.3-215	Formulate mobile marketing strategy 108030L5 Credit: 3 P.3-231		
	Perform game database design 107920L5 Credit: 6 P.3-11					Formulate resource management strategy 108024L5 Credit: 3 P.3-217	Formulate digital marketing objectives 108031L5 Credit: 3 P.3-233		
							Formulate digital marketing analytics strategy 108033L5 Credit: 3 P.3-235		
							Formulate social media marketing strategy 108034L5 Credit: 3 P.3-237		

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
4	Prepare asset list 107921L4 * Credit: 3 P.3-13	Create motion graphics 107944L4 ^ Credit: 3 P.3-59	Create digital visual effects 107964L4 Credit: 6 P.3-99	Create H2M (Human to Machine) design for interactive media projects 107985L4 Credit: 3 P.3-141	Create asset inventory 108004L4 Credit: 3 P.3-179		Implement inbound marketing strategy 108032L4 Credit: 6 P.3-239	Develop infrastructure performance testing 108055L4 Credit: 3 P.3-281	Implement DRM for online and offline digital media products 108064L4 Credit: 3 P.3-299
	Perform level design 107922L4 Credit: 3 P.3-15	Apply 3D digital models 107945L4 ^ Credit: 3 P.3-61	Edit digital AV production 107965L4 #* Credit: 3 P.3-101	Design interactive website 107986L4 Credit: 3 P.3-143	Define asset management requirements 108005L4 Credit: 3 P.3-181		Plan marketing of digital media products 108035L4 Credit: 3 P.3-241	Implement cloud strategy of digital media content 108056L4 Credit: 6 P.3-283	Implement cloud disaster recovery strategy 108065L4 Credit: 3 P.3-301
	Perform human computer interaction (HCI) design 107923L4 Credit: 3 P.3-17	Create digital character animation 107946L4 Credit: 3 P.3-63	Create customised audio effects 107966L4 #* Credit: 3 P.3-103	Develop interactive website 107987L4 Credit: 6 P.3-145	Define user access control for media content 108006L4 Credit: 3 P.3-183		Implement digital marketing plan 108036L4 Credit: 6 P.3-243		
	Perform game prototyping 107924L4 Credit: 3 P.3-19	Design animation visual effects 107947L4 Credit: 3 P.3-65	Perform colourisation of digital video sequence 107967L4 Credit: 3 P.3-105	Develop apps 107988L4 Credit: 3 P.3-147	Manage content distribution performance 108007L4 Credit: 3 P.3-185		Implement digital marketing in Mainland China for digital media products 108037L4 Credit: 6 P.3-245		

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management				Content and Media Management	Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management								
	Game	Animation	Digital AV	Interactive Media					
4	Design characters 107925L4 * Credit: 3 P.3-21	Perform motion capture 107948L4 # Credit: 4 P.3-67	Perform enhancement of digital video 107968L4 Credit: 3 P.3-107	Perform server programming for apps request 107989L4 Credit: 3 P.3-149	Select digital rights management system 108008L4 Credit: 3 P.3-187		Implement social media marketing plan 108038L4 Credit: 6 P.3-247		
	Create map and texture 107926L4 * Credit: 3 P.3-23		Conduct technical support for marketing 107969L4 #* Credit: 6 P.3-109	Implement data management of apps 107990L4 Credit: 3 P.3-151			Implement mobile marketing 108039L4 Credit: 6 P.3-249		
	Create low polygon models 107927L4 Credit: 3 P.3-25			Test apps deployment on various hardware platforms 107991L4 Credit: 3 P.3-153			Analyse market trend for digital media products 108040L4 Credit: 3 P.3-251		
	Create pixel art 107928L4 * Credit: 3 P.3-27			Develop Augmented Reality (AR) application 107992L4 Credit: 3 P.3-155			Plan direct digital marketing 108041L4 Credit: 3 P.3-253		

Functional Matrix for the Digital Media Technology Branch

	Operations Management				Content and Media Management	Strategic Management	Marketing Management	DMT Architecture	Content Security
Functional Area / **Level**	Production Management								
	Game	Animation	Digital AV	Interactive Media					
4	Create scenes 107929L4 * Credit: 3 P.3-29			Perform location analysis for graphic overlay in AR application 107993L4 Credit: 3 P.3-157			Plan measurements on the effectiveness of digital marketing 108042L4 Credit: 3 P.3-255		
	Create User Interface (UI) layout 107930L4 Credit: 3 P.3-31			Analyse camera data for graphic overlay in AR application 107994L4 Credit: 3 P.3-159			Coordinate and manage digital marketing contents production 108044L4 Credit: 3 P.3-257		
	Prepare character animation 107931L4 * Credit: 3 P.3-33			Apply augmentation data in AR application 107995L4 Credit: 3 P.3-161			Conduct marketing research with social media 108045L4 Credit: 3 P.3-259		
	Develop BGM and audio effects 107932L4 * Credit: 3 P.3-35			Develop Virtual Reality (VR) application 107996L4 Credit: 3 P.3-163			Design and create effective digital marketing contents 108049L4 Credit: 3 P.3-261		

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
4	Develop game level 107933L4 Credit: 3 P.3-37			Deploy VR application to different hardware platform 107997L4 Credit: 3 P.3-165					
	Create in-game cinematic 107934L4 * Credit: 3 P.3-39			Implement data management for VR / AR applications 107998L4 Credit: 3 P.3-167					
	Perform game programming 107935L4 Credit: 3 P.3-41								
	Perform script programming 107936L4 Credit: 3 P.3-43								

Functional Matrix for the Digital Media Technology Branch

Level / Functional Area	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
4	Develop game management system for customer service 107937L4 Credit: 3 P.3-45								
	Develop patch system 107938L4 Credit: 3 P.3-47								
	Develop game monitoring system 107939L4 Credit: 3 P.3-49								
	Create user documentation 107940L4 % Credit: 3 P.3-51								

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
3	Perform game testing 107941L3 Credit: 3 P.3-53	Understand and confirm the brief 107949L3 # Credit: 3 P.3-69	Prepare for digital video capture 107970L3 Credit: 3 P.3-111	Develop interactive infographic for website 107999L3 Credit: 3 P.3-169	Utilise compression techniques and CODEC for digital media production 108009L3 Credit: 3 P.3-189		Monitor effectiveness of inbound marketing activities 108043L3 Credit: 3 P.3-263	Coordinate implementation of network for content delivery with cloud service provider 108057L3 Credit: 3 P.3-285	Maintain content security 108066L3 Credit: 3 P.3-303
	Develop promotion materials * 107942L3 Credit: 3 P.3-55	Setup rendering farm 107950L3 Credit: 3 P.3-71	Synchronise digital audio with video 107971L3 Credit: 3 P.3-113	Create a responsive website 108000L3 Credit: 3 P.3-171			Source analytic tools for digital marketing 108046L3 Credit: 3 P.3-265	Monitor performance of digital media infrastructure 108058L3 Credit: 3 P.3-287	Develop content security practices and procedures 108067L3 Credit: 3 P.3-305
		Plan animation 107951L3 Credit: 3 P.3-73	Apply transition effects 107972L3 Credit: 3 P.3-115				Implement direct digital marketing 108047L3 Credit: 3 P.3-267		
		Create character model 107952L3 ^ Credit: 3 P.3-75	Perform titling 107973L3 Credit: 3 P.3-117				Handle outsourced digital marketing 108048L3 Credit: 3 P.3-269		

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management				Content and Media Management	Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management								
	Game	Animation	Digital AV	Interactive Media					
3		Apply texture 107953L3 Credit: 3 P.3-77	Perform noise reduction of digital video sequence 107974L3 Credit: 3 P.3-119				Develop social media contents for marketing 108050L3 Credit: 3 P.3-271		
		Perform lighting 107954L3 ^ Credit: 3 P.3-79	Select digital video capturing device 107975L3 Credit: 3 P.3-121						
		Create environment for digital animation 107955L3 Credit: 3 P.3-81	Compile clips to form digital video sequence 107976L3 Credit: 3 P.3-123						
		Perform rendering of animation 107956L3 Credit: 3 P.3-83	Convert linear video to non-linear 107977L3 Credit: 3 P.3-125						

Functional Area / Level	Operations Management				Content and Media Management	Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management								
	Game	Animation	Digital AV	Interactive Media					
3		Perform Keyframe 3D animations 107957L3 Credit: 3 P.3-85							
		Create duplicate objects with procedural animation 107958L3 Credit: 3 P.3-87							
		Create rig for 3D character animation 107959L3 Credit: 3 P.3-89							
		Produce basic 2D animation 107960L3 Credit: 3 P.3-91							

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
3		Produce basic 3D animation 107961L3 Credit: 3 P.3-93							
2					Convert non-digital media to digital format 108010L2 #% Credit: 3 P.3-191		Develop an analytic mindset for digital marketing 108051L2 Credit: 3 P.3-273	Develop mapping and documentation of infrastructure 108059L2 Credit: 3 P.3-289	
					Observe intellectual property rights 108011L2 $ Credit: 3 P.3-193				
					Observe digital rights management 108012L2 $ Credit: 3 P.3-194				

Functional Matrix for the Digital Media Technology Branch

Functional Area / Level	Operations Management					Strategic Management	Marketing Management	DMT Architecture	Content Security
	Production Management				Content and Media Management				
	Game	Animation	Digital AV	Interactive Media					
2					Observe information security 108013L2 Credit: 3 P.3-196				
1					Observe content standards 108014L1 Credit: 3 P.3-197				

Remarks :

(1) Legend

UoC also applies to Stream "Games"
* UoC also applies to Stream "Animation"
^ UoC also applies to Stream "Digital AV"
% UoC also applies to Stream "Interactive Media"
$ UoC also applies to Functional Area "Content Security"

(2) DMT Generic Competencies

This competency area focuses on competencies that are common across DMT streams of functional areas (e.g. games or animation, operation or strategic management). They include both DMT skills and soft skills. Some of the competencies are also applicable to other Branches of the ICT Sector.

Under this category, there are (a) Generic DMT skills which are related to the technology aspects of DMT jobs; and (b) Generic Soft Skills which are essential to all service functions in all sectors and related to the attitude and basic understanding of human interaction as well as professionalism that are normally expected of a DMT practitioner.

Example UoCs are listed in Appendix 6.

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

Functional Area - Operations Management

Title	Manage game development
Code	107915L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game development management. Same as other business projects, game development utilises well-established methods for organising and running activities to keep the project on schedule and budget while achieving a certain level of quality and profitability. This UoC is concerned with the capabilities, considerations and activities for game project development as carried out by a project manager.
Level	6
Credit	6

Competency	Performance Requirements
	1. Knowledge for game development
	
	• Realize the philosophy and guidelines of the organisation towards game development
	• Understand related budget and resources allocations
	• Understand the competitive environment and customer requirements of the game market
	• Possess good communication and presentation skills
	• Possess good negotiation, conflict resolution and decision making skills
	• Possess the leadership and project management skills in leading the game development team, such as Agile software development
	• Possess proficient knowledge about the key phases and related tasks of the game development life cycle, namely:
	   o Initiating: determine project startup, charter and scope
	   o Planning: define work structure, resources, activities, scheduling, etc.
	   o Executing: perform the planned work and quality assurance
	   o Closing: product acceptance and performance analysis
	• Possess the personal traits of a competent game project manager, such as:
	   o Strong enthusiasm towards games
	   o Be able to multitask
	   o Good emotional quotient in handling customers and colleagues, etc.
	
	2. Manage game development
	
	• Conduct a detailed analysis of the game design specification and work out the project milestones, and specific targets that have to be met by certain dates
	• Estimate the scale of the game project in concern, and organise a development team with possible members as follow:
	   o Game designers
	   o Programmers
	   o Artists
	   o Writers
	   o Musicians
	   o Actors, etc.
	• Review and confirm the teams, equipment and resources needed
	• Arrange for commencement of game development, and keep close monitoring of the progress against the schedule
	• Perform overall monitoring and controlling activities for different phases of the aforesaid game development life cycle, and focus on issues such as:
	   o Scope of work

Functional Area - Operations Management

	○ Cost expenditures ○ Schedules ○ Quality of output ○ Potential risks ○ Task blockers removal ○ Periodic status reporting to management and customers, etc. - Act as the central point of contact and liaison for all aspects of the game production with parties such as: ○ Senior management ○ Publishers ○ The public relation and marketing departments ○ Members of the development team ○ Outsourced personnel, if any - Ensure proper completion of the game product and coordinate subsequent activities such as marketing and product launching, etc. - Prepare a final report about the overall game development for management's review and further instructions 3. Exhibit professionalism - Always devote fully to all activities related to the game development - Always perform the game development management tasks in an objective and fair manner, and balance the interests of both the organisation and employees
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Able to complete the game development management tasks within time and budget constraints; and - Able to ensure the quality of the game product being developed and meeting all prescribed requirements
Remark	

Functional Area - Operations Management

Title	Perform game design
Code	107916L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game design. Game design is a series of activities based on a prescribed methodology to start with an idea for a game and develop it into a finished product. This UoC is concerned with the capabilities, considerations and activities for game design as carried out by a designer.
Level	5
Credit	6
Competency	Performance Requirements 1. Knowledge for game design and development • Realize the philosophy and guidelines of the organisation towards game development • Understand the budget and other resources constraints for game projects • Understand the market requirements for game products • Possess good literacy and communication skills • Possess proficient knowledge in design skills and methodologies, and well versed in the followings: o Visual design o Drawing o Programming o Storytelling o User interface design o 2D and 3D graphics o Animation, etc. • Understand common script languages, such as: o LUA o Python for quest development, etc. • Possess the personal traits of a competent game designer, such as: o Creativity o Patience o Persistence, etc. 2. Perform game design • Identify the target market for the game, including the sex, age, nationality, etc. of the potential players • Determine the target platform for the game, such as: o Mobile o PC o Console (Xbox, Wii, MMORPG, standalone, etc.) • Define and create the fundamental elements of the game, which may include: o The game system mechanism and game background o The setting, storyline, rules, characters, interface and codes of playing o The goal for players and the game quest • Perform detailed design of the proposed game in a stepwise methodology similar to the followings: o Confirm a design treatment, which is a quick description of the game's unique features and target audience

Functional Area - Operations Management

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- o Prepare a preliminary design for deliberating the game's rules, content and behaviour in qualitative manner
- o Circulate the above design document to and discuss with members of the game development team
- o Arrive at a final game design after iterative refining and updating
- o Prepare the product specification with details on how the features adopted in the final design will be implemented
- o Determine the look and feel of the game's characters, maps, props, etc.
- o Work on the interactive screenplay, which contains the dialogues and storyline implemented into the game, etc.
- Take care of and prevent possible mistakes or pitfalls in the design process, for examples:
  - o The game is offbase and inapplicable to the organisation
  - o The design is beyond the allowable budget
  - o The game is not fun enough or lacking in contents from the perspective of players, etc.
- Present the final game design proposal to the game development team for comment and approval for implementation
- In case if the game proposal is approved and implemented:
  - o Keep necessary updating of the product specifications during development
  - o Keep track of the project's progress in order to meet important deadlines
  - o Ensure what gets done about the game is satisfactory, etc.

3. Exhibit professionalism

- Always perform the game design with full dedication and effort, and in an efficient and effective manner
- Always perform the game design with originality without illegal plagiarizing or reproduction

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The integrated outcome requirements of this UoC are the abilities to:

- Conduct the game design according to prescribed methodology / procedures and produce related game specifications / documents accordingly; and
- Complete the game design work within required time frame and budget constraints

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

Functional Area - Operations Management

Title	Create game specification
Code	107917L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game design and development. Game specification basically includes the game design document that specifies the story background and the functional specification that specifies the game flow. This UoC is concerned with the abilities and procedures in creating such documents, using game specific glossaries and following the organisation's required formats and styles.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for game specification
	
	• Realize the philosophy and guidelines of the organisation towards game development
	• Master the concepts and development life cycle for game applications
	• Fully understand the key successful elements of a game
	• Fully grasp the purposes, contents and target audiences of the game specification
	• Possess good understanding about the strength and weakness of the organisation's development team and other supporting resources
	• Possess proficient literacy skill in drafting and expressing ideas efficiently and concisely
	
	2. Create game specification
	
	• Always prepare game specifications with the concept that they are to convert game ideas into concrete and detailed reality on paper
	• Produce the game specification with the following ideas in mind:
	   ○ It should be written from the user's perspective
	   ○ It serves as the skeleton for the vision expressed in the game concept and game proposal at an earlier stage
	   ○ It also serves as the foundation for the game technical specifications
	   ○ It facilitates the scheduling and commencement of the game development processes
	   ○ It is a living document in that it will undergo changes especially during implementation, etc.
	• Draft the detailed contents of the game specification according to but not restricted to the following sectioning and descriptions:
	   ○ Story - the background and synopsis of the story, with description of the game characters
	   ○ Game mechanics - such as the game play, game flow, game play elements, etc.
	   ○ User interface - such as the flowcharts, functional requirements, mockups and graphical user interface (GUI) objects
	   ○ Art and video - specify the overall goal, characteristics, style, mood and colour, etc. for the game
	   ○ Sound and music - define the mood and required sound in the game and where they are to be used
	   ○ Level requirements - define the goals for each level of the game to facilitate those level designers
	• Review and refine the game specification, exercise judgement to avoid mistakes and loopholes such as the followings:

Functional Area - Operations Management

	o List just the functions without their detailed description, thus no references for subsequent development
	      o Provide too much details on the other hand, which hinders development as well
	      o Existence of inconsistent materials or descriptions
	      o Ambiguous presentation of materials
	      o Fluctuating vision presentation
	      o Overwhelming personal style in the design, etc.
	• Present the game specification to management or the game development team for comment and approval
	
	3. Exhibit professionalism
	
	• Always create the game specification with full dedication and originality, without illegal copying or plagiarizing
	• Always create the game specification according to organisational guidelines, and with due consideration for the players

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the game specification creation task within the defined time and budget of the project requirement specifications; and • Review and refine the game specification according to the stage of the game development life cycle
Remark	

Functional Area - Operations Management

Title	Perform technical feasibility study
Code	107918L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game graphics designing. The technical feasibility study is a logistical or tactical plan of how the organisation will produce, store, deliver, and track its products or services and game applications are of no exception. It is an excellent tool for trouble-shooting and long-term planning. This UoC is concerned with the considerations and details involved in the performance of such study in the capacity of a lead programmer or technical director.
Level	5
Credit	3
Competency	Performance Requirements 1. Knowledge for technical feasibility study - Realize the philosophy and guidelines of the organisation towards game development - Get hold of the resources and support for development of the game application in concern - Understand the state-of-the-art technology used in the game industry - Well-versed in the following programming techniques: - Multi-threading programming - Network programming - Computer graphics programming, etc. - Understand database concept and design - Understand the functions and limitations provided by different cloud platforms 2. Perform technical feasibility study - Evaluate whether the prescribed game design is feasible in terms of technical ability of the development team - Estimate the resources and time required to develop the software to ensure it can meet the targeted delivery date - Identify experimental features for the game application in concern - Explore the basic elements to be included in the technical feasibility study, which may include: - Materials resources - Human resources - Hardware and software available - Technologies employed, etc. - Evaluate whether the organisation is technically and operationally feasible for the game application in concern, with considerations such as: - The necessary expertise - The infrastructure and capital to develop, install, operate and maintain the proposed system - Whether the organisation is able to deliver the game product at a profit, etc. - Estimate the size of the project and production schedules, including: - Minimum and maximum rated capacity - Fixed costs involved - Actual capacity utilization - The number of operating days required, etc. - Work out alternate plans or work around if the required game features are at risk, and the way they compared with the chosen plan

Functional Area - Operations Management

	• Communicate and liaise with the game designer and development team to exchange ideas towards the results of the technical feasibility study, and provide guidance for their respective tasks 3. Exhibit professionalism • Always perform the technical feasibility study in an objective and open manner, with minimal subjective elements or interferences by un-related issues • Always strike a proper balance among the interests of the organisation, staff members and potential players in the performance of the technical feasibility study
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the technical feasibility study and produce reasonable and sensible comments for the game application in concern; and • Complete the technical feasibility study that can provide proper guidance for other members of the game application development team
Remark	

Functional Area - Operations Management

Title	Create game development environment
Code	107919L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game development. The game development environment is a software suite of tools that enable a game programmer to develop anything from start to finish, and usually includes elements such as source code editor, compiler, debugger, etc. This UoC is concerned with the knowledge and activities to create such an environment to facilitate games development.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for game development environment
	
	• Understand game engine as a software framework designed for the creation and development of game applications, such as Unity
	• Understand common integrated development environment for games, for examples:
	   o Microsoft visual studio
	   o XNA game studio
	   o Unity, etc.
	• Understand different roles in the game development team for work flow design
	• Understand the technical requirements for accommodating and operating the game application
	• Possess proficient knowledge in common programming languages, development plugin or customised game editor
	• Get hold of the organisation's resources and supports for game development
	
	2. Create game development environment
	
	• Exercise good knowledge in common game engines to analyse the requirements of the game products to be developed
	• Setup the game development environment by selecting the available and appropriate hardware platform, system and application software, and with considerations for the planned design tools and work flow
	• Implement the required tools and plugins
	• Ensure the established platform and tools can cater for the planned work flow and meet requirements of the different development team members, including:
	   o Designers
	   o Illustrators
	   o Modelers
	   o Texturers
	   o Riggers
	   o Animators
	   o Developers / programmers, etc.
	• Test run and refine the development environment until its satisfactory operation
	• Formally release the game development environment after seeking approval from management or the game development team
	
	3. Exhibit professionalism
	
	• Always establish the game development environment with full dedication and effort, and in an efficient and effective manner

Functional Area - Operations Management

	• Always maintain an optimal balance between performance of the established development environment and related budget and resources
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Create a suitable development environment for the game products to be explored; and • Create a game development environment that can facilitate the tasks of most game development team members
Remark	

Functional Area - Operations Management

Title	Perform game database design
Code	107920L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with data management tasks for game applications. A database is the core of a game, without it the game has no means to store its components and details and becomes nothing. This UoC is concerned with database design issues for proper storage and handling of all relevant information for a game application, which will have profound influences to its subsequent performance, reliability and stability.
Level	5
Credit	6

Competency	Performance Requirements
	1. Knowledge for game database design
	
	• Realize the organisation's requirements and guidelines towards game applications and their development methodology
	• Possess in-depth understanding about the functional and technical specifications of the game in concern
	• Possess the ability to estimate with good accuracy the resources requirements for smooth operation and running of the game application
	• Possess proficient knowledge in database concept and facilities, and popular database management systems (DBMS) software
	• Possess the capability to design and build a suitable database for the game application in concern
	
	2. Perform database design for games
	
	• Fully explore the facilities offered by popular DBMSs for game applications development, for examples:
	   o MS-SQL
	   o MYSQL
	   o Oracle
	   o Other database management software
	• Plan for the potential and proper usage of DBMS facilities, such as:
	   o Table structures for mass data storage and retrieval
	   o Primary and foreign key definitions to identify game players and relationships with their inventories, scores and various objects in the game
	   o Index structures for random and quick information access
	   o Security features to authenticate players and characters
	   o Integrity features to ensure consistency of information viewed by players
	   o Recovery features to preserve and restore data after failure situations, etc.
	• Propose database structures to satisfy game specific requirements, such as:
	   o Determine the method and schema for storage of information related to:
	      ▪ Game characters
	      ▪ Character details
	      ▪ Skills
	      ▪ Inventory
	      ▪ Scores, etc.
	   o Determine the method and schema for the game billing system, including details about:
	      ▪ Player accounts

Functional Area - Operations Management

	▪ Point cards processing (if used)
	          ▪ Interface with the publisher's billing system
	          ▪ Interface with the billing details of other game systems
	   o Determine the indexing structures for rapid information retrieval, such as:
	          ▪ Standard B-Tree index
	          ▪ Bitmap index
	          ▪ Hash key index
	          ▪ Multi-columns (compound) index, etc.
	   o Setup database procedure calls to interface with the game application, for functions such as report generation
	   o Make use of DBMS facilities to satisfy miscellaneous game related requirements such as:
	          ▪ Transaction logging
	          ▪ Concurrent player handling
	          ▪ Voluminous data or players handling, etc.
	• Consolidate and properly document the aforementioned game database design elements and choices
	• Present the design document to the game development team (or management) for comments and approval for implementation
	
	3. Exhibit professionalism
	
	• Always committed to fully devoted to all activities related to game database design
	• Always perform the game database design in an objective, open-minded and fair manner, without illegal copying or adoption of ideals

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the game database design that can satisfy all requirements of the game application in concern; and • Complete the game database design effectively and efficiently by fully exploiting the features and facilities of the DBMS software used
Remark	

Functional Area - Operations Management

Title	Prepare asset list
Code	107921L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of game and animation products. Assets are everything that contributes to the visual appearance of the game and / or animation, which may include artwork, sounds, video, maps, and other data. This UoC is concerned with the necessary knowledge, skills and procedures in handling an application's asset, in the capacity of a designer.
Level	4
Credit	3
Competency	Performance Requirements
1. Knowledge for game and animation assets

- Fully comprehend the contents and details of the game and / or animation application in concern
- Understand the technical requirements for accommodating and operating the application
- Understand the current trend of the digital media industry and users' preferences
- Understand all application components that are visible to the users
- Possess good knowledge about the wide range of assets, such as:
  o 2D sprites, 3D models
  o Missions, levels, areas
  o Text and dialogue
  o Textures
  o Key framing and motion capture
  o Sound effects, music and special effects, etc.
- Possess proficient programming techniques for applications development

2. Prepare asset list

- Prepare a list of things that are useful and will go into the game and / or animation in concern, including items in the above asset list and anything else that is presented to the users
- Gather the required elements from different sources and through various means, such as:
  o Free downloads
  o Purchase from commercial sources
  o Use video clipping tools to create video clips for sound effect production
  o Use appropriate text to describe required graphics for creation by artists
  o Arrange artists to develop concept art and asset sketches as a springboard for developing real game assets, etc.
- Ensure that the above pieces of data / visual elements:
  o Are in a format that can be presented to the users
  o Can be plugged into the application engine
- Establish a centralised registry of the selected assets to describe:
  o Their property settings
  o Actions that the project system should perform on the asset
- Review the coverage and properties of the asset list with members of the development team
- Monitor and maintain the asset list throughout the entire application development life cycle, including the addition, amendment and removal of elements when deemed necessary |

Functional Area - Operations Management

	3. Exhibit professionalism • Always fully devoted and committed to all activities related to the preparation of the asset list • Always take the perception and preferences of players as first priority considerations in the process of asset list preparation
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Able to prepare a comprehensive asset list for use by the game and / or animation application in concern; and • Able to maintain the asset list in an accurate and updated status
Remark	

Functional Area - Operations Management

Title	Perform level design
Code	107922L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with games development. Game level is one the key elements in the design and development of almost all kind of games. This UoC is concerned with levels in the design aspects of games, which will have strong influences to the subsequent marketing, programming, and maintenance processes of the particular game developed.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game level design
	
	• Realise the philosophy and guidelines of the organisation towards game development
	• Possess good understanding about the requirements of game specifications adopted by the development team
	• Possess good understanding about the essential elements in game level development
	• Possess good knowledge about the key processes, and the position of game level in the entire game development cycle
	• Possess the ability to accurately speculate and figure out the preferences and expectations of game players
	
	2. Perform level design for games
	
	• Prepare for the design work based on the following facts about game level:
	    ○ It is the data entry and layout portion in the game development cycle
	    ○ Level serves as a mission, stage, map or other venue of player interaction
	    ○ It is an essential element in judging whether the game is welcomed or felt exciting by the players
	• Conduct the design work based on the following essential requirements above game level:
	    ○ Challenge, for testing the players' skills at the core game-play
	    ○ Entertainment, for maintaining the players' interest
	    ○ Uniqueness, for introducing variations in the plot, challenge, setting, and characters
	    ○ Escapism, to immerse the player and suspend their disbelief
	• Complete the designing for the following elements in each level:
	    ○ Level opening, which specify the initial situations
	    ○ Level content, such as on how normal player wins and expert gets bonus, and how conflict is to be resolved when they arise
	    ○ Level ending , to show the result of player in that level, and how they can do better next time
	• Include the following features in the level design as appropriate:
	    ○ Control the overall level pacing
	    ○ Control the overall level of excitement
	    ○ Cope with the learning curve and skill of the players
	    ○ Level of difficulty should be synchronous with tension of the entire story
	• Consolidate the overall design elements in the form of a design specifications, or alike
	• Present the design document to the game development team for comments and approval for development

Functional Area - Operations Management

	3. Exhibit professionalism • Always committed to full devotion in all activities related to game level design • Always perform the game level design in an objective, open-minded and fair manner, without illegal copying or adoption of ideas
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the game level design and produce satisfactory results for both the organisation and those game players; and • Perform the game level design according to all specified requirements and restrictions (if any)
Remark	

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

Functional Area - Operations Management

Title	Perform human computer interaction (HCI) design
Code	107923L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game design. Human Computer Interaction (HCI) is the study, design, construction and implementation of human-centric interaction with computer systems. It includes elements such as designing screens and menus, studies reasoning behind building specific functionality, etc. This UoC is concerned with the knowledge and activities involved in HCI design in the capacity of a game designer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for HCI design
	
	• Understand the technical requirements for accommodating and operating the game application
	• Understand the details of the game mechanism
	• Understand HCI as processes for the following activities:
	    o Goal-directed problem solving
	    o Creativity
	    o Decision making
	    o Planning for development, etc.
	• Possess proficient knowledge in designing user-friendly interfaces for game applications
	• Possess the ability to present relationship of interfaces by flow charting
	• Possess the ability to implement HCI user design features and usability techniques for developing interactive games
	
	2. Perform HCI design
	
	• Design the interface between players and the game, which may include elements such as:
	    o Psychology
	    o Ergonomics
	    o Engineering
	    o Design
	    o Semiotics
	    o Ethnography
	    o Language, etc.
	• Design the inter-relationship between interfaces
	• Design the components of an interface and ensure that they are kept simple, descriptive and fast, such as:
	    o Opening menu
	    o Configuration screens
	    o In-game, onscreen buttons, etc.
	• Design what is visible for each interface to the player and also the relationship between interfaces, with the help and depiction of flowcharts
	• Carry out basic activities for the above HCI design elements, including:
	    o Identify needs and establish requirements
	    o Develop alternative designs and suggest ideas to fulfill the requirements
	    o Build interactive versions of the designs
	    o Evaluate designs and their acceptability, etc.

Functional Area - Operations Management

	• Conduct integration and testing for the final design products and ensure they meet the prescribed usability and other criteria 3. Exhibit professionalism • Always perform the HCI design and related activities with full dedication and effort, and in an efficient and effective manner • Always ensure the final design products can satisfy specific user and organisational requirements
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the HCI design tasks for the game application in concern on time; and • Complete the HCI designing that can satisfy the requirements of users, within the prescribed budget and constraints of the organisation
Remark	

Functional Area - Operations Management

Title	Perform game prototyping
Code	107924L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game applications development. The main objective of game prototyping is to create a demo for proof of concept before actual production and almost all games development adopt this approach. This UoC is concerned with the considerations and activities in creating game prototypes.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game prototyping
	
	• Understand details of the game engines adopted by the organisation
	• Understand game animation and related techniques
	• Understand related concept and techniques, such as rapid game prototyping
	• Get hold of the organisation's resources and support for game prototyping
	• Master popular script languages for game application development
	• Possess proficient knowledge in basic physics as applied to games development
	
	2. Perform game prototyping
	
	• Gather relevant information and requirements about the game application to be developed from various sources, such as:
	  o The game development team
	  o The current industry trend
	  o Suggestions and preferences of the players, etc.
	• Prepare for creation of the game prototype with the following aims and considerations:
	  o Ensure the game concept is fun enough before its actual implementation
	  o Test the game mechanics and gameplay
	  o Create a playable portable demo for consideration by management
	  o Select the best idea from a set of alternatives
	  o Test the technical feasibility of ideas
	  o Make available a design and development sandbox before a full development team has been staffed, etc.
	• Carry out the game prototyping tasks according to prescribed guidelines or procedures if applicable, and which may include:
	  o Pick and use the designated tools such as game maker, game-editor, Unity, construct etc.
	  o Develop the prototype and play around with it, such as simulate tilting and other features by using the keyboard
	  o Create some artwork and evaluate if there is too much or insufficient details on it
	  o Import art into the prototype and make sure all appear as desired
	  o Capture video footage from the game in the desired resolution, etc.
	• Avoid prolonged development time for the game prototype and prepare for the possibility of failures
	• Get feedback towards the game prototype from the correct and objective advisors other than developers
	• Present the completed game prototype to the game development team for comment and references

Functional Area - Operations Management

	3. Exhibit professionalism • Always perform game prototyping with the idea of producing a reliable proof of concept in the shortest time frame and using minimum resources • Always carry out the game prototyping activities in an objective and non-biased manner in order to solicit accurate outcomes
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the game prototype on time and within budget constraints; and • Deploy fully designated resources and support to carry out the game prototyping tasks
Remark	

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

Functional Area - Operations Management

Title	Design characters
Code	107925L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game characters design. Game characters are one of gaming's great challenges, and games require characters to act as a gateway into their virtual world. Characters also provide a colourful cast of individuals, each with their own personalities and motivations. This UoC is concerned with the capabilities, considerations and activities for creating such game characters by a game artist.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game characters
	
	• Understand the game specifications and detailed requirements as prepared by the game development team
	• Understand the current industry trend and player preferences towards game characters
	• Understand related budget and resources allocation of the organisation
	• Possess technical proficiencies for game character design and creation:
	    o Possess the breadth and depth of animation knowledge
	    o Can handle computer graphics and 3D modelling
	    o Possess the skills and knowledge of an illustrator, concept artist, animator, and game artist
	    o Can blend skills from across fields to create vivacious, well rounded characters, etc.
	• Possess the personal traits of a competent game character designer, such as:
	    o Imaginative and creative
	    o Details oriented
	    o Reliable
	    o Love the challenge of tackling difficult work, etc.
	
	2. Design game characters
	
	• Perform background planning for the characters of a game with the following considerations and actions:
	    o The character is involved in the story
	    o The role is the base of a game character
	    o Ensure a main character is fun to play
	    o Design the look and feel of animated characters
	    o Storyboard the characters by writing their past and their future
	    o Place characters within the context of the narrative to give them life and depth
	    o Imagine and sketch out the first draft of characters, etc.
	• Undergo the following steps for designing the game characters, namely:
	    o Determine the role of the character and its significances in the game
	    o Decide the gender of the character to unlock half side of its personalities
	    o Arrive at a personality type for the character, for examples:
	        • Aggressive, kind, or both
	        • Hardworking or sluggish
	        • Perceiving in personality or not
	    o Decide the strength and weaknesses of the character, for examples:
	        • Strong or weak

Functional Area - Operations Management

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Intelligent or not
Social or standalone, etc.

Explore the character's relationships with other characters in the game
Determine the style that the character will play like
Explore the potential for creating more characters as a result of this character traits

Define other features for the game character based on game aspects such as theme, time period and genre:

What the character will likely wear
What equipment / weapon it might have available
How the character may act
The general population, the enemies in the game, etc.

Determine the prioritisation of the character, such as:

Main character
Supporting character
Side-character, and so forth

Determine the practicalities of animation for the character so as to define its personalities through:

How it walk
Its personal affectations
Its gestures, facial expressions, etc.

Consolidate the above considerations and decisions to a game character design proposal, and present to the game development team or management for review and approval

3. Exhibit professionalism

Always devote fully to all activities related to the game characters design
Always perform the game characters designing according to requirements of the game specifications, and place the interests of potential players as the highest priority consideration

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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

Able to complete the game character design tasks within the defined time and budget of the requirement specifications; and
Able to design appropriate characters for the game in concern, and fulfilling all requirements specified in the game specifications

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

Functional Area - Operations Management

Title	Create map and texture
Code	107926L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in games or animation applications graphics designing. Map and texture consist of red, green, and blue and these RGB values allow a 2D or 3D image to represent depth and can save a lot of time and resources. This UoC is concerned with the activities and steps in creating maps and textures as part of the applications development.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for map and texture
	
	• Understand the details about object space and tangent space map and texture
	• Understand how to do shading with a computer program (shader) in the process of application development
	• Possess good knowledge in creating high resolution (hi-res) model, and related software such as "z-brush"
	• Possess the ability to perform UV (the 2 axes of the 2D texture) mapping and unwrap UV
	• Possess the ability to modify map and texture using image editing software
	
	2. Create map and texture
	
	• Gather requirements towards map and texture creation as part of the graphics designing tasks
	• Work according to the following considerations and criteria for map and texture creation:
	    o Identify the requirements for hi-res model which demand for high computation power for rendering
	    o Make use of low polygon model to increase the efficiency
	    o Increase the details of low polygon model by storing the normal of the surface in map and texture, which fake the lighting of bumps and dents
	    o Bake the normal map by the hi-res model
	• Use designated software and tools to generate the required map and texture, for examples:
	    o CrazyBump, generates normal maps from photos, height maps, or other normal maps
	    o xNormal, generates normal maps from high-poly and low-poly 3D models
	    o nDo2, generate normal maps using selections and other features
	    o Photoshop, manually paints a normal map using different color channels (RGB), etc.
	• Make appropriate adjustments to the actual map and texture image until the desired results are achieved, for examples:
	    o Fiddle with the settings until it is bumpy enough for the texture
	    o Decide upon the range of colors which finally determine the range of angles on the surface
	    o Change the image to grayscale and fiddle with brightness and contrast to make certain desired details stand out
	    o Perform the above step multiple times to enable different details to stand out, and put the images together in layers with the blend mode set to overlay, etc.

Functional Area - Operations Management

	• Present the completed map and texture to the development team for comment and seek agreement for adoption 3. Exhibit professionalism • Always create the map and texture with full dedications and professional rather than any alternate judgements • Always carry out the map and texture creation tasks strictly according to requirements, without avoiding any difficulties or problems
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the map and texture creation on time and within budget constraints; and • Deploy fully designated resources and support to complete the map and texture creation tasks
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Create low polygon models
Code	107927L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game graphics designing. Low polygon is a polygon mesh in 3D computer graphics that has a relatively small number of polygons and frequency occurs in real-time game applications. This UoC is concerned with the activities and steps in creating low polygon models as part of the game applications development.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for low polygon models
	
	• Understand the details about textures and materials
	• Understand the effects of diffusion, specular and ambient light
	• Understand how to do shading with a computer program (shader) in the process of game application development
	• Possess good knowledge in creating low resolution (low-res) models
	• Possess the ability to perform UV (the 2 axes of the 2D texture) mapping and unwrap UV
	• Master the techniques in using 3D modelling software, such as:
	    o 3DSMax
	    o Maya
	    o Blender, etc.
	
	2. Create low polygon models
	
	• Gather requirements towards low polygon models creation as part of the graphics designing tasks
	• Decide what the optimal polygon limit should be and come up with a reasonable polygon count, for examples:
	    o A rock on the side of the road may be comprised of only 10-30 polygons
	    o An eye-catching building needs more details and may need 350-550 or more polygons
	• Consider the following factors to determine the threshold for a low polygon mesh:
	    o The time the meshes were designed and for what types of hardware
	    o The details required in the final mesh
	    o The shape and properties of the object in question, etc.
	• Use designated 3D modelling software to create the low-res models, which are typically polygons less than 10K in size
	• Arrange the polygon mesh so that joints are ready for animation
	• Unwrap UV for texture creation and normal map creation
	• Create materials to indicate how the surfaces interact with light
	• Make appropriate adjustments to the low polygon models until the desired results are achieved
	• Present the completed low polygon models to the game development team for comment and seek agreement for adoption
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Always create the low polygon models with a proper balance between optimal game performance and possibly undesirable appearance in the resulting graphics • Always carry out the low polygon models creation tasks strictly according to requirements, without avoiding any difficulties or problems
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the low polygon models creation on time and within budget constraints; and • Deploy fully designated resources and support to complete the low polygon models creation tasks
Remark	

Functional Area - Operations Management

Title	Create pixel art
Code	107928L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game graphics designing. Pixel art is one form of digital art which is generally thought of as a computer graphic where the image is literally drawn pixel-by-pixel in tiny detail, using limited color palette and primitive computer graphics tools. This UoC is concerned with the activities and steps in creating pixel art as part of the game applications development.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for pixel art
	
	• Get hold of the organisation's resources for pixel art creation work
	• Understand different graphics style typically used in game applications
	• Understand frame based animation techniques
	• Understand the details about spirits, the stand-alone two-dimensional characters or objects in games
	• Understand the details about anti-aliasing, which is adding intermediary colours to the kinks of the line to smooth them out
	• Possess proficient knowledge about the usage of gradient
	• Master the technique in using different drawing software, for examples:
	   o Computer's built-in paint program
	   o Photoshop
	   o Pro Motion
	   o Pixen, etc.
	
	2. Create pixel art
	
	• Gather requirements towards pixel art creation as part of the graphics designing tasks
	• Follow prescribed steps to handle the creation of pixel art, which may include:
	   o Decide upon the software tools to be used
	   o Consider the kinds of lines to be drawn, such as straight and curve lines
	   o Visualize the objects to pixel in mind or on paper and determine the kind of spirits to appear in the game
	   o Perform outlining by sketch out a crude outline for the spirits
	   o Choose and apply colors
	   o Work with shading tasks such as choosing light source, shading, soft shadow, highlights, etc.
	   o Use anti-aliasing to make the lines look smooth
	   o Do dithering to get more shades without using more colors, as appropriate
	   o Do anti-aliasing as appropriate
	   o Finish up with the pixel arts
	• Create graphics contents by drawing in pixel levels, for examples:
	   o Icon / button in game
	   o Pixel based human characters
	   o Texture, etc.
	• Make appropriate adjustments to the pixel arts created until the desired results are achieved
	• Present the completed pixel arts to the game development team for comment and seek agreement for adoption

Functional Area - Operations Management

	3. Exhibit professionalism • Always create the pixel arts with full dedications and exercise professional rather than any alternate judgements • Always carry out the pixel arts creation tasks strictly according to necessity and requirements, without avoiding difficulties or problems
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the pixel arts creation on time and within budget constraints; and • Deploy fully designated hardware and software resources to complete the pixel art creation tasks
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Create scenes
Code	107929L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in games and/or animation graphics designing. An asset type that allows storing of object with components and properties acts as a template from which a graphics designer can create new object instances for the scene of a game or animation application. This UoC concerns with the activities and steps in creating scenes as part of the application development.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for scenes - Get hold of the organisation's resources for creating scenes - Understand the use of various textures, such as: - Diffusion map - Specular map - Normal map, etc. - Understand frame based animation techniques - Possess proficient knowledge in creating materials for 3D models - Possess proficient knowledge in using 3D creation software, such as Blender 2. Create scenes - Gather requirements towards the creation of scenes as part of the graphics designing tasks - Determine scenarios to apply the strength of scenes, for examples: - Use a single brick prefab to build a wall by creating it several times in different positions - Instantiate the firing of a rocket launcher by a flying rocket prefab, etc. - Create pre-built small objects used for building the scene, which may involve steps such as the followings: - Create prefabs by adding some objects to the scene and then save as reusable prefabs - Save the prefabs and optionally include other objects such as point light and particle emitter for a lamp - Edit a prefab from its instances - Save changes to the current scene and other project wide changes - Make changes also to import settings when required, for examples: - Change the texture type of an image asset - Change the scale factor of an 3D model asset - Change the compression settings of an audio asset - Perform any other import setting change, etc. - Instantiate the prefabs at runtime when needed - Make appropriate adjustments to the scenes created until the desired results are achieved - Present the completed scenes to the development team for comment and seek agreement for adoption 3. Exhibit professionalism

Functional Area - Operations Management

	• Always create the scenes with full dedications and exercise professional rather than any alternate judgements during the process • Always carry out the scenes creation tasks strictly according to necessity and requirements, without avoiding difficulties or problems
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the scenes creation on time and within budget constraints; and • Deploy fully designated hardware and software resources to complete the scenes creation tasks
Remark	

Functional Area - Operations Management

Title	Create User Interface (UI) layout
Code	107930L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game graphics designing. The design and creation of UI is often one of the most challenging aspects of game development as there is a lot of information to convey to the player within the little screen space. This UoC is concerned with the activities, considerations, and choices of options involved in the creation of UI layout by a game graphics designer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for UI layout
	
	• Understand the Human Computer Interaction (HCI) design details prepared by game designers
	• Understand the relationship between color and feelings
	• Possess proficient knowledge in the use of drawing software, such as Photoshop
	• Possess good knowledge in font design
	• Possess the ability to implement HCI user design features and usability techniques for developing interactive games
	
	2. Create User Interface (UI) layout
	
	• Explore why some layouts feel better than others and what makes a layout being felt good by game players
	• Assess how easy user interfaces are to be used during the creation process, including but not limited to the followings:
	    ○ Learnability, how easy it is for players to accomplish the tasks
	    ○ Efficiency, how quickly can players perform the tasks
	    ○ Memorability, how easy can players re-establish proficiency
	    ○ Errors, how many errors will players make in using the design layout
	    ○ Satisfaction, how pleasant it is to use the design layout, etc.
	• Always consider the strength and weaknesses of the players, such as their:
	    ○ Memory, the chunk of information they can remember
	    ○ Visual perception
	    ○ Motor skills, such as mouse skill
	    ○ Learning and skill acquisition
	    ○ Conceptual model
	    ○ Human diversity, such as the accessibility issues for disabled players, etc.
	• Work on the followings with designed software tools, and based on the HCI design prepared beforehand:
	    ○ Add decoration to the interface
	    ○ Ensure the interfaces match with the theme of the game, for examples:
	        ▪ Use dark theme for serious games
	        ▪ Use colourful theme for casual games, etc.
	• Use the correct UI components in their specific places, such as:
	    ○ Push buttons, used for selection
	    ○ Radio buttons, used to toggle or select from a group
	    ○ Sliders, used for setting and adjust values with a wide range
	    ○ Lists and drop downs, used for display of ordered data
	    ○ Text fields, for naming or communication

Functional Area - Operations Management

	○ Drop down menu, allow navigation, etc. • Communicate with the game designer or designer team to ensure the completed UI layout matches with the requirements of the prescribed HCI design 3. Exhibit professionalism • Always perform the game UI layout creation according to requirements of the prescribed HCI design, with minimal subjective elements • Always perform the game UI layout creation with player usability as the first priority consideration
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Create the UI layout according to requirements of the HCI design; and • Complete the UI layout that can satisfy the demand and facilitate the operations of the game players
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Prepare character animation
Code	107931L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game graphics designing. Game character animation is the techniques of developing and animating amazing characters for the games in concern. This UoC is concerned with the activities and steps in creating exciting, believable, engaging game characters in the capacity of a graphics designer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for character animation
	
	• Understand the game specifications and detailed requirements as prepared by the game development team
	• Get hold of the resources and support for character animation tasks
	• Understand the current industry trend and player preferences towards game characters
	• Understand skeleton in 3D animation
	• Understand kinetic and inverse kinetic
	• Understand key frames in the context of game applications
	• Understand motion bending, such as real time conversion of a motion from another motion
	• Possess the knowledge in creating animation loops, such as:
	    o The difference with fixed animation in movies
	    o Synchronous between the first and the last frames, etc.
	
	2. Prepare character animation
	
	• Gather requirements towards game characters animation as part of the graphics designing tasks
	• Make use of logic and artificial intelligence to drive game characters to act and react to different situations
	• Fully consider the relationships between kinetic, hierarchy and inverse kinetic
	• Apply human mechanics in the process of game character animation as appropriate and when needed, for examples:
	    o Line of action, which refers the flow of the body shape
	    o Energy burst, for storing a huge amount of energy before a burst happens
	    o Balance, to help the character in gaining a stable pose
	    o Momentum, to be applied to motions of the game characters
	• Use mathematical strangeness in actual motions to produce 3D game character animations, such as:
	    o Acceleration
	    o Deceleration
	    o Forces
	    o Dynamics
	    o Weights and curves, etc.
	• Apply skinning / enveloping techniques as appropriate, such as:
	    o Vertex blending
	    o Matrix palette
	    o Linear blend skinning, etc.

Functional Area - Operations Management

	• Use the technique of animation loop where appropriate, and define related parameters such as the loop time
	• Create motions for different game characters based on the above considerations, which may include:
	    ○ Attack
	    ○ Use magic
	    ○ Walk
	    ○ Run
	    ○ Sit
	    ○ Die, etc.
	• Make appropriate adjustments to the character animations until the desired results are achieved
	• Present the completed character animations to the game development team for comment and seek agreement for adoption
	
	3. Exhibit professionalism
	
	• Always devote fully to all activities related to the preparation of character animations
	• Always perform the character animation preparation according to requirements of the game specifications, and place the interests of potential players as the highest priority consideration

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the character animation preparation tasks within time and budget constraints; and • Complete the character animation preparation work for the game in concern, and fulfilling all requirements specified in the game specifications
Remark	

Functional Area - Operations Management

Title	Develop BGM and audio effects
Code	107932L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game audio engineering. Both video and mobile phone games require soundtracks and musical pieces to play along while the game progresses. Background music (BGM) and sound effects thus are essential elements in the creation of game applications. This UoC is concerned with the activities and steps in the creation of BGM and audio effects in the capacity of an audio engineer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for BGM and audio effects
	
	• Understand the game specifications and detailed requirements as prepared by the game development team
	• Get hold of the resources and support for game BGM and audio effects
	• Understand the current industry trend and player preferences towards BGM and audio effects
	• Possess good knowledge in various sound effects used in game applications
	• Possess the techniques in creating music for different atmospheres
	• Possess the techniques in creating melodies for different game events
	
	2. Develop BGM and audio effects
	
	• Gather requirements towards BGM and audio effects as part of the audio engineering tasks
	• Explore different sources for creating in-game use music and sound effects, such as:
	    o Self-producing
	    o Purchasing
	    o Free downloading
	    o Combination of the above, etc.
	• Develop music appropriate to the atmosphere of the game application in concern, for examples:
	    o Chinese and Western styles
	    o Science fiction (Sci-fi)
	    o Mystery, etc.
	• Develop sound effects to suit situations within the game, such as:
	    o Wind breezing
	    o Door opening
	    o Gun shooting
	    o Wood or metal hitting
	    o Glass breaking, etc.
	• Develop short melodies for in-game events, for examples:
	    o Level up
	    o Encounter the boss
	    o Face dangerous situations, etc.
	• Fine tuning the BMG and audio effects for optimal results, for examples:
	    o Use random, modulation (pitch and volume) and attenuation nodes in sound cue to achieve special sound effects for the game characters

Functional Area - Operations Management

	o Use reverb volumes to achieve interior and exterior sound effects, and for first person shooter (FPS) or third person shooter (TPS) shooters in games
	    o Select stereo or mono versions for different sound designs, etc.
	 • Perform activities related to sound and music for games appropriate to the hardware and platform being used, such as:
	    o Digitally synthesize and compress the music such that they can be easily embedded in the game's files and facilitate programming
	    o Arrange music to be accessed and processed by the device's sound chip
	    o In case of desktop computer, create and play game music loops through MIDI sequencing
	    o Compose and store the game music in smaller file format on mobile phone scale, etc.
	 • Make appropriate adjustments to the BGM and audio effects created until the desired results are achieved
	 • Present the completed BGM and audio effects to the game development team for comment and seek agreement for adoption
	
	3. Exhibit professionalism
	
	 • Always devote fully to all activities related to the development of BGM and audio effects for the game in concern, and remain open and objective in the process
	 • Always perform the BGM and audio effects development according to requirements of the game specifications and optimal expected results, and place the interests of game players as the highest priority consideration

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the BGM and audio effects development tasks within time and budget constraints; and • Complete the BGM and audio effects development work for the game in concern, and fulfilling all requirements specified in the game specifications
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Develop game level
Code	107933L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with games development. Game level is one the key elements in the design and development of almost all kind of games. This UoC is concerned with the activities and issues about levels development, which is a key process in the entire games development life cycle.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game level design and development
	
	• Realise the philosophy and guidelines of the organisation towards game development
	• Possess good understanding about the requirements of the development team for:
	   o Game specifications prepared and released
	   o The details of game level design completed and approved
	   o Other related requirements
	• Possess good understanding about those programming techniques applicable to games
	• Master popular languages commonly used for game programming
	
	2. Development of game levels
	
	• Conduct game level design according to popular level design processes, which usually include the following steps:
	   o Preparation of thumbnail sketches
	   o Discuss the concept with designer in the game development team
	   o Prepare a detailed paper version of the design for seeking further advices, listing those mission specific code and art
	   o Create the core of the level which establish the core game play
	   o Fill in those finer details and update the paper design and task lists
	   o Carry out a play test and may invite those designers to play their levels
	   o Keep track of all bugs, feedback and tasks as reported
	• Conduct the actual development work with designated languages, tools, platforms and other resources
	• Carry out the development work following the common iterative steps until completion:
	   o Coding
	   o Testing
	   o Debugging
	• Establish a centralised database with level specific issues and feedback
	• Conduct play test repeatedly and treat it as an ongoing process
	• Review the problems identified / discovered and make appropriate modification work
	
	3. Exhibit professionalism
	
	• Always committed to full devotion in all activities related to game level development
	• Always perform the game level development according to prescribed specifications and requirements

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the game level development and produce results as specified in the design process; and

Functional Area - Operations Management

	• Perform the game level development within time and budget constraints
Remark	

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

Functional Area - Operations Management

Title	Create in-game cinematic
Code	107934L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in graphics designing. The in-game cinematic is a sequence in video games that is not interactive and breaking up the gameplay. It can be in the form of full motion videos (FMV) or other forms such as a series of images, plain text, audio, etc. This UoC is concerned with the activities and steps in the creation of in-game cinematic in the capacity of a graphics designer.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for in-game cinematic - Understand the game specifications and detailed requirements as prepared by the game development team - Get hold of the resources and support for in-game cinematic creation tasks - Possess the knowledge in creating storyboard - Possess the knowledge in lighting for game applications - Possess the knowledge and techniques in controlling 3D cameras - Master the techniques in handling movie editing software, such as: - Microsoft Movie Maker - Apple iMovie - Avid FreeDV - Premiere Pro - Wax - Zwei-Stein, etc. - Master the techniques in handling different rendering software, such as: - Windows Live Movie Maker - Sony Vegas Movie Studio, etc. 2. Create in-game cinematic - Gather requirements towards in-game cinematic as part of the graphics design tasks - Work with the concept that in-game cinematic is a type of cutscene that is rendered in real time using the game's graphics engine - Determine the type of cutscene appropriate for the game in concern, such as: 2D animations in the form of animated bitmap images 3D polygon graphics to render computer-generated imagery (CGI) animation - Exercise lighting design to create impacts on game aesthetics and influence the gaming experience, with elements such as: - Brightness or luminance - Colour - Hard or soft shadow quality - Direction - Variation over time, etc. - Create cinematic to present in-game events based on the above considerations and actions, and perform the followings if appropriate: - Work through intensive pre-production and storyboarding - Compose an animatic generated from a storyboard - Use cinematic techniques to create and place camera according to storyboard - Use storyboard and animatic to design layout, etc.

Functional Area - Operations Management

	• Make use of the followings in the cinematic creation process as needed:
	    ○ Designated software tools and facilities
	    ○ Equipment such as 3D cameras, etc.
	• Fine tune the in-game cinematic created for optimal effects
	• Present the completed in-game cinematic to the game development team for comment and seek agreement for adoption
	
	3. Exhibit professionalism
	
	• Always devote fully to all activities related to the creation of in-game cinematic for the game in concern, and remain open and objective in the process
	• Always perform the in-game cinematic creation tasks according to requirements of the game specifications and optimal expected results, and place the interests of game players as the highest priority consideration

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the in-game cinematic creation tasks within time and budget constraints; and • Complete the in-game cinematic creation tasks with the designated software and tools, while fulfilling all requirements specified in the game specifications
Remark	

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	Performance Requirements
	1. Knowledge for game programming
	
	• 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:
	   o Windows programming
	   o Interactive programming
	   o Interfacing with multimedia development library, e.g. DirectX
	• Master popular languages commonly used for game programming, such as:
	   o C++
	   o Objective-C
	   o Java
	
	2. Perform game programming
	
	• Comprehend the structure and contents of various design documents and specifications, which may include:
	   o Architecture design
	   o Detailed level design
	   o Game specification
	   o 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:
	   o Integration of game logic and media components
	   o Integrate with social media Application Program Interface (API)
	   o Integrate with payment gateway, for providing in-app purchasing
	   o Perform network programming, for connection to the game server
	   o Access to Database (DB) API, for retrieving or storing all game related information
	   o Work with integrated script engine, for connection with tasks, missions, etc.
	   o Perform Artificial Intelligence (AI) programming
	   o Perform physics programming
	   o Perform shader programming, which are graphics related 3-dimensional (3D) effects like:
	     ▪ Animal fur

Functional Area - Operations Management

	• Water effect
	• Neon light
	• Carry out the following programming stages iteratively until completion of the specific program modules:
	  ○ Coding
	  ○ Testing
	  ○ Debugging
	
	3. Exhibit professionalism
	
	• 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	The integrated outcome requirements of this UoC are the abilities to: • 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
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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	Performance Requirements
	1. Knowledge for script programming
	
	• 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:
	    o LUA
	    o Python
	    o C++
	    o BASIC, etc.
	• Possess good understanding about the essential features of those script programming engines, such as:
	    o Variable declaration
	    o Flow control
	    o Mathematical calculation
	    o String manipulation
	    o Subroutine / function calls, etc.
	
	2. Perform script programming
	
	• Fully explore the advantages offered by those aforementioned script languages, such as:
	    o Ease of understanding
	    o Ease of maintenance
	    o Ease of modifications
	    o Low resources consumption, etc.
	• Plan for the usage of script languages facilities for game applications, such as:
	    o Use variable declaration for dynamic text generation, such as showing names in a dialog
	    o Use the initialization functions to define game elements such as:
	        ▪ Player status and properties
	        ▪ Player position and facing direction
	        ▪ NPC details and positions
	        ▪ Active spots and item spots, etc.
	    o Use string functions for string copy, concatenation, conversion, and so on
	    o Use flow control capabilities for NPC dialog, event movement, battle event, etc.
	    o Use function calls to access different script files, etc.

Functional Area - Operations Management

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Judge on the pros and cons in using existing instead of self-developed scripts, based on considerations such as:

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:

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:

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:

Coding
Testing
Debugging

3. Exhibit professionalism

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

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<tr>
<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

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

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

Functional Area - Operations Management

Title	Develop game management system for customer service
Code	107937L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game application and supporting systems development. A management system to handle the services for players is an indispensable part of a successful game application. This UoC is concerned with the considerations and activities involved in the development of such a management system in the capacity of a programmer or developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game management system for customer service
	
	• Get hold of the resources and supports for game management system development
	• Understand event driven front end development
	• Understand requirements of a customer service system, for examples:
	   o Create activity log
	   o Setup user right system, etc.
	• Possess good knowledge in database concept and design
	• Well-versed in reports creation using database facilities
	• Possess proficient knowledge in popular programming languages for games development
	
	2. Develop game management system for customer service
	
	• Gather requirements towards the game management system for customer services from relevant sources and stakeholders, such as:
	   o Game players
	   o Staff responsible for customer services
	   o Senior management in charge
	   o The game application development team, etc.
	• Gather the necessary hardware, software and financial resources to kick off the system development work
	• Create Graphical User Interface (GUI) front end for use by staff members responsible for customer services
	• Create server module for retrieving players' data from the game database and send to the front end for display
	• Create tools to modify the game database to facilitate customer services staff in handling enquires and complaints, which may include:
	   o Player registration and de-registration
	   o Game account information
	   o Game products delivery
	   o Ordering and payment
	   o Events recording
	   o Game reward
	   o Site policies
	   o Loss of weapons or rewards, etc.
	• Provide instant message (such as Skype) functionality for the tools
	• Ensure ability of the created tools in generating reports to facilitate checking of customer service related activities by senior management
	• Conduct testing for the functionalities of the game management system in concern

Functional Area - Operations Management

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<td>• Present the completed system to management or the development team for comment and approval for implementation

3. Exhibit professionalism

• Always develop the game management system with customer service as the top priority consideration
• Always carry out the system development work according to requirements, without skipping the handling of any difficulties</td>
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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

• Complete development of the game management system for customer service on time and within budget constraints; and
• Build up a game management system for customer service that can satisfy the requirements of relevant stakeholders</td>
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Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Develop patch system
Code	107938L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game programming and maintenance. A game patch system provides periodic updates, rectifications and enhancements to existing programs in use. This UoC is concerned with the development of such game patch system and all its related tasks and work.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game programming and related patch system
	
	• Master basic programming knowhow, concepts and techniques
	• Fully comprehend the list of the game programs developed and used by game players
	• Possess good understanding about those programming techniques applicable to games
	• Master popular languages commonly used for game programming
	• Possess good understanding about the nature and requirements of a patch system for game programs
	• Fully understand the organisation's specific requirements and guidelines towards the game patch system
	• Possess the ability for problem identification and solutions recommendation
	• Comprehend the mechanism and tools for establishing and maintaining a game programs patch system
	
	2. Develop a patch system for game programs
	
	• Solicit instructions and requirements from management or the game development team regarding the game patch system to be developed
	• Acquire the hardware (if necessary), software tools and other resources required for the patch system development
	• Design a patching system for the organisation according to requirements, and make considerations for but not limited to the following:
	    o Evaluate the necessity in creating a patch after reviewing players' feedback
	    o Evaluate the necessary manpower and resources for patches creation
	    o Timing and frequency for releasing patches
	    o Other considerations such as file size, download speed, etc.
	• Develop tools for various checking tasks, such as:
	    o Checking file in the source
	    o Update (including add, modify and delete) files in the source
	    o Client version checking, etc.
	• Develop tools for other patch handling tasks, such as:
	    o Create patches
	    o Pack changes
	    o Control patch release
	    o Patch deployment, etc.
	• Perform Hypertext Transfer Protocol (HTTP) or File Transfer Protocol (FTP) based processes for downloading and applying patches
	• Keep an accurate and detailed logging on the organisation's patch system development, for reporting to management and subsequent reviews

Functional Area - Operations Management

	3. Exhibit professionalism • Always develop the game patch system based on new requirements and problems reported / observed • Always consider the services to game players as the first priority issue in the course of game patch system development
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Develop an effective game patch system for the organisation within required time frame and budget constraints; and • Develop a patch system that provides good support to the game programs already launched
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Develop game monitoring system
Code	107939L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in game development. Game companies and game infrastructure providers must properly monitor and manage game workloads and contents so that they can maximize player satisfaction while minimizing their own costs. This UoC is concerned with the knowledge and activities for development personnel to work out a scheme for game monitoring.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game monitoring system
	
	• Fully comprehend the contents and details of the game application in concern
	• Understand related budget and resources allocation
	• Understand the technical requirements for accommodating and operating the game application
	• Understand the market requirements for game products and player behaviour
	• Understand event driven front end development
	• Possess proficient knowledge in popular programming languages for games
	• Possess proficient knowledge in common computer resources measurement, such as:
	   ○ Virtual memory
	   ○ Central Processing Unit (CPU) idle time measurement
	   ○ Network bandwidth
	   ○ Database and storage capacity
	
	2. Develop game monitoring system
	
	• Conduct a comprehensive and long term analysis of the game product in concern and its players, with special focus for the followings:
	   ○ Internet capacity
	   ○ Popularity of the particular game product
	   ○ Network traffic performance
	   ○ Behaviour and preferences of the players, etc.
	• Determine appropriate means and methods to conduct the followings based on analysis results:
	   ○ Track user statistics including returning or new users
	   ○ Record operational performance of unique game machines
	   ○ Track players who are having difficulties, etc.
	• Design the monitoring procedures such as the followings:
	   ○ Create Graphical Unit Interface (GUI) front end for monitoring
	   ○ Create server module to communicate with front end
	   ○ Send alert when there is any issue regarding machines, game sessions and game events, etc.
	   ○ Log statistics for server performance and resources usage
	• Ensure compatibility with and integration of the monitoring software (if adopted) into the existing game engine
	• Consolidate the above measures and activities as a scheme or system for game monitoring with proper documentation
	• Test running and refining the game monitoring system until its satisfactory operation

Functional Area - Operations Management

	• Formally implement the prescribed game monitoring system after seeking approval from management or the game development team 3. Exhibit professionalism • Always develop the game monitoring system with full dedication and effort, and in an efficient and effective manner • Always maintain a proper balance between game monitoring performance and related resources consumption
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Able to work out a cost-effective game monitoring system; and • Able to develop a game monitoring system that can provide useful and relevant information to the game development team
Remark	

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

Functional Area - Operations Management

Title	Create user documentation
Code	107940L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in preparing user documents / guides for the games. A user document is a formal writing piece with a specific structure, and its purpose is to explain how to handle and play the game program in a language and level the players can understand. This UoC is concerned with the necessary skills and steps in creating such game user document.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for game user document
	
	• Understand the organisation's resources and requirements for user documents preparation
	• Fully comprehend the details of game programs and master the game contents in concern
	• Understand the technical requirements for accommodating and operating the game programs in concern
	• Understand the purposes and functionalities of game user documents, such as:
	   o Instruct players on how to use the game product
	   o Reduce support costs through provision of clear information
	   o Market and raise the organisation's image
	   o Provide specific information needed by the players, etc.
	• Possess good literacy and writing skills
	• Possess proficient knowledge in using publishing software
	• Possess the illustration skill for graphics and knowledge in font design
	
	2. Create user document for games
	
	• Conduct a thorough review of the game product in concern and identify areas with potential difficulties or ambiguities to the players, such as:
	   o Installing / uninstalling the game software
	   o Playing with various aspects of the game
	   o Migrating to the next higher game level
	   o Encountering events that require for decision making, etc.
	• Choose or follow a prescribed language and format for developing the user document
	• Choose or adopt a designated word processing or publishing software for editing the user document
	• Determine the document's scope, coverage and level of details
	• Create the user document by performing the followings:
	   o Organise the document logically by splitting it into chapters or sections that make sense for the game's usage
	   o Include all necessary parts to make it a self-sufficient document, such as:
	      ▪ A front cover
	      ▪ A table of contents
	      ▪ The main body of the document
	      ▪ A list of figures or tables
	      ▪ A glossary or index
	      ▪ An appendix for further explanation of some issues, etc.
	   o Use words and terms that the intended audience (game players) will understand

Functional Area - Operations Management

	○ Write up the contents for the above parts of the user document, and describe the game features, story and characters, etc. ○ Careful check the writing for accuracy and consistency of the details ○ Include visual aids to assist visual learners if deemed appropriate ○ Design font for the text and illustrate manual graphics ○ Proofread the document to avoid the loss of credibility due to grammatical and spelling mistakes • Present the completed document for approval by management, head of the technical writing or the game development team, depending on organisational structure 3. Exhibit professionalism • Always create the game user document based on the game's actual contents and levels, without excessive subjective ideas • Always take the perception and acceptance of players as first priority consideration in the course of game user document creation
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Able to complete an appropriate user document for the game product in concern within time and budget limits; and • Able to create a user document that can provide good support and guidance to the players
Remark	

Functional Area - Operations Management

Title	Perform game testing
Code	107941L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are designated to conduct testing for game applications. Similar to all software applications, testing is a mandatory and critical stage in the development life cycle, and specific testing methodologies needed to be applied to games. This UoC is concerned with the effective testing of a game application, and all its related tasks and work.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for game testing
	
	• Possess basic programming knowhow, concepts and techniques
	• Possess basic understanding about common programming techniques and practices for game applications
	• Fully understand the details of the game applications to be tested
	• Comprehend the techniques and tools for conducting effective game testing
	• Possess the ability for problems and abnormalities identification
	• Possess the personal traits as a game tester, including:
	    ○ Good at playing games
	    ○ Good eye for details
	    ○ Ability to write well (literacy skill), etc.
	
	2. Perform game testing
	
	• Always maintain a correct attitude towards and follow good practices for game testing, such as:
	    ○ Keep an orderly control on elements / factors to be tested, one at a time
	    ○ Keep an eye on everything including even the smallest part
	    ○ Never assume something without trying in the testing processes
	    ○ Keep track of all technical bugs and logical bugs discovered, etc.
	• Work out a test case (or follow an established one) in a sense of destructing the game product
	• Work out a test plan (or follow an established one) detailing the game elements to be tested, the testing methods and the procedures to follow
	• Write scripts for automatic testing when deemed necessary, such as regression testing
	• Perform manual testing for designated portions of the game / game elements as appropriate
	• Conduct various form of testing for the game application, such as but not limited to the followings:
	    ○ Functionality testing to look for general problems within the game itself or its user interface
	    ○ Compliance testing against those technical requirements
	    ○ Soak testing to cater for problems such as memory leaks or rounding errors
	    ○ Stress, volume and load testing to check the game's stability and limits
	    ○ Compatibility testing with all associated devices and platforms
	    ○ Regression testing to ensure that all the old capabilities still work after a bug has been fixed
	    ○ Multiplayer testing to ensure all connectivity methods are working, etc.
	• Prepare a report after completing the above testing, with highlights such as:

Functional Area - Operations Management

	o The kinds of bugs / abnormal situations discovered o Under what circumstances will the bugs appear (defect tracking) o Information about the bug's manifestation, if any o Other problems observed, etc. • Keep an accurate and detailed logging on activities associated with game testing, for reporting to management and subsequent reviews 3. Exhibit professionalism • Always perform game testing activities with full dedication and effort, not omitting any step or item • Always perform game testing activities with objectivity and fairness, and report all problems based on evidences rather than subjective judgements
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Successfully complete the game testing by checking all required game components with the designated methods and procedures; and • Successfully uncover and report bugs and problems embedded in the game applications
Remark	

Functional Area - Operations Management

Title	Develop promotion materials
Code	107942L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who assist in creating game promotion materials for game promotion. Game promotion is where the need to get the word out about how wonderful the game is. The materials deployed depend on the promotion activities. Printed leaflets, posters, fans site and games trailer are few of the many commonly used promotion materials.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for developing promotion materials
	
	• Good understanding on game feature and story
	• Possess good knowledge of video editing, audio development and visual effects
	• Knowledge of video editing and visual effects software tools and applications, such as: Final Cut Pro, After Effects, Premiere, etc.
	• Updated with video editing and trends
	• Possess basic knowledge of marketing and promotion
	
	2. Develop promotion materials
	
	• Work with colleagues of marketing and/or promotion department to understand the marketing approach, the target audiences of the game, their ages, level, occupation, etc.
	• Games fans site (Web portal) for:
	   o Promotion materials Web page
	   o Fan's enrollment
	   o Fan's forum
	   o Downloads
	• For printed materials, use appropriate application to develop, including but not limited to the following:
	   o Identify the game "standout" features to be used in promotion
	   o Provide write up of game
	   o Extract/capture screen shots from the game, including:
	      ▪ Characters
	      ▪ Themes
	   o CD cover image design
	• Form sample game:
	   o Identify which part to be used in the sample
	   o Provide specification to program/development team
	• Develop trailer video
	   o Select most appropriate video editing and visual effects tools
	   o Include some short features about the game in the trailer
	   o Generate a number of features options that are technically feasible and meets the requirements. Present the options to director/supervisor/team to agree key frames to structure the animation
	   o Include some short features about the game in the trailer
	• Review output/effects with relevant people (marketing or promotion). Respond positively to feedbacks and make adjustment or refinements as required

Functional Area - Operations Management

	3. Exhibit professionalism • Develop the needed materials that complied with the organisation standard and deliver the best result for the promotion of the game
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Team work with marketing and/promotional people to identify what promotional materials needed for the game promotion • Coordinate with games development team to develop the needed materials for different promotional activities • Review outputs of materials with stakeholders (promotional team) and refine the material to deliver the best result for the promotion of the game
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Manage animation development
Code	107943L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible for managing animation production work. The task of the practitioners is to control the workflow and resources, as well as steering the production work to complete with the required quality according to the development plan.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for managing animation development
	
	• Possess good communication and interpersonal skills to communicate at all levels
	• Possess excellent knowledge of animation production work
	• Possess good project management skills including: planning, scheduling, implementing, monitoring and delivering
	• Possess good experience of managing different stages of animation work
	
	2. Manage animation development:
	
	• Work with stakeholders to understand the production brief, script, storyboard, animatic and the story of the production
	• Develop a production plan with tasks including but not limited to the following:
	    o Prepare production timeline
	    o Schedule each animation stage
	    o Recruit the production team
	    o Identify resources required for production work (software, hardware, etc.)
	    o Acquire designs and model sheets, if available
	• Organise the development team (Background Artist, Key Frame Animator, In-between Animators, Clean-up Artist , etc.) and develop specifications of all scenes for the animation development pipeline, such as:
	    o Models
	    o Shaders
	    o Rigs
	    o Texture and materials
	    o Animations
	• Work with the development team to ensure all team members understand the requirements and the schedules
	• Monitor and assess production progress of all team members to ensure all production work is in-line with the development plan
	    o Identify issues when progress is not going as scheduled
	    o Reschedule and redeploy resources when problems are identified
	• Review quality of work from the development team to ensure it meets the production requirements
	• Regularly hold team meetings to maintain team morale, share development knowledge, assess quality, ensure individual team members' works are on schedule, etc.
	• Regularly prepare animation development progress report and present to stakeholders
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Apply industry project management standards with digital animation production management to ensure animation development completed to the required quality and on schedule
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Work and communicate effectively with all levels of the animation team and production stakeholders to ensure the whole team understands the animation development requirements • Develop a detailed development plan and ensure production work are completed in accordance to the production plan • Monitor the progress of each part of the animation development pipeline and provide regular progress reports to stakeholders
Remark	

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	Performance Requirements
	1. Knowledge for creating motion graphics
	
	• 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
	
	2. Create motion graphics
	
	• Plan and organise the production work, including but not limited to the following:
	    o Comprehend the scripts / synopsis / storyboards / creative direction / stylistic elements and other work requirements
	    o Research and identify the purpose and functionalities of the motion graphics
	    o Write a design brief supplemented with visual contents for the motion graphics based on idea generation / inspiration
	    o Design graphics and animation to satisfy functional, aesthetic and creative requirements of the design brief
	    o Schedule / monitor the motion graphics design pipelines
	• Determine appropriate software / tools for the required motion graphic work. For examples:
	    o Photoshop or Flash for cell animation
	    o After Effects, Illustrator or Flash for 2D, vector
	    o Cinema 4D, Studio Max or Maya for 3D
	    o Apple's Motion for 2D and 3D compositing for visual effects
	    o 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:
	    o Basic layer manipulation and animation through keying, motion tracking, and colour management
	    o Key frame navigation
	    o Animating scale / rotation
	    o Motion control moves
	    o Creating a flat vector look / fractured 3D type / movie trailer titles / retiming and tracking footage

Functional Area - Operations Management

	- Dynamic camera movement - Creating / incorporating flying logos or music elements - Perform motion graphics lighting with suitable technique. For examples: - 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 3. Exhibit professionalism - 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	The integrated outcome requirements of this UoC are the abilities to: - 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	

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

Functional Area - Operations Management

Title	Apply 3D digital models
Code	107945L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the animation production work. It is common that animation project is performed by more than one person and the model for the animation scene has already been created and the animator is required to create one of the animation sequences in the project. (Project can be games or video production)
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for applying 3D digital models
	
	• Possess good literacy skills that can read and interpret relevant sources of information related animation work
	• Good communication skills to liaise with different parties to confirm and present work
	• Possess good knowledge of features and functions of different animation software
	• Possess good animation concepts and techniques for games or video production
	
	2. Apply 3D digital models
	
	• Comprehend the script/story/project brief and work with appropriate stakeholders (such as director, supervisor, etc.) to understand and confirm work requirements
	• Plan work approach and prepare setup of character model for animation work
	    o Acquire all the digital assets to be used for the animation work
	    o Determine the model topology to allow the required deformation for the scene
	    o Evaluate various factors of the character model that influence the selection of appropriate software to use, including but not limited to the following:
	        ▪ Compatibility between model and software (i.e. Can it be imported?)
	        ▪ Does the model need lots of enhancement, such as greater detail rigging, etc.
	        ▪ If the model is antiquated, can it be converted to match newer version of the software
	    o Setup work environment, including hardware and software
	    o If necessary, present work approach to supervisors or stakeholders and adjust approach to incorporate feedbacks
	• Apply character model to produce the animation sequence
	    o Import model into the software
	    o Select and assign animation clip from library (such as run, dance, walk, etc.) to the model
	    o Place the model into the scene and adjust position and size of model to match the scene
	    o Use suitable method to play animation, such as script or the software's play window
	    o Review settings to create animated sequence to meet requirements
	• Render and output the animated sequence for review, delivery and work sign off
	
	3. Exhibit professionalism
	
	• Apply industry best practices and use current animation software to develop animation sequence that can meet the technical and work requirements

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to:
	• Plan animation approach after examining various factors of the 3D model and various production reference materials, including scripts, storyboard, etc.
	• Import the 3D model with animation clips, components and controls into the selected software successfully including performing version conversion, if necessary
	• Complete the animation sequence as per required by the work requirement specification and as scheduled
Remark	

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

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	Performance Requirements
	1. Knowledge for creating digital character animation
	
	• 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
	
	2. Create digital character animation:
	
	• Comprehend the script/storyboard/character sheet/animation brief to understand the animation requirements, includes but not limited to the following:
	    o What appears in the animation
	    o Camera angle
	    o Character poses
	    o Timing
	• Plan and prepare the animation work
	    o Animation method to use
	        ▪ Key framing
	        ▪ Skeleton
	        ▪ Procedural
	    o Select the animation software and tools for the animation work
	    o 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:
	    o Timing
	    o Anticipation
	    o Squash and stretch
	    o Charisma of the character
	    o Follow Through and Overlapping Action
	    o Secondary actions
	    o Exaggerations
	    o Arc

Functional Area - Operations Management

	• Render the animation work, if required, and package for delivery for next stage of production workflow 3. Exhibit professionalism • Apply industry best practices to create animation work that meet industry standards
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

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	Performance Requirements
	1. Knowledge for designing digital animation visual effects
	
	• 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
	
	2. Design digital animation visual effects
	
	• 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:
	    o Budget and scope
	    o Production schedule/timeline
	    o Type and complexity of the effects
	    o 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:
	    o Emitters
	    o Spawn rate
	    o Size
	    o Colour
	    o Life duration
	    o 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
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Apply industry best practices and standards to deliver the most effective design of the visual effect for the production work
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Perform motion capture
Code	107948L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who perform animation using motion caption technique in workplace. Motion capture is the process of recording actors' movements and recreating them on digital character models. The practitioner takes a hands-on supervisory role who actively conducts the motion capture animation session. This UoC can also be applied to games and cinematic production.
Level	4
Credit	4

Competency	Performance Requirements
	1. Knowledge for performing motion capture animation
	
	• Possess literacy skills that can read and interpret relevant sources of information such as: the script, animatic characters and colour model
	• Possess project and risk management skills that can complete project on schedule, without safety issues and within budget
	• Possess excellent knowledge of motion capture animation techniques with good knowledge of motion capture software tools and applications
	• Well conversed with different methods of motion capture and required equipment including its advantages and disadvantages
	
	2. Perform motion capture animation
	
	• Comprehend and clarify the motions/actions work requirement, from:
	    o Project/Production briefs
	    o Storyboards and visual references
	    o Design specification
	• Plan and prepare the motion capture shoot and subsequent production, including but not limited to the following:
	    o Create list of required motions/actions: shot name (identification), duration, priorities, number of actors, etc.
	    o Identify the best motion capture technique and tool for capturing the required motions/actions. Example:
	        ▪ Organin Motion - Motionstage
	        ▪ Vicon - Blade
	        ▪ Ipi soft - Ipi motion capture
	        ▪ Autodesk - motion capture
	    o Determine the required skills of the crew and assemble the team for the motion capture sessions
	    o Plan schedule and order the shooting running sequence to maximise performers' efficiency
	    o Determine required facilities, equipment (cameras, lighting, computer systems, software, etc.), shooting environment, etc.
	    o Gather reference materials (video or written brief) that can show the motions/actions required from the shoot
	    o Arrange props, shooting schedules, performers, etc.
	    o Prepare suits, marker and other equipment for the shoot
	• Perform capture of the motions/actions with following methods:
	    o Marker system
	        ▪ Optical tracking systems (passive and active)

Functional Area - Operations Management

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- o Marker less system
  - ▪ Tracking computer vision systems
- o Non optical method
  - ▪ Mechanical motion, Magnetic systems, Inertial system
- Edit the motion captured data to clean imperfection, alterations and enhancement
- Use appropriate motion capture animation tools to retarget/map the motions to the characters and perform required animation. Example of tools: Unity, Motionbuilder, Xsens MVN, etc.
- Save and package the animations and motion capture data for use at next stage of production

3. Exhibit professionalism

- Observe all safety procedures during motion capture sessions to ensure no unexpected safety issues occurred
- Apply industry standards and best practices for motion capture of required motions/actions that can be used for animation production in the most efficient manner

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The integrated outcome requirements of this UoC are the abilities to:

- Fully comprehend project requirements and form a complete list of motions/actions required to be captured
- Plan and prepare the motion capture sessions and activities without any impediments
- Complete the capturing of all required motions/actions and clean the captured motion data on schedule
- Map the motion-captured data characters on animation tools and complete required animations

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

Functional Area - Operations Management

Title	Understand and confirm the brief
Code	107949L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in digital media production. There can be many different briefs ranging from contractual to competition. The kind this UoC is concerned with is project brief serving as a guide for Digital Media (DM) production project which is referred to throughout the project timeline.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for understand and confirm the brief
	
	• Possess literacy skills that can read and interpret relevant sources of information such as: project plans, requirement specifications, scripts, storyboards, etc.
	• Possess good overall concept of animation and DM production
	• Good teamwork
	
	2. Understand and confirm the brief
	
	• Understand the contents of the brief related to the project work, including but not limited to the following:
	    o Introduction/overview with objectives and goals
	    o Budget and schedule
	    o Target audience
	    o Scope (deliverables), Example:
	        ▪ 2-3 minute animation
	        ▪ Music
	        ▪ Voiceover
	        ▪ 3D perspective images
	    o Available materials/required materials to help with the production work, Example:
	        ▪ Full set of working drawing - received
	        ▪ Google earth location file - received
	        ▪ Material specification – required
	        ▪ etc.
	    o Overall looks/styles/scenes, Example:
	        ▪ Opening scene – showing company logo and project name
	        ▪ Scene 1 – show gentle panning movement of apartment building
	    o Special requests or "what not wants"
	• Clarify items of the brief with other team members or clients through formal meetings, questionnaires, interviews, etc.
	• Confirm if the deliverables, the schedule/timeline and budget can satisfy the brief. Request any adjustments, if necessary
	
	3. Exhibit professionalism
	
	• Committed to fully comprehend the brief and deliver the brief's requirements in the agreed schedule and budget

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Understand the importance of brief and how it is being used

Functional Area - Operations Management

	• Comprehend and confirm the contents of the brief, including to work with team members or clients to clarify different areas of the brief and make adjustments where necessary • Ensure the DM production stages fulfilled the brief requirements
Remark	

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Unit of Competency

Functional Area - Operations Management

Title	Setup rendering farm
Code	107950L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in setting up rendering environment for animation production. To dramatically reduce render times one can create a distributed network rendering farm with multiple computers. Each computer will render a different frame of the animation, or part of the scene with the render manager controlling the submission of the jobs to rendering node. This UoC concern setup of render farm locally. However, with maturing of network technology rendering farms can be implemented in the cloud.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for setup render farm
	
	• Possess basic knowledge of animation principles
	• Possess good knowledge of computer and network infrastructure
	• Possess good understanding of animation rendering techniques
	• Updated with trends of animation rendering technologies
	
	2. Setup render farm
	
	• Preparations for render farm setup, include but not limited to the following:
	    o Comprehend the render farm infrastructure design
	    o Purchase all hardware (e.g. workstations, servers, Network Attached Storage NAS)
	    o Network connections installed and tested
	    o Render farm software purchased with license (e.g. render software and controllers)
	    o Reference manuals, installation instructions, etc.
	• Select appropriate render management software for the render farm controller. Desirable features of the render management software may include the following:
	    o Interactive Network Rendering
	    o Render across hybrid (e.g. PC/Mac) networks
	    o Automatic node detection and activation
	    o Compatible/support most of industry's common animation software, including: 3Ds Max, After Effects, Blender, Cinema 4D, Maya, Modo, etc.
	• Install and connect all the render nodes, server, and network storage (NAS) connected to the same network.
	• Install rendering software on the rendering client and install the render farm management on the controller which is used to queue/submit rendering jobs to the render nodes
	• Create a shared folder for use by the render farm (Create a folder on a node, preferably on a server or NAS that is accessible by all the other nodes which will process or use the render farm)
	• Perform necessary integration and load testing to ensure all nodes, and software are performing as expected
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Apply industry best rendering techniques and use most appropriate rendering application to achieve the best result
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Understand the render farm design and have all the necessary hardware, software and network purchased and prepared for the setup of the designed render farm • Successfully install all the rendering software on all nodes and the render controller. They are linked and can be managed by the management software on the controller • Test the render farm to ensure it fulfills the integration and expected performance required by the design
Remark	This UoC concerns setup of render farm locally. However with advancing network technology, complex 3D animation demands and affordable cloud services, organisations will consider using SAAS rendering farms

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Plan animation
Code	107951L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the related animation production work. There are many reasons to plan and there are different levels of planning and this UoC concerns the content production level, where animators just prior doing the animation of the assigned work he/she plans out the animation work. The plan will help him/her gain inspiration, to be organised, to track progress, and ensure nothing is missed, etc. The details of planning depend on the complexity of the work.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for planning animation
	
	• Possess literacy skills that can read and interpret relevant sources of information such as: the script, animatic characters and colour model, soundtrack, etc.
	• Possess basic knowledge of storyboarding or thumbnail drawing
	• Possess basic sketching skill
	• Possess good animation skills
	
	2. Plan animation:
	
	• Comprehend the script or animation brief to understand the story
	• For new animation, research internal library or public sources for inspiration of characters and rough ideas, where possible create "character sheets" or rough drawings of the following:
	    o Facial shots (e.g. angry, happy)
	    o Body angles, different movements
	    o Body special feature (e.g. scars, birth marks, etc.)
	• Plan the scenes. By review script and mark where one scene ends and the next begins, then identify the requirements of each scene including but not limited to the following:
	    o Number of characters
	    o Backgrounds
	    o Music
	    o Voiceover
	• Sketch simple storyboard/thumbnails of each scene
	• Mark timing details, taking into account time limit for the animation allowed duration. Where possible, create a "dope sheets" otherwise mark on the storyboard/thumbnail drawings.
	• Review and refine the plan, where necessary, which will be used for the animation work
	
	3. Exhibit professionalism
	
	• Apply industry best practices to ensure animation work is well planned and delivered with required quality at the required time

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully comprehend the story/script of the animation work • Plan the animation work to ensure all items of the animation work have been included and the timing of the scenes fit the requirement • Create the plan in accordance with the organisation standards or guidelines

Functional Area - Operations Management

Remark	

Specification of Competency Standards
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Unit of Competency

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	Performance Requirements
	1. Knowledge for creating character model
	
	• 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
	
	2. Create character model:
	
	• Comprehend the script/storyboard/character sheet/animation brief to understand the story and requirements of the animation
	• Preparing for modelling:
	  o Select suitable modelling software
	  o Acquire modelling materials such as:
	    ▪ Scan (laser) or import character image (front, sides and back)
	    ▪ From scratch – layout each vertex and draw all polygons for the model
	  o Acquire details about the model, such as but not limited to the following:
	    ▪ Finger count (full finger or mitten type)
	    ▪ Polygon count
	    ▪ Level of details required
	• Develop the model's body, leg and arm with relevant software
	  o Extrude the base of leg cylinder and adjusting vertices to create the feet of the model
	  o 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
	  o 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
	  o Attach the rig to the mesh to perform simple test and identify any imperfection of the model
	  o Save or export the mesh character model for use or next workflow stage of production work. The final pose follows industry practices. For example:
	    ▪ 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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Functional Area - Operations Management

	▪ 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. 3. Exhibit professionalism • Committed to produce high quality animation production • Apply industry best practices to create mesh characters for animation work
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

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	Performance Requirements
	1. Knowledge for applying texture
	
	• 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
	
	2. Apply texture:
	
	• 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:
	   o Digital sculpting
	      ▪ Zbrush
	      ▪ Mudbox
	   o 3D painting
	      ▪ Bodypaint 3D
	      ▪ Mari
	   o UV mapping
	      ▪ Maya
	      ▪ Roadkill UV Tool
	      ▪ Diamant Modeling Tools
	   o Map generation/baking
	      ▪ 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:
	   o Wrap
	   o Paint
	   o 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
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• 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	The integrated outcome requirements of this UoC are the abilities to: • 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	

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	Performance Requirements
	1. Knowledge for performing lighting
	
	• 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
	
	2. Perform lighting:
	
	• 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:
	    o Illumination
	    o Key light
	    o Shadows
	    o Interior shots
	    o Exterior shots (sunlight)
	    o Light entrance to a room
	    o Direction of light
	• Determine the suitable lighting method to use for scene, such as:
	    o Simulated light technique
	    o 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:
	    o Three point lighting
	    o Radiosity
	    o Light Tracer
	    o Photon mapping
	• Manipulate and combine lighting options to achieve the required effects, include but not limited to the following:
	    o Point/Omni light
	    o Directional light

Functional Area - Operations Management

	o Spot light
	        o Volume light
	        o 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
	
	3. Exhibit professionalism
	
	 • Apply industry best practices and use current technologies to create the right effects for scene or character model

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

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	Performance Requirements
	1. Knowledge for creating environment for digital animation
	
	• 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
	
	2. Create environment for digital animation
	
	• Comprehend the script/story/project brief and work with concept designer or supervisor to understand the environment design and requirements
	• Prepare for modeling
	    o Acquire all digital assets to be used for the environment creation
	    o Acquire reference material (e.g. pictures, drawings, etc.)
	    o Select software that best suited for the production work, such as:
	        ▪ 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:
	    o Experiment with lightings
	    o Camera angles
	    o 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
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Apply industry best practices and standards to create and deliver the required environment on time
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

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

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	Performance Requirements
	1. Knowledge for performing rendering of animation
	
	• 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
	
	2. Perform rendering of animation
	
	• Comprehend and grasp the animation work requirements, from:
	    o Project/Production briefs
	    o Storyboards and visual references
	    o Design specification
	• Select suitable animation rendering software/tool for the job, such as:
	    o 3Ds Max
	    o Blender
	    o Maya
	• Define setting in the rendering software, include but not limited to the following:
	    o Render size (X/Y resolution and percentage slider)
	    o Frame Range (start and stop position)
	    o Frame rate
	    o Pixel aspect ratio
	    o 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
	
	3. Exhibit professionalism
	
	• Apply industry best rendering techniques and use most appropriate rendering application to achieve the best result

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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

Functional Area - Operations Management

	• Complete render of all images to high quality output and to final video as required by the design specification
Remark	

Functional Area - Operations Management

Title	Perform Keyframe 3D animations
Code	107957L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who use keyframing for 3D animation in workplace. The practitioners specify a set of keyframes and use computing interpolation (tweening) to assist the animation process. Interpolation should be based on some type of parameterised spline (Hermite, Bezier, B-spline, ...) and adjusting different parameters to produce character/model with the desired effects
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for Performing keyframe 3D animations
	
	• 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 3D animation principles
	• Understand animation keyframe principles, differences between hand drawn keyframe vs computer keyframe techniques in addition to their advantages and disadvantages
	• Knowledge of 3D animation software tools and applications, such as: Maya, 3Ds Max, Blender, Lightwave, etc.
	• Updated with computer 3D animation technology and trends
	
	2. Perform keyframe 3D animations
	
	• Comprehend and clarify the 3D animation work requirement, from:
	    ○ Project/Production briefs
	    ○ Storyboards and visual references
	    ○ Design specification
	• Plan animation approach including keyframes for character's actions and identify whether any and what drawings will be needed to be drawn in order to animate the scene or action
	• Select and use appropriate 3D animation software for keyframing of each 3D model/character/scene
	• Create movements by specifying set of keyframes parameter, including but not limited by the following:
	    ○ Position and orientation
	    ○ Body deformation
	    ○ Facial features
	    ○ Hair and clothing
	    ○ Lighting
	• Specify type of interpolation, such as: linear, cubic, parametric curve, etc.
	• Specify speed profile of interpolation such as: constant velocity, ease-in ease-out, etc.
	• Adjust interpolation settings to generate in between frames
	• Review output with relevant people. Respond positively to feedbacks and make adjustment or refinements as required
	• Save and store the output to required format for use at next stage of production
	
	3. Exhibit professionalism
	
	• Apply industry best current 3D animation techniques to produce the animation production that complied with the industry and the organisation standards

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

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • fully comprehend the design brief and production requirements as well as taking initiatives to clarify requirement ambiguities • select the most suitable 3D animation software/tools that enable keyframe production • specify appropriate set of keyframe parameters for the 3D animation production and use adjusting interpolation setting to generate in between frames • review output with appropriate people and package output for next stage of production as specified by the production requirement
Remark	

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

Functional Area - Operations Management

Title	Create duplicate objects with procedural animation
Code	107958L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with performing animation production. There are many cases where multiple instances of same or similar objects are required in an animated scene such as a flock of birds, 4 legs of a table, etc. Creating large number of objects by hand is not only a tedious task but also quite tricky, at least if the animator would need to maintain perfect spacing, angles, etc. among all the objects. Fortunately, there are tools for duplicating objects and with procedural animation, multiple instances can be animated.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for creating duplicate objects with procedural animation
	
	• Possess good knowledge of animation techniques
	• Possess good knowledge of procedural animation programming
	• Possess good knowledge of object duplication techniques
	• Good experience in operating animation software and object duplication tools
	
	2. Create duplicate objects with procedural animation:
	
	• Comprehend the animation requirements, such as:
	   o Number of instance of the same object
	   o Motion requirements and parameters of the objects
	   o The type of procedure animation technique to use (depends on the object that is being animated), such as:
	      ▪ Mechanics simulation for rigid bodies and shapes
	      ▪ Inverse kinematic for character movements
	      ▪ Chaotic functions for textures
	• Select animation software/tools that provide the functions for duplication of objects. The original object may be created with a different software or tool and imported to a different tool for the duplication process
	• Select the object in the scene and select the duplication function needed to create multiple copies of the object. For example:
	   o "Linked Duplication" – all parameters of the parent object are linked with the child object i.e. parent and child, looks, and movements are identical and in unison
	   o "Partial Duplication" – only certain parameters are linked, such as texture, colour, etc. Others parameters can be independently set, meaning the object looks alike but motion and others can be different
	   o "Unlinked Duplication" – every parameter except the object
	• Adjust or reprogram the parameters of individual objects until the required effects are achieved
	
	3. Exhibit professionalism
	
	• Be updated with current animation technologies and techniques

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to:

Functional Area - Operations Management

	• Select the correct procedural animation technique to create duplication of objects for animation work • Use the correct duplication function provided by the tools to perform the duplication of objects • Adjust or program the objects to create the required animation effects for the production work
Remark	

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

Functional Area - Operations Management

Title	Create rig for 3D character animation
Code	107959L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the 3D animation production work. Before any kind of advanced animation can happen, a rig must be built. A rig consists of bones and joints (skeleton) inside a character model which allows the animator to move the character model smoothly and precisely.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for creating rig for 3D character animation
	
	• Possess literacy skills that can read and interpret relevant sources of information related to the character animation
	• Possess good communication skills to collaborate with modellers and animators
	• Possess detail knowledge on operating character modelling software
	• Possess good animation concepts and techniques
	• Possess good rigging skills and good knowledge of different rigging techniques
	• Possess basic knowledge of body anatomy movement
	
	2. Create rig for 3D character animation
	
	• Comprehend the script/storyboard/character sheet/animation brief to understand character animation requirements
	• Prepare for rigging:
	    o Select suitable modelling software
	    o Acquire the character model
	• Load the previously prepared character model into the animation software and perform some basic checking and adjustments prior performing rigging, for example:
	    o Is the model in neutral pose?
	    o Is the model in scale with others characters in the scene?
	    o Is the model centred over the axes
	• Create all character model's joints/bones and connect them together to form the rig structure (skeleton), such as:
	    o Neck and head
	    o Spine (backbone)
	    o Arms and legs
	    o etc.
	• Create Inverse Kinematics (IK) handles for the joints/bones to allow independent control during animation
	• Set up controls of the rig by parenting objects to joints/bones and add controls to limit/constraint IK handles actions or movements in relations to parented objects, such as the arm movement is controlled by elbow and hand. A "top control" may be created to allow animator to control the whole rig movements
	• Finalise the rig by testing, with the character model, to ensure it can provide the necessary movement controls required for the animation process
	
	3. Exhibit professionalism
	
	• Apply industry best practices for rigging to deliver the necessary controls that allow the animator to easily and correctly perform the animation task

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Fully comprehend the animation requirements of the character model, such as what type of controls and the constraints of the movements, etc. - Create sufficient joints/bones and controls for the rig that enable the animator to have all the controls it needed to perform his/her animation - Complete and deliver the character model in the format comply with industry standard and matches the requirement for next stage of production work
Remark	

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

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	Performance Requirements
	1. Knowledge for producing basic 2D animation
	
	• 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
	
	2. Produce basic 2D animation
	
	• Comprehend and clarify the 2D animation requirement from:
	   o Project / Production brief / Design specification
	   o Storyboard and visual reference
	• Comprehend the animation work including:
	   o Select the most appropriate 2D animation software / tools, such as: Photo-shooting, stop motion, or computer generated, etc.
	   o Apply the animation principles into motions, such as: squash and stretch, anticipation, etc.
	• Produce animated sequence, including:
	   o Import or generate key drawings for required actions
	   o Produce the sequence by applying different techniques, such as: various visual effects, combining or removing objects, adding frames, etc.
	   o 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
	
	3. Exhibit professionalism
	
	• Apply the industry best compression technology to ensure digital media content production complied with the organisational standards

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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

Functional Area - Operations Management

	• 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	

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

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	Performance Requirements
	1. Knowledge for producing 3D animation
	
	• 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
	
	2. Produce 3D animation:
	
	• Comprehend and clarify the 3D animation requirement from:
	   ○ Project / Production brief / Design Specification
	   ○ Storyboard and visual reference
	• Comprehend the 3D animation work including:
	   ○ 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:
	   ○ 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
	
	3. Exhibit professionalism
	
	• Apply the industry best compression technology to ensure digital media content production complied with the organisational standards

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully comprehend the design brief and production requirements as well as taking initiatives to clarify requirement ambiguities

Functional Area - Operations Management

	• 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	

Functional Area - Operations Management

Title	Manage digital AV production
Code	107962L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible for managing Digital Audio Visual production work. In this UoC, production implies the actual creation work of the 3 stages (pre-production, production and post-production) of AV production.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for managing digital AV production
	
	• Possess good people management and interpersonal skills
	• Possess excellent knowledge of video production processes and methodologies
	• Possess good project management skills including: planning, scheduling, implementing, monitoring and delivering
	• Possess good experience of managing different DAV production stages and workflows
	
	2. Manage digital AV production:
	
	• Comprehend the project brief to grasp the objectives and type (TV, training, event, film, etc.) of the production work, the magnitude of the project, budget and delivery format and schedule
	• Understand the script and the story of the project and manage various tasks listed but not limited in the 3 stages of digital AV production:
	• Pre-production
	    o Plan technical, equipment and manpower requirements of the production work
	    o Manage the creation of storyboarding
	    o Identify and line-up resources for production work
	    o Setting timeline and deadline for various tasks
	• Production
	    o Facilitate filming/shooting process
	    o Transform linear contents to non-linear format
	    o Supervise creation of digital audio and effects
	    o Source other digital assets
	• Post-production
	    o Oversee the assembling of full production (digital video/movie)
	    o Perform acquisitions of assets for the production work
	    o Supervise editing process, cleaning, colour, etc.
	    o Supervise voiceover and addition of sound and special sound effects
	    o Oversee the addition of computer-related graphic, visual and special effects
	    o Ensure tasks completed as scheduled and meet deadline
	    o Ensure production work adhere to compliance requirements
	    o Work with marketing and publicity department to develop promotion materials
	• Present the completed production, with documentation, for next stage of the project
	
	3. Exhibit professionalism
	
	• Apply industry best practices and techniques as well as being updated with trend of digital AV production to manage digital AV production projects to deliver high quality of production work without exceeding the budget or schedule

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Comprehend the production brief and the project requirements enabling him/her to develop a comprehensive plan showing all tasks that covers the DAV production stages - Identify the resources required for the DAV production work and well schedule them to enable the work to complete with no delay - Produce quality production work to meet the project requirement and the organisation's standard
Remark	

Functional Area - Operations Management

Title	Perform compositing
Code	107963L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Digital compositing is an essential part of visual effects in video games production. The practitioner's task is to take different elements, no matter how they were created, and blends them together seamlessly, photorealistic as a whole, and make them appear as if they were all shot together at the same time, under the same lights with the same camera, then give the shots a final artistic polish with colour correction.
Level	5
Credit	6
Competency	Performance Requirements 1. Knowledge for performing compositing - Possess good communication skills that can communicate effectively with various stakeholders, including: matte painters, colourists, Computer-generated imagery (CGI) artist, art director, etc. - Possess good literacy skills that can read and interpret work requirements - Possess good knowledge and experience of compositing visual effect techniques, including: chroma keying, rotoscoping, morphing, etc. - Possess good knowledge of CGI compositing as well as CGI production techniques - Possess extensive knowledge of compositing software and tools - Possess excellent editing skills particularly with fine details 2. Perform compositing - Comprehend the script/storyboard/project brief and work requirement to understand the compositing requirements. Where necessary clarification with stakeholders may be required, including but not limited to the following: - Confirm type of compositing work (visual effects or/and CGI) - Node based or layer based - Delivery schedule - Preparation for compositing - Evaluate the compositing job requirement and create a work plan, coordinate with other stakeholders, if necessary - Acquire all the elements (images, animations, blue screen shots, etc.) for compositing work - Setup compositing hardware/software and tools depending on the type of hardware and functions required for the compositing work. For example: Flame and Inferno for dedicated hardware or Shake and After Effects for desktop based - Using composition systems/software to create nodes or layers to link all the elements of the video sequence - Perform CGI compositing - CGI over live action background - Set extension - Match move (live action camera matching CGI camera shots) - Perform visual effects including but not limited to the following: - Chroma keying (bluescreen compositing) - Motion tracking - Warping and Morphing - Crowd duplication

Functional Area - Operations Management

	o Atmospherics
	     o Rotoscoping
	     o Wire removal
	     o Scene salvage (fixing damaged shots or scenes)
	• Preview and perform colour and/or other corrections until satisfied with result
	• Render and save in the required format for work sign off
	
	3. Exhibit professionalism
	
	• Apply industry's best practices and technical knowhow to composite disparate elements created from difference sources and seamlessly integrated as a total realistic video scene without visible flaws

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Communicate with various stakeholders and fully grasp the compositing work requirements • Analyse the compositing work requirements and formulate a work plan, as well as prepare the compositing equipment and digital assets for the editing work, ensuring no adverse effect or delay during editing • Apply appropriate compositing techniques to produce the visual effect and quality that satisfies the work requirements
Remark	

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	Performance Requirements
	1. Knowledge for creating digital visual effects
	
	• 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/plug-ins
	
	2. Create digital visual effects
	
	• 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
	    o Matte painting
	    o Rotoscoping
	    o Particle effects
	    o Chroma keying,
	    o Morphing
	    o Computer graphics in lighting, texturing
	    o 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:
	    o Designing
	    o Prototyping
	    o Programming
	    o 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

Functional Area - Operations Management

	• Export the completed video sequence with VFX and package with original video sequence for work sign off 3. Exhibit professionalism • Apply industry's best practices and be current with VFX technologies and tools to create the required visual effects for video
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Edit digital AV production
Code	107965L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with editing digital audio visual (DAV) production. After the AV content has been imported into a computing system, it can be edited. Editing is the process of choosing which picture, scene, and sounds will go into the final production, then make fine adjustment, correction, add effects, etc. Normally it will involve several cuts (Rough, Main and Final) with refinements at each cut. This UoC will list editing competence in general and does not make any reference at where or what stage of the editing process.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for editing digital AV production - Possess good reading and interpersonal skills to comprehend the production requirements and work with others - Possess good knowledge of DAV post-production workflows - Possess good experience of managing different DAV production stages and workflows - Able to operate computing editing systems, electronic titling systems, video switching equipment and digital effects units - Possess good knowledge of the organisation standards and procedures for DAV editing 2. Edit digital AV production: - Comprehend the project brief and/or scripts to become familiar with production requirements - Prepare for editing, ensuring backup for master copy was performed, editing equipment set, other digital assets (audio, video effects) are available - Review footage sequence by sequence to become familiar with it before selecting for editing - Perform editing, include but not limited to the following: - Separating (segmenting; add edit, make subclip), cut shot sequences to different angles at specific point in scenes - Linking (sequencing, adding) - Selecting (select, activate, mark in /mark out), select and combine most effective shot and scenes in order to form a logical and smooth running order, according to the script - Inserting (substitute, joining), insertion of addition effects (audio and video) or other scenes - Removing (noise reduction and eliminating, extract) - Replacing (colourisation, permutations, replace, overwrite) - Making longer or shorter (expand and compress, trim, slip, slide) - Perform fine adjustments to ensure perfect frame accuracy for every single edit in the production and make sure each moment flows as best it can - Collaborate with music editor to select appropriate music and piece sounds together to develop soundtracks - Review the edited production with other colleagues to determine that all requirements have been satisfied and ready for next stage of production

Functional Area - Operations Management

	3. Exhibit professionalism • Apply industry best practices and new technologies for digital video editing • Ensure the production work is completed to the required standard and perfection
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Be well prepared for the editing process, including comprehending the script, project brief, setup of equipment and its availability • Perform the editing to fulfil the production requirement and exhibit no detectable visible faults • Collaborate with others to develop additional items for the editing process or assist in the review of edited production
Remark	

Functional Area - Operations Management

Title	Create customised audio effects
Code	107966L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the audio effects production work. Sound effects are used for many purposes in various digital media production to set the mood, introduce important elements of the plot, or even intentionally confuse or mislead audiences. This UoC describes the competence in creating customised audio effects, from recording to applying effects. Although this is mainly for video production but many of the competences can be applied to other digital media productions, such as games.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for creating customised audio effects
	
	• Possess good communication and coordination skills for organising audio recording/capturing sessions and communicating of ideas
	• Possess experience with setting up microphones and recording equipment
	• Possess good knowledge of sound editing software
	• Possess detail knowledge of audio effects creation and production techniques
	• Possess sound design and creativity experience
	
	2. Create customised audio effects
	
	• Comprehend the audio effects requirements from work order and plan how to produce the best audio effects for the scene, tasks including but not limited to the following:
	    o View the storyboard/script to determine what effects are needed
	    o Plan how to produce the audio effects
	        ▪ Field recording
	        ▪ Foley studio
	• Record or capture a sound clip
	    o Research and scout best recording location to avoid sound overlapping caused by people, birds, insects, etc.
	    o Choose the right equipment for the job and location
	    o Decide how to record the audio clip during shooting
	• Master the audio effect by editing raw field recorded audio clips, it includes but not limited to the following:
	    o Edit, trim and apply fades
	    o Modify the level or loudness of sound
	    o Remove imperfections and sound distracts
	    o Apply filters and equalisation to remove unwanted parts or highlight some aspects over others
	    o Enhance sound with processing plugin to give it new characteristics
	• Provide name and embed metadata for the audio effect
	    o Provide unique and descriptive name, that is accurate and useful, for the audio effect
	    o Embed metadata to provide greater details of the audio effects for ease of identification, use and locate when it is held in a library. Metadata may include but not limited to the followings:
	        ▪ Description (full details),
	        ▪ FXName (friendly name)
	        ▪ Category and sub-category

Functional Area - Operations Management

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▪ Location and source
▪ Designer

Apply audio effects

○ Select and insert audio effects into appropriate sound tracks of the editing software, adjusting duration of the audio effect to match visual
○ Adjust audio editing plugin controls to achieve further effects with Compression (loudness), Delay, Equalisation, Reverberation/Reverb, etc.

3. Exhibit professionalism

Apply industry's best practices and techniques to create audio effects and use audio effects to enhance digital media effects

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<tr>
<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

Plan the steps required for the creation of the audio effects for the video sequence
Record raw audio clip with minimum sound distraction and use audio editing systems to master the raw audio clip to produce the desired audio effect that is completed with the required metadata conformed to the organisation standard
Apply the audio effects to the video sequence to create the desired effects

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

Functional Area - Operations Management

Title	Perform colourisation of digital video sequence
Code	107967L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Colourisation is one of the last steps and one of the most important steps in preparing the video for output. It can involve from correcting improper white balance, making shots visually consistent from clip to clip (shot matching), to introducing new colour themes creating dramatic effects and visual tone to the video. In this UoC, the term colourisation includes 2 workflows of the post production process, colour correction and colour grading. Colour grading requires more creative decision making but the process uses the similar tools and skills as of colour correction.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for performing colourisation of digital video sequence - Possess good knowledge of colourisation concept - Possess detail operation skills of current digital video editing software - Possess good knowledge and experience of digital video editing and enhancement techniques - Possess good knowledge and able to operate different colourisation filters/plug-ins 2. Perform colourisation of digital video sequence: - Comprehend and clarify colourisation work order requirement - Preparing for colourisation - Calibrate monitors to prevent colour shifting - Make a backup of the video sequence - Setup hardware and editing software - Install/Setup additional colourisation filters/plugins - Plan "Primary" and "Secondary" colourisation work in order to maintain image quality. For example: - Remove artefacts and de-noise - Balance shots by adjusting BLACK/MID/WHITE, SATURATION, and WHITE BALANACE - Realign shots - Add gradients, diffusion and other filters - Add vignettes - Grade the images - Resize and sharpen - Apply primary colourisation to correct luminance and chroma of the video sequence - Perform secondary (narrow range) colourisation of selected objects of the video sequence, such as: background, grass, face, windows, etc. - Perform additional colour grading as required by the work order, if any. Manipulate with filters/plugins within the editing software and decide which colourisation adjustments will give the desirable effects that is required by the work order - When satisfied with the colourisation result export the new video sequence for signoff and perform post editing administration (example: documentation, recoding of settings, etc.) as required by organisation

Functional Area - Operations Management

	3. Exhibit professionalism • Apply industry colour standards, such as ICC and RGB, to ensure consistent colour appearance across equipment and enable universal communication
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Grasp and clarify the colourisation work requirements • Be well prepared for the colourisation work, by having all the equipment and software installed and ready, including colour calibrating monitors • Plan and perform colourisation without degrading image quality • Complete and sign off the colourisation work on schedule
Remark	

Specification of Competency Standards
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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	Performance Requirements
	1. Knowledge for performing enhancement of digital video
	
	• 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/plug-ins
	
	2. Perform enhancement of digital video:
	
	• Comprehend work order to determine work requirements of video enhancement, including but not limited to the following:
	   o De-shake
	   o Blur
	   o Soften and smooth adjust
	   o Brightness, contrast, hue or saturation
	   o 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,
	   o Acquire the original video
	   o Acquire the appropriate hardware and editing software, including filters/plugins for the video enhancement
	   o 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
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Apply industry best practices and use current video enhancement technologies to improve video quality
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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	

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Conduct technical support for marketing
Code	107969L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners. It is common that IT technical production team is required to provide various ad-hoc support to customers or other internal departments related to their area of expertise or project work involvement. This UoC concentrates on DMT practitioners providing support to the organisation marketing activities, ranging from just providing simple technical advice to developing materials for marketing campaigns
Level	4
Credit	6

Competency	Performance Requirements
	1. Knowledge for conducting technical support for marketing
	
	• Possess good communication and interpersonal skills to work with marketing team and understand their requirements
	• Possess strong knowledge on digital media production, delivery, theories, technologies, principles, concepts and methodologies, particularly in their area of production work, such as video editing for digital video production or programming for games production
	• Possess basic knowledge of marketing techniques and methodologies (traditional and online)
	• Possess basic project management skills
	• Capable of working with all level of stakeholders
	
	2. Conduct technical support for marketing
	
	• Liaise with relevant marketing colleagues to determine the nature and the scope of technical support required, including but not limited to the following:
	   o Provide technical advice for marketing activities
	   o Prepare promotional materials related to participated projects
	      ▪ Create a short demo release of the game or trailer/excerpt of video for marketing purpose
	      ▪ Extract images from the game or video
	   o Participate with roadshow demos or presentations
	• Evaluate the effort and plausibility of requested marketing support
	• For large or long duration supports, prepare a work plan, schedule and estimate of supporting resources requirements for supporting the marketing activity. Presentation of work plan and ideas may be required
	• Implement the supporting activities when all parties are satisfied with the work plan and agree on schedule. Implemented activities including but not limited to the following:
	   o Organise IT team to assist marketing activities
	   o Cut certain footage from video for creation of trailer
	   o Program an auto demo of the game
	   o Take snap shot of characters from game/video for posters/brochure production
	   o Package promotional materials for use in marketing activities
	• Review implemented results with marketing team to determine area for improvements
	
	3. Exhibit professionalism
	
	• Always willing to cooperate with any parties for the interest of the organisation
	• Apply industry best practices and techniques to support marketing activities

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Communicate effectively with marketing colleagues to understand their supporting needs • Provide plausible technical support solutions or provide technical advice in the implementation of marketing activities that can increase the effectiveness of the marketing activities • Systematically carryout reviews of supporting efforts provided to marketing activities and its effectiveness
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Operations Management

Title	Prepare for digital video capture
Code	107970L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with digital audio visual (DAV) production. Prior editing can be performed on the AV content, it is needed to be digitised, and/or transformed into a format that is fit for editing. This UoC concerns the competence for preparing the AV contents for digitisation into digital form. AV content can be traditional film video clips or other linear video content.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for preparing for digital video capture
	
	• Possess good knowledge of DAV post-production workflows
	• Possess good administrative skills and experience of managing different DAV production stages and workflows
	• Able to operate digital video capture hardware and software
	• Possess good knowledge of the organisation standards and procedures on metadata for digital resource management
	
	2. Prepare for digital video capture
	
	• Comprehend the project brief to grasp the digital capture requirements, included but not limited to the following:
	   o Determine what content is being captured
	   o Determine the format of incoming content (film/video) from the production stage which could be traditional camera capture format or the video clip format
	   o Determine the digital requirements for next stage of post-production work
	      ▪ Where is it used:
	         ▪ Internet/Web used
	         ▪ Further editing
	         ▪ Streaming/DVD
	      ▪ Compression bitrate
	      ▪ Type of CODEC for viewing/playback
	   o Determine the work schedule
	• Plan the DAV capture work
	• Organise the AV contents in accordance with the project and organisation standards including:
	   o Naming
	   o Batch and sequence of work
	   o Location
	   o Storage
	• Commission and setup the appropriate hardware and software for the DAV capture, ensuring it can support the input and output requirements
	• Update required task documentation, with completion status, to proceed to next stage of workflow
	
	3. Exhibit professionalism
	
	• Apply industry best practices for digital video capturing and to ensure the preparation work is of highest standard meeting the organisation in industry standards

Specification of Competency Standards
for the Information & Communications Technology Industry
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Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Comprehend the production brief and understand all the requirements in the preparation for the digital video capture process - Follow the organisation metadata standards and procedure to organise the AV contents before and after the DAV capture process - Prepare the hardware and software correctly and effectively to enable no hindering of DAV capture process
Remark	

Functional Area - Operations Management

Title	Synchronise digital audio with video
Code	107971L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the audio editing production work. For professional video production projects audio is captured separately with high quality recording equipment to capture only the audio that is wanted and not environment distracts. The practitioner is required to add in the sound track and synchronise the audio with the video.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for synchronising digital audio with video
	
	• Possess good literacy skills that can comprehend work requirement
	• Possess good knowledge of fundamentals of audio production
	• Possess good knowledge of digital audio concepts and editing techniques
	• Possess strong editing skills in operating audio editing software
	• Possess good knowledge of CODEC
	
	2. Synchronise digital audio with video
	
	• Comprehend the audio editing requirements from work order
	• Plan and prepare for the editing work, including:
	  ο Setup the hardware and editing software
	  ο Collect all the video (containing original audio recording)
	  ο Separate audio clips
	  ο Backup video clip before editing
	  ο etc.
	• Load or import the video into the "timeline" of the editing software. Do not remove the original camera audio as it can be used for references or comparison purpose
	• Load and drag the audio clip into "timeline" of editing software
	• Locate the synchronisation point which could be the spike of a clap sound (created by clapboard) or a spike that matches the original camera audio
	• Synchronise the video with the synchronisation point
	• Review the video with synchronised new audio clip. Align new audio clip left or right for precise synchronisation, if needed
	• Once achieved satisfactory synchronisation, discard the original camera audio
	• Render the video with new sound clip and save in the required format for signoff
	
	3. Exhibit professionalism
	
	• Apply industry's best practices and techniques for audio editing to ensure audio is perfectly synchronised with the video
	• Adhere to operation safety procedures when working with editing equipment

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Plan and prepare the audio synchronisation work so that whole editing process proceeded without issues or delay • Select the most effective method to locate the synchronisation point of the audio • Complete synchronisation of the separated audio with video without any apparent delay or appeared out of sync issues

Functional Area - Operations Management

Remark	

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

Functional Area - Operations Management

Title	Apply transition effects
Code	107972L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Transition is the "blending" of two video or image sequences to a smooth flow, a merging of the video clips. Almost all video editing software provides some kind of transition effect functions and makes the editing task to be simple and easy but all video editing practitioners must have a good understanding of how to make effective transitions.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for applying transition effects
	
	• Possess basic literacy skills that can read and follow work requirements
	• Possess good knowledge and experience with video transition techniques
	• Capable of operating video editing software
	
	2. Apply transition effects
	
	• Comprehend the work order to understand the transition editing requirements. May require to refer to reference materials for detail understanding of the required output effects, such as: production script, storyboard or supervisor
	• Load/import/drag the 2 clips into video editing software
	• Locate the transition library and the required transition, such as:
	    o Crossfade (dissolve)
	    o Wipe
	    o Cut
	• Drag the transition, placing it in between the 2 clips and make appropriate adjustment to settings, if any. For example:
	    o Duration/length
	    o Speed
	    o Direction
	    o etc.
	• Adjust audio to match the transition. For example: If you slowly fade into a video and the audio plays normally throughout the fade would not be acceptable. The audio level need fad out or fad in to match the transition
	• Preview and re-adjust transition settings, if necessary
	• Render and save the movie file in the required delivery format
	
	3. Exhibit professionalism
	
	• Apply industry's best video editing practices to apply required transition effects to ensure the intended effects were achieved and no over-use of transitions that confuse the video scene

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Grasp the work requirements with indication of required transition effects and settings for joining video clips • Operate editing software and make correct settings to complete initial transition process • Judge and fine tune transition effects between clips and adjust audios to match the transition

Functional Area - Operations Management

Remark	

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Functional Area - Operations Management

Title	Perform titling
Code	107973L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved with performing titling in digital audio visual (DAV) production. Title sequences contribute both information and atmosphere to a production and form a very important part of the post production. This UoC concentrates on competences on customisation of titling sequence. Competences for creating titling sequence can also be applied to trailer sequence.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for performing titling
	
	• Possess good administrative skill
	• Possess good knowledge of DAV post-production workflows
	• Possess good knowledge of titling design
	• Possess good knowledge of typography
	• Able to operate digital video capture hardware and software
	• Possess good knowledge of the organisation guidelines for titling production
	
	2. Perform titling
	
	• Comprehend the project brief and work with titling designers to grasp the titling (and trailer) sequence requirements, such as type (text based, animation, etc.), duration, format, etc.
	• Select suitable software for editing, such as:
	   ○ Photoshop
	   ○ After Effects
	   ○ Illustrator
	• Select the appropriate typeface taking in considerations but not limited to the following:
	   ○ Readable on screen
	   ○ Thematically appropriate for the subject matter
	   ○ The size not too small that distort when shown on big screen or cannot be seen on mobile devices
	   ○ Space between characters and space between lines
	   ○ Separation between title and background
	   ○ Edit in "title safe" area
	• Create title graphics with images applications also taking into consideration of the following:
	   ○ Alpha channel in image editor and need to be exported
	   ○ Distortion of "non-square" pixel in image editor
	• Set effect of title
	   ○ Text fading in and out
	   ○ Roll (scroll from bottom to top)
	   ○ Crawl (from one side to another)
	   ○ Thin, fat fonts
	   ○ etc.
	• When satisfied with completed title sequence, export the title sequence, in the required format for insertion to main production

Functional Area - Operations Management

	3. Exhibit professionalism • Create title sequences using industry best practices and techniques and deliver the effects that was required by the production brief
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Work with title designer and study the production brief to fully grasp the requirements of the title sequence • Produce the title sequence that set the stage of the broadcasting production, provide information about the production and set the mood and impacts that was required • Follow and apply organisation's guidelines and procedures while editing the title sequence and deliver the expected results
Remark	

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Functional Area - Operations Management

Title	Perform noise reduction of digital video sequence
Code	107974L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Video image noise can be apparent during the video capturing stage and can cause issues for adding effects or viewing. With advanced functions provided by video capturing equipment, there is a choice at where noise removal (de-noise) can be performed but this UoC is mainly concerned with post production stage of noise removal.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for performing noise reduction of digital video sequence
	
	• Possess good literacy skills that can read and interpret work requirement
	• Possess good knowledge of digital video de-noise techniques
	• Possess good knowledge and able to operate different de-noise filters/plug-ins
	• Possess good knowledge of different effects of image noise
	• Possess basic knowledge of the organisation's sourcing policies
	
	2. Perform noise reduction of digital video sequence:
	
	• Comprehend work order to determine work requirements, including what noise correction is required and where in the video sequence appears
	• Load the video sequence into a video editor/viewer to inspect and verify location of noise. If necessary, mark the location for noise removal
	• Identify the noise type that appears on the video sequence. Noise type may be:
	   o Fixed pattern noise
	   o Random noise
	   o Banding noise
	• Identify suitable noise reduction technology to use for enhancing the video sequence, such as:
	   o Spatial noise identification and reduction
	   o Temporal noise identification and reduction
	• Identify and seek the suitable software and filter/plugin for the appropriate noise removal without degrading the video image. For example: Neatvideo, Video Denoise, etc.
	• Adhere to guidelines of noise reduction filter/plugin on "dos and don'ts" to achieve best results, For example:
	   o Perform brightness first
	   o Never change image size or resolution before de-noised
	   o Interlaced video should be de-interlaced before de-noised
	   o Don't use more than one noise reduction filter/plugin
	   o etc.
	• Initiate de-noising of video image with appropriate settings
	• Inspect result and perform sharpening procedures if the de-noising process creates too soft video images
	• Export the completed de-noised video sequence in the required format and package with original video sequence for work sign off
	
	3. Exhibit professionalism

Functional Area - Operations Management

	• Apply industry best practices and use current de-noise technologies to remove common noise imperfections from digital video images
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Determine the requirements of the noise removal work • Identify and confirm the type of noise on the video sequence to select the correct software filter/plugin to be used for the de-noise process • De-noise the video sequence to an acceptable quality that can be signed off
Remark	

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Functional Area - Operations Management

Title	Select digital video capturing device
Code	107975L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Most video capturing device share similar feature, taking video (input element) from some external device and transform into an editable format (output element). However, it is not easy as it sounds, there are many factors the practitioner needs to consider before selecting a suitable capturing device. The capturing device can be an external device or an internal (within the computer) add on captured card. The video may be analog or digital. The selection task, in this UoC, implies making a recommendation rather than performing purchasing.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for selecting digital video capturing device
	
	• Good communication skills to liaise with vendors and suppliers
	• Possess good knowledge of video capture concept and techniques
	• Possess good equipment sourcing and evaluation techniques
	• Possess basic knowledge of the organisation's sourcing policies
	
	2. Select digital video capturing device
	
	• Comprehend the video capture work requirements which determines the output element of capture process, factors including:
	    o Required output media type
	    o Compression details
	    o Any enhancement required
	• Gather the source video information which is the input element of the capture process such as:
	    o The format (analog or digital)
	    o Video player's output connection ports (composite, s-video, firewire, HDMI, etc.)
	• Determine and define a list of features required and a list of optional features required from the capturing devices, such as but not limited to the following:
	    o Capture resolution
	    o Capture speed
	    o Data transfer rate
	    o Compression capabilities
	    o Editing functions
	    o Multiple screen viewing functions
	    o Connection compatibilities/capabilities for connect to external devices
	    o Cost
	• Determine and understand organisation sourcing policies that influence sourcing decisions, policies include:
	    o Compliance
	    o Security
	    o Standard suppliers
	• Use different channels to source suitable capture that matches the defined feature list, sources include:
	    o Internet
	    o Suppliers

Functional Area - Operations Management

	• Formulate a list with comparison features and price of suitable devices that matches featured list and complied with the organisation's sourcing policies for approval 3. Exhibit professionalism • Be updated with new video capturing technologies and trends and taking into these factors into consideration when sourcing for capturing equipment • Always adhere to the organisation policies and guidelines when sourcing and purchasing equipment
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Determine the requirements of the input and output elements of the video capture work • Define a complete list of required function and features that is required from the sourcing capturing device • Source and produce a comprehensive comparison list with recommendations that fulfill all required factors
Remark	

Functional Area - Operations Management

Title	Compile clips to form digital video sequence
Code	107976L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. A very important part of post-production in Digital Audio Visual (DAV) production is to assemble all the clips and form a continuous video. The joining of nonlinear clips are easy, but to deliver the expected effects and outcome of the final video will need to understand the thoughts of the script, storyboard and various stakeholders to ensure the assembling process has delivered the expected results.
Level	3
Credit	3
Competency	Performance Requirements 1. Knowledge for compiling clips to form digital video sequence - Possess literacy skills that can read and interpret project plans, scripts, storyboards, requirement specifications, etc. - Possess detailed knowledge on invisible cut (continuity) and visible cut (discontinuity) editing techniques - Possess good knowledge and experience of digital video editing and enhancement techniques - Possess good knowledge and able to operate different video editing software 2. Compile clips to form digital video sequence - Comprehend work order to determine compilation work requirements and perform preparatory for the editing work, including but not limited to the following: - Acquire all the reference material (storyboard, scripts, editor's note, etc.) - Video clips - Setup of editing environment (hardware and software) - Backup additional copy of the video clip - Analyse the reference materials to determine the visual effect that should create after joining of clips. From the analysis, certain clips may require further trimming or splitting and reordering. Trimming and splitting may require audio adjustment too - Import the video clips into the "timeline" of the editing software. Perform format conversion of video clips, if they are not in the matching editing format - Ensure joining of clips maintains the continuity or discontinuity effect of the video without creating "disruption point" that affect the story flow unless it is intended by the script or storyboard - On completion of assemble edit, review and fine tune edit to produce a fine cut, including trimming and adjusting duration of joined clips, etc. - Export and save the fine cut in required format and package with appropriate documentation for work sign off 3. Exhibit professionalism - Apply industry best practices and use current editing technologies to assemble all required clips and deliver a fine cut that matches the expectation of stakeholders
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: Grasp the assembling work requirements and prepare the work environment to ensure the editing work were not hindered or delayed

Functional Area - Operations Management

	• Analyse reference materials and proactively consult stakeholders to comprehend the storyline which affects the result of the fine cut when fine tuning the assembled and rough cut, including the order of clips, the overall duration of the video • Maintain and enhance the continuity of storyline and effects after clips have been joined
Remark	

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Functional Area - Operations Management

Title	Convert linear video to non-linear
Code	107977L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners in the digital video production work. Linear (analog) video player plays video signal by sequentially reading the variations in the intensity of magnetisation of the tape. Traditional video editing is very time consuming and laborious. Additionally the video tape will degrade when it is played many times. Non-linear (digital) video do not have those disadvantages. This UoC concentrate on competences related to converting linear video to non-linear in production house.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for converting linear video to non-linear
	
	• Possess good literacy skills that can comprehend the requirements for analog to digital conversion
	• Possess good knowledge of analog to digital conversion concepts and techniques
	• Possess good knowledge on operating analog to digital conversion equipment
	• Possess basic knowledge of the organisation's health and safety guidelines and procedures
	
	2. Convert linear video to non-linear:
	
	• Comprehend the work order instruction for the conversion work, including:
	  o The output format (AVI, MPEG, RM, MOV, etc.)
	  o Identify format of the linear video (U-matic, VHS, Betamax, Hi-8, etc.)
	  o Objective for converted file (preservation or viewing purpose)
	  o Required output or storage format
	  o etc.
	• Identify suitable conversion hardware and software required to the conversion work such as:
	  o Video player and video capture device
	  o CODEC
	  o Computing device
	  o Capturing and conversion software
	• Identify and collect metadata requirements to be integrated with the converted digital video and ensure the collected metadata built into the converted output
	• Prepare and setup capturing equipment for the conversion process
	• Request/select the "best quality" copy of the analog video to be the "analog master" which will be used in the conversion process
	• Capture the analog video in digital format at the highest quality setting. Use no compression (or lossless compression if compression is unavoidable) for creating a digital preservation master
	• Perform checks after the conversion to ensure no corruption or distortion occurred during the conversion process
	• Incorporate the collected metadata with the converted file
	• If enhancements were made, create 2 copies, a 'master' of the original and enhanced version. The master copy should be in a form that can be easily transcoded when current digit format become obsolete (normally 5 – 10 years)

Functional Area - Operations Management

	• Package the converted files, including master copies of analog and digital video with details and metadata information related to the conversion, to be signed off for completion of work 3. Exhibit professionalism • Be updated with new digitisation technology trends and apply industry's best practices and technology to convert linear/analog video to non-linear/digital format with no distortion from the original
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Comprehend the conversion requirements and identify the equipment that are required for the conversion work • Convert and perform any enhancements, if any and produce a lossless digital preservation master without any defects. Additional the required metadata have been incorporated with the digital video file • Complete the packaging of completed work in accordance with the organisation standards and sign off the completed work
Remark	

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Functional Area - Operations Management

Title	Manage interactive media projects
Code	107978L6
Description	This unit of competency applies to personnel who manage resources devoted to and personnel working on interactive media projects. Interactive media development utilises well-established methods to organise and run activities to keep the projects on schedule and budget, while achieving the expected level of quality and profitability. This UoC is concerned with the capabilities, judgments and activities for interactive media projects management.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for interactive media projects management
	
	• Realise the philosophy and guidelines of the organisation towards interactive media projects development
	• Understand related budget and resources allocations
	• Understand the competitive environment and customer requirements in the market
	• Possess proficient knowledge about the key phases and tasks for interactive media projects development and management
	• Possess good analytical, communication, initiative and enterprise skills to exercise a high level of creative ingenuity and innovation
	• Possess project planning and organisational skills for tasks such as:
	   o Delegate tasks and responsibility appropriately
	   o Establish clear roles and goals to achieve required project outcomes
	   o Organise resources to achieve required outcomes
	   o Meet project deadlines and milestones, etc.
	• Possess the technical skills to resolve hardware, software and technical issues
	• Possess a wide range of knowledge on interactive media tools
	• Possess the personal traits of a competent project manager, such as:
	   o Negotiation skills
	   o Time management
	   o Critical thinking, etc.
	
	2. Manage interactive media projects:
	
	• Conduct detailed analysis about requirements of the interactive media project in concern and work out the project milestones, and specific targets that have to be met by certain dates
	• Conduct technical and scholastic research to ensure all resources and content are well allocated and ready for any risk management
	• Estimate the scale of the project and organise a project team with possible members as follow:
	   o Concept artists
	   o Designers
	   o Programmers
	   o Animators and others
	• Direct and manage the interactive media project combining technological competence with human-centered design and artistic / creative endeavor
	• Carry out overall management throughout the life cycle of the interactive media project, for tasks such as:
	   o Scope of work

Functional Area - Operations Management

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- o Cost expenditures
- o Schedules
- o Quality of output and potential risks
- o Periodic status reporting to management and customers, etc.
- Exercise analytical skills to:
  - o Analyse documentation and images to inform implementation of the project specifications
  - o Interpret briefs, work instructions, and technical and conceptual information
  - o Analyse environmental impact and make sustainability considerations, etc.
- Exercise communication skills to:
  - o Communicate complex designs in a structured format drawn from industry standards, styles and techniques
  - o Communicate technical requirements related to software development, graphics requirements and code development to team members
  - o Provide practical advice, support and feedback to team members and management, etc.
- Exercise crucial judgments to resolve potential problems
- Handle critical turning points in the project to ensure smooth execution and good result returns
- Act as the central point of contact and liaison for all aspects of the interactive media project with parties such as:
  - o Senior management
  - o Publishers
  - o The public relation and marketing departments
  - o Members of the development team
  - o Outsourced personnel, if any
- Manage all testing with interactive hardware devices
- Manage device APIs with developing software
- Ensure proper completion of the project and coordinate related follow-up activities
- Prepare a final report about the project in concern for management's review and further instructions

3. Exhibit professionalism

- Always devote fully to all activities related to interactive media project management
- Always perform the interactive media project management tasks in an objective and fair manner, and balance the interests of both the organisaton and employees

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The integrated outcome requirements of this UoC are the abilities to:

- Able to complete the interactive media project development tasks within time and budget constraints; and
- Able to successfully manage all issues related to software development and testing; and
- Able to ensure the quality of the interactive media project and meeting all prescribed requirements

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

Functional Area - Operations Management

Title	Plan implementation of interactive media projects
Code	107979L6
Description	This unit of competency applies to personnel responsible for project management in the DMT (digital Media Technology) profession. Implementation is one of the key processes in the project management life cycle, and special techniques on top of those basic skills are required for interactive media projects. This UoC concerns competencies required for interactive media projects planning and implementation, in the capacity of a project manager.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for interactive media projects implementation planning
	
	• Possess in depth knowledge of interactive media applications and their different forms of existence, such as:
	    o Digital games
	    o Web sites
	    o Desktop software applications
	    o Interactive television applications
	    o Mobile applications, etc.
	• Possess good understanding about the popular application areas of interactive media, for examples:
	    o Research
	    o Education
	    o Games and gamification
	    o Digital and interactive theatre, etc.
	• Possess good knowledge about the requirements for successfully implementing an interactive media project
	• Proficient in techniques for motion and graphic design and video editing
	• Possess good communication skills and be able to interact with all levels of internal and external personnel
	• Possess the personal traits of a qualified project manager, such as:
	    o Flexible and able to learn new trends, tools and work methods
	    o Attentive to related industry and market information
	    o Dedicated and firm to the achievement of goals and objectives
	    o Self-organising and owns his/her own development implementation decisions
	    o Sensitive and reactive to risks and contingencies, etc.
	
	2. Plan implementation of interactive media projects:
	
	• Select and adopt creative and critical thinking techniques for the effective implementation of the interactive media project in concern, for examples :
	    o Identify measures or indicators of system performance
	    o Identify actions needed to improve or correct performance
	    o Determine the kind of tools and equipment needed, etc.
	• Coordinate the different roles of the project team and ensure their proper co-operation for project implementation, such as:
	    o Software developers
	    o Designers
	    o Musicians
	    o Scriptwriters

Functional Area - Operations Management

	- o Other professionals • Determine the complexity of the project and best approaches for its implementation, so as to achieve: - o Smooth team dynamic and communication - o Successful execution of the project - o Effective combination of various technical and artistic components into an effective interactive media system • Evaluate the current situation and proposed with appropriate resources / allocations to ensure smooth project implementation • Integrate the resources on human resources, technical and budget to compromise a realistic and applicable interactive media project plan • Apply project management methods to successfully run the project to completion, including: - o Set assessment milestones on the plan in order to analyse or review by different parameters to ensure the project is going on track - o Prepare proper documentation for stakeholders • Analyze the following issues that arise during the implementation of the interactive media project and assess their impacts: - o Privacy - o Confidentiality - o Data protection, etc. • Deploy the interactive media project in concern to the proper display platform for testing • Explain to end-users or stakeholders the various project components and their interrelationships, such as: - o Typography - o Graphics - o Interfaces - o Audio and video - o Animation - o Text treatments - o Photography, etc. • Solve the problems encountered during the implementation phase using a variety of innovative methods and approaches 3. Exhibit professionalism • Always ensure that the business value of the intended product has been delivered to the satisfaction of the project stakeholders • Always ensure the compliance with all laws, regulations, agreements and requirements during implementation of the interactive media projects
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Able to meets the technical, creative and resource requirements of an interactive media project at a professional level • Able to critically review the concept, doing technical and scholastic research, adjust and apply the researched content and skills in the planning stage • Able to achieve the project's proposed solutions and deliver the application on the promised time and costs
Remark	

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

Functional Area - Operations Management

Title	Formulate Human to Machine (H2M) requirements for interactive media projects
Code	107980L6
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Human to Machine (H2M) interfaces varies widely in nature and techniques, and identifying the actual requirements towards it is essential to the success or failure of the interactive media project in concern. This UoC concerns competencies in soliciting and ascertaining the requirements towards the H2M interfaces, researching on H2M requirements and applicable design applications, etc., in the capacity of an application specialist.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for H2M requirements for interactive media projects
	
	• Realise the philosophy and guidelines of the organisation towards interactive media projects development
	• Possess professional researching, analytic and design techniques
	• Possess proficient knowledge in layout, design and graphics
	• Critically review and consolidate the user preferences and requirements towards the H2M interfaces
	• Compile the design and implementation guideline to meet the requirement specifications
	• Can distinguish poor and effective H2M design, such as the following areas:
	  o Presentation of raw data as number vs information
	  o Bright colours vs limited use of colour
	  o No trends vs key performance indicators as trends, etc.
	• Comprehend relevant technical requirements and able to use them to create and maintain test conditions and scripts
	• Possess excellent software test analysis skills
	• Keep open and abreast of the latest technological development in H2M design and implementation
	
	2. Formulate Human to Machine (H2M) requirements for interactive media projects:
	
	• Lead and coordinate the work of designers and creative specialists to:
	  o Consolidate the professional research on H2M requirements
	  o Review user requirements
	  o Review design documentation
	  o Analysis of the problems identified, etc.
	• Identify needs and requirements for the project's H2M components, which may include but not limited to the following categories:
	  o Information requirements
	  o Collaboration requirements
	  o Action requirements
	  o Interaction requirements, etc.
	• Make decisions regarding the H2M interfacing issues based on user interface researching, for examples:
	  o What is the information needed by the users
	  o What is the best way to present information to the users
	  o How should that information be organized
	  o What information should be emphasized, etc.

Functional Area - Operations Management

	- Judge the most appropriate segment in the identification of H2M requirements
	- Explore the detailed H2M requirements and proposed appropriate solutions, for examples:
	    ○ Capture strategic objectives of the H2M development effort and draft the corresponding H2M interface philosophy
	    ○ Recognise usability and performance issues with the existing design and guide development team members in:
	        ▪ The use of proven presentation, navigation and interaction techniques
	        ▪ Implement effective H2M solutions on the chosen platforms, etc.
	    ○ Ensure achievement of high performance solution with user acceptance through involvement and liaison with key stakeholders, etc.
	- Consolidate the above H2M considerations and present to the project development team or supervisor for comment and approval
	
	3. Exhibit professionalism
	
	- Always devote fully to all activities related to the identification of H2M requirements for interactive media projects, and remain objective and impartial throughout the entire process
	- Always perform the H2M requirements identification with the interests and benefits of potential users as highest priority consideration

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Able to complete the H2M requirements identification within time and other constraints - Able to analyse or review the select requirements and make appropriate decisions on possible enhancements - Able to complete the H2M requirements identification accurately and propose proper solutions for subsequent design and implementation
Remark	

Functional Area - Operations Management

Title	Manage interactive media projects with Agile approach
Code	107981L6
Description	This unit of competency applies to personnel who manage resources devoted to and personnel working on project management aiming to provide new product or service development in a highly flexible and interactive manner. Agile management aims to interact with users under a non-hierarchical form of leadership to produce a frequent and continuous delivery of quality software. This UoC is concerned with the capabilities, considerations and activities for Agile projects management.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for managing interactive media projects with Agile approach
	
	• Understand the basic principles of Agile project management, including:
	    ○ Satisfy users through early and continuous delivery of quality software
	    ○ Accept changes even late in the development process under a fixed timescale and budget
	    ○ Organise a team of motivated developers that are self-directed
	    ○ Have regular and close interaction with users in face-to-face conversation
	    ○ Have regular self-inspection to become more effective, etc.
	• Possess proficient knowledge of Agile management practices, such as: Scrum, eXtreme Programming (XP), etc.
	• Understand related budget and resources allocations
	• Understand the competitive environment and customer requirements in the market
	• Possess proficient knowledge about the core functions, key phases and tasks for software development and management
	• Possess good analytical, communication, initiative and enterprise skills to exercise a high level of creative ingenuity and innovation
	• Possess project planning and organisational skills for tasks such as:
	    ○ Delegate tasks and responsibility appropriately
	    ○ Establish clear roles and goals to achieve required project outcomes
	    ○ Organise resources to achieve required outcomes
	    ○ Meet project deadlines and milestones, etc.
	• Possess the technical skills to resolve hardware, software and technical issues
	• Possess a wide range of knowledge on interactive media tools
	• Possess the personal traits of a competent project manager, such as:
	    ○ Negotiation skills
	    ○ Time management
	    ○ Critical thinking, etc.
	
	2. Manage interactive media projects with Agile approach
	
	• Conduct a detailed analysis about requirements of the interactive media project to ensure the right product is delivered
	    ○ Capture requirements at a high level, on a piecemeal basis, and in a visual format, such as: storyboard, user interface, etc.
	    ○ Prioritise the requirements based on the needs of the user and market
	    ○ Clarify requirements with users on a daily basis, to ensure the product delivered in each iteration meets the user expectation

Functional Area - Operations Management

	• Conduct technical and scholastic research to ensure all resources and content are well allocated and ready for any risk management
	• Empower the project team to make decision, to ensure it is their complete responsibility to deliver the product
	• Factor emerging requirements into the development schedule as appropriate and trade-off non-mandatory features, under a fixed timeframe and budget
	• Develop small, incremental releases of product and iterate, to reduce risk and allow flexibility for better cost management
	   ○ Start development with the core and highest priority features to ensure they are delivered in the earliest iterations
	   ○ Fully develop and test each feature before moving on
	• Deliver the product and arrange iteration for product release more frequently
	• Perform integrate testing throughout the development life cycle
	• Exercise crucial judgments to resolve potential problems
	• Handle critical turning points in the project to ensure smooth execution and good result returns
	
	3. Exhibit professionalism
	
	• Always devote fully to all activities related to interactive media project management
	• Always perform the interactive media project management tasks in an objective and fair manner, and balance the interests of both the organisation and employees

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Able to complete the interactive media project development tasks within time and budget constraints; and • Able to successfully manage all issues related to project development and testing; and • Able to ensure the quality of the interactive media project and meet all prescribed requirements
Remark	

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

Functional Area - Operations Management

Title	Coordinate software development of interactive media projects
Code	107982L5
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Software development involves multiple steps and tasks and proper coordination of manpower and resources is vital for its successful completion. This UoC concerns competencies and knowledge in coordinating software development especially for interactive media projects, in the capacity of a project leader.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for coordinating software development of interactive media projects
	
	• Realise the philosophy and guidelines of the organisation towards interactive media projects development
	• Comprehend related budget and resources allocations
	• Understand the competitive environment and customer requirements in the market
	• Possess proficient knowledge and skills in the following areas:
	    o Diverse software tools
	    o Resources selection techniques
	    o Time management methods
	    o Project scoping, scheduling, resourcing and tracking, etc.
	• Possess excellent communication and interpersonal skills for dealing with various stakeholders, such as:
	    o Management
	    o Software developers
	    o Resources suppliers / controllers
	    o End-users, etc.
	• Possess the personal traits of a competent project leader, such as the abilities to:
	    o Manage multiple projects simultaneously
	    o Devise solutions for challenges in an uncertain environment
	    o Communicate both orally and in writing effectively, etc.
	
	2. Coordinate software development of interactive media projects:
	
	• Conduct a detailed analysis about requirements of the interactive media project in concern and work out the project milestones, and specific targets that have to be met by certain dates
	• Estimate the scale of the project and get acquainted with the project team members
	• Ensure resources are assigned and allocated appropriately to the project plan throughout different stages in the project life cycle
	• Conduct the overall project coordination and drive towards the successful completion of the project, with relevant targets such as:
	    o Scope of work
	    o Cost expenditures
	    o Schedules and milestones
	    o Quality of output, etc.
	• Ensure the following outcomes throughout the project life cycle:
	    o Completion of agreed upon project deliverables
	    o Meet requirements in time, budget and quality
	    o Strive to fulfill or even exceed users' expectations, etc.

Functional Area - Operations Management

	• Act as the central point of contact and liaison for all aspects in the development of the interactive media project, with parties such as:
	    ○ Senior management
	    ○ Members of the development team
	    ○ Outsourced personnel, if any
	    ○ End users, if necessary
	• Ensure proper accomplishment of the project, and also coordinate relevant follow-up activities
	• Prepare reports about the project for management's review, acceptance and further instructions
	
	3. Exhibit professionalism
	
	• Always devote fully to all activities related to the coordination work for software development of the interactive media project in concern
	• Always perform the coordination tasks in an objective and fair manner, and balance the interests of all parties including the organisaton, employees and end users

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the coordinate tasks for software development within time and budget constraints; and • Ensure the quality of project deliverables and meet all prescribed requirements
Remark	

Functional Area - Operations Management

Title	Manage synchronisation of augmentation data and real life data in AR application
Code	107983L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of VR applications. AR augmentation data is in semantic context with environmental elements, with proper synchonisation of augmentation and real life data, users' surrounding real world will become more interactive and meaningful. This UoC concerns with the abilities in managing the synchronisation of both types of data in the capacity of an experienced developer.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for synchronisation of augmentation data and real life data in AR application
	
	• Realize the policies and guidelines of the organisation towards AR application development
	• Possess proficient programming skills in areas such as:
	   o Authoring
	   o Engineering
	   o Quality testing, etc.
	• Familiar with languages for AR application development, such as:
	   o Objective-C
	   o Swift
	   o Java, SQL, PHP, ASP.net, JSP, etc.
	• Experienced with but not limited to the following software:
	   o Computer Vision
	   o AR
	   o Mobile HCI, etc.
	• Proficient in handling common requisite hardware devices for running AR applications, such as:
	   o Camera
	   o Display
	   o GPS module
	   o Gyroscope
	   o Various VR headset and wearable devices, etc.
	• Keep abreast of the new developments and technological advancements in the ICT industry
	
	2. Manage synchronisation of augmentation data and real life data in AR application:
	
	• Lead and work with the application development team to design a solution that meets the requirements of the targeted AR application
	• Design and determine the followings for the AR application in concern:
	   o The hardware devices and software to be adopted
	   o An environment on how virtual and real objects will coexist
	   o Ensure augmentation data delivered from AR devices will aid but not distract from data in real environment and situation, etc.
	• Determine the following AR design issues:
	   o How to make the augmentation data to become part of the user's context
	   o How to detect whether users are interested in the AR content

Functional Area - Operations Management

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o How the system can progressively provide more information in an interactive manner, etc.

Coordinate and carry out the steps for augmentation and real life data sychronisation, which may include:

o Capture relevant information within the image perceived by the video camera / VR devices (real life data)
o Identify and locate the desired image appearance
o Ensure the overlay can be properly matched for the desired image appearance
o Select an image (augmentation data) to be electronically overlaid on the desired image
o Direct the system to transform the images to accomplish the appropriate overlay appearance
o Display the augmented-reality image to the users, etc.

Strive to achieve the following benefits in the process:

o Allow users to interactively manipulate the images by issuing instructions
o Create an illusion for enabling users to dynamically alter the images, etc.

Conduct the above tasks in an iterative design, testing and development sprints to refine the overall product solution
Report the progress and results to the development team at appropriate time intervals

3. Exhibit professionalism

Always devote fully to all activities related to the synchronisation of augmentation data and real life data, and follow all prescribed policies and guidelines
Always perform all tasks related to data synchronisation in an accurate and professional manner, without sacrificing the results due to resources limitations or other considerations

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The integrated outcome requirements of this UoC are the abilities to:

Complete all data synchronisation management tasks accurately and effectively within time and budget constraints
Produce appropriate outputs to the satisfaction of the development team and meeting users' expectations

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Functional Area - Operations Management

Title	Coordinate the development of Human to Machine (H2M) interface
Code	107984L5
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Human to Machine (H2M) interface is the hardware and / or software which allows the operator or engineer to control and monitor the machine functions. This UoC concerns competencies and knowledge in coordinating the development of H2M interface especially for interactive media projects, in the capacity of a project leader.
Level	5
Credit	3
Competency	Performance Requirements 1. Knowledge for coordinating the development of H2M interface • Realise the philosophy and guidelines of the organisation towards interactive media projects development • Comprehend related budget and resources allocations • Possess deep understandings on: o Human interactions with their environment o Awareness of the psychology of interfaces designing o H2M techniques used to provide control and status for automated systems, etc. • Master popular tools and means for H2M interfacing, including but not limited to the followings: o Electronic display such as a video computer monitor o Touch screen computer o Touch panel o Push button panel o Indicating light o Interfaces which can be controlled with the mind, etc. • Possess excellent communication and interpersonal skills for dealing with various stakeholders, such as: o Management o Software developers o Resources suppliers / controllers o End-users, etc. • Possess the personal traits of a competent project leader, such as the abilities to: o Manage multiple projects simultaneously o Devise solutions for challenges in an uncertain environment o Communicate both orally and in writing effectively, etc. 2. Coordinate the development of Human to Machine (H2M) interface: • Conduct a detailed analysis of the requirements and nature of the H2M interfacing in concern, such as: o For presentation and control o For dialogue and information processing o For information preprocessing o As user model o As application model, etc. • Work out the scale and costs for development and ensure availability of manpower and resources

Functional Area - Operations Management

	• Identify, select and deploy appropriate input and output devices for the designated H2M interface development tasks • Tackle the challenges for the H2M interfacing design, and ensure that the interfaces will be: o Functional o Accessible o Pleasant / user-friendly for using o Logical, etc. • Ensure proper outcomes at completion of the H2M interface development, including: o Accomplishment of all agreed upon deliverables o Meet general requirements in time, budget and quality o Fulfil special requirements such as taking care of stroke patients or people with severely restricted modes of communication, etc. • Act as the central point of contact and liaison for all issues related to the H2M interface development, with parties such as: o Senior management o Members of the development team o Outsourced personnel, if any o End users, if necessary • Coordinate all relevant follow-up activities, if any • Prepare reports about the completed development tasks for management's review, acceptance and further instructions 3. Exhibit professionalism • Always devote fully to all activities related to the H2M interface development work in concern • Always perform the coordination tasks in an objective and fair manner, and balance the interests of all parties including the organisaton, employees and end users
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the coordinate tasks for H2M interface development within time and budget constraints; and • Ensure the quality of all deliverables and meet all prescribed requirements
Remark	

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

Functional Area - Operations Management

Title	Create H2M (Human to Machine) design for interactive media projects
Code	107985L4
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Human to Machine (H2M) interfaces varies widely in nature and techniques, and designing such interfaces is a challenge which requires a great deal of work. This UoC concerns competencies in H2M designing with special focus on interactive media projects, and in the capacity of an application analyst.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for H2M design for interactive media projects - Realise the philosophy and guidelines of the organisation towards interactive media projects development - Comprehend related budget and resources allocations - Get hold of user needs and requirements for the designated interfaces and be able to suggest design guidelines and approaches to meet the needs - Possess good understanding in layout, design and graphics - Possess good interactive design skills, such as: - User and task analysis - Interface design and evaluation, etc. - Possess proficient programming skills for: - Authoring - Engineering - Quality testing, etc. - Keep open and abreast of the latest technological development in H2M interface 2. Create H2M (Human to Machine) design for interactive media projects: - Coordinate and work with designers and creative specialists of the project to: - Apprehend the design concept - Advise on how the requirements can be technically implemented - Tackle possible constraints - Standardise the design and sketch a design methodology, etc. - Sort out operational logic and business rules necessary for the features to be reproduced correctly according to the designer's specifications - Design an iterative and participatory development methodology to deliver effective and performant displays - Formulate and implement the ideal characteristics for the interface design, which may include but not limited to the followings: - Establish a high level of situational awareness - Align with work processes - Minimize operator workload and errors - Enable effective abnormal situation responses - Enhance task performance, etc. - Make appropriate adjustments reiteratively to the H2M design until the desired outcomes are achieved - Present the completed H2M design to the project development team or supervisor for comment and approval

Functional Area - Operations Management

	3. Exhibit professionalism • Always devote fully to all activities related to the H2M design for interactive media projects in concern, and remain open, current and updated with related technologies • Always perform the H2M design according to requirements and expectations, and place the interests of potential users as the highest priority consideration
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the H2M design tasks within time and budget constraints • Grasp users' expectations towards the H2M design in concern and produce outputs with appropriate effects and features to satisfy the users
Remark	

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

Functional Area - Operations Management

Title	Design interactive website
Code	107986L4
Description	This unit of competency applies to interactive web designers in the DMT (digital Media Technology) profession. One of the most important qualities of a great web site is interactivity which gives its visitors way to participate and this UOC concern competencies in designing interactive website to facilitate the creation of a more engaging website and increase traffics.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for designing interactive website
	
	• Possess good communication skills to be able to communicate with all levels
	• Possess in depth knowledge of interactive and non-interactive web contents, technologies and trends
	• Possess good knowledge standards such as Web 2.0, HTML5
	• Possess website designing skills and basic knowledge of web script programming
	• Possess good knowledge of interaction design
	
	2. Design interactive website:
	
	• Work with stakeholders to determine various factors concerning the website, including but not limited to the following:
	    ○ Goals, purpose and needs of the web site, such as:
	        ▪ A market place portal
	        ▪ Information delivery
	    ○ Target audience
	    ○ Target device
	    ○ The basic hosting architecture of the site, if exist
	• Determine and provide advice on interactive features for the website, include but not limited to the following:
	    ○ Blog, Social network forums, wiki
	    ○ Drag and drop
	    ○ Interactive maps. For example Google map
	    ○ Virtual world. For example: secondlife
	• Perform initial design with sketches (on paper or electronic based graphic device) that matches the goals of the organisation. Also taking into consideration of interactive features, target users, target devices, and how user interact with the website. Design should include but not limited to the following:
	    ○ Interactive features
	    ○ How user interaction with the website (mouse, finger, keyboard,etc.)
	    ○ Responsive design
	    ○ H2M (Human to Machine) interactions and the type of device user is using to access the website
	    ○ A unique and optimal UI (User Interface) & UX (User Experience) with following considerations:
	        ▪ Let visitors know what the website is about
	        ▪ Forms and field with meaningful names that can give hints of action/s that they can take without long complex instructions
	        ▪ Provide contextual information that maintain the visitor to stay longer i.e. offer value proposition

Functional Area - Operations Management

	▪ Apply visuals and styling that gives distinctive personality of the website and attract visitor's attention ○ Interactive infographics and responsive animation • Construct prototype after agreed the initial design with stakeholders. This is project dependent. The prototype should have a realistic visual part of the website with virtual links of web pages and limited simulation of interactive features • Package the design with documentation and instructions for next stage of the implementation process which includes the construction of programs for the interactive features and web pages 3. Exhibit professionalism • Be current, updated with trends of interactive web technologies • Apply industries best practices to design interactive websites that meets the organisation business needs and conformed with web standards
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Grasp the organisation goals for website and produce a design with the correct type and level of interactive contents that satisfied those goals • Design the required interactive contents that can be viewed and performed correctly on required devices • Package the design together with all the necessary documentation and other details that can enable the web pages and interactive contents be develop at the next stage of the implementation process
Remark	

Functional Area - Operations Management

Title	Develop interactive website
Code	107987L4
Description	This unit of competency applies to interactive web developers in the DMT (Digital Media Technology) profession. A successful website don't need to be interactive, however if the organisation need to have an effective website that can communicate with its customers and users then the site needs to be interactive. This UOC concern competencies for implementation of interactive features into website after the design has been finalized with stakeholders.
Level	4
Credit	6

Competency	Performance Requirements
	1. Knowledge for developing interactive website
	
	• Possess good communication skills to be able to communicate with all levels
	• Possess in depth knowledge of interactive and non-interactive web contents, technologies and trends
	• Possess good skills with various web programming such as: W3C standards, HTML5, Cascade Style Sheets (CSS), scripting languages (Javascript, jQuery, etc.)
	• Possess good knowledge of responsive web technology
	• Possess good knowledge in server side programming, database and security
	• Have good knowledge of the organisation's business goals and objectives
	
	2. Develop interactive website:
	
	• Comprehend the design specification and work with designer and/or stakeholders to understand and confirmed the design specification.
	   ○ Clarification of requirements, if necessary
	   ○ Contribute interactive feature/idea or functional enhancements of the design, if any
	• Plan, prepare website contents and perform research of the following :
	   ○ What interactive feature can be implemented
	   ○ Tools that can help to create the required interactive functions
	   ○ Tools that can enable the development of the website
	   ○ Creation of responsive website
	   ○ HTML5, JavaScript and various interactive libraries
	• Develop the website contents, including but not limited to the following:
	   ○ Basic web markup pages with HTML or web authoring tools
	   ○ Cascade Style Sheets (CSS)
	   ○ Responsive components
	   ○ Interactive contents:
	      ▪ Blog/forum, Calendars, calculators
	      ▪ Interactive infographics
	      ▪ Interactive 3D contents
	      ▪ Social plugins
	      ▪ Gamification functions
	• Test the website to ensure it fulfilled the design spec requirements and all the contents worked on all required devices and browsers
	• Backup, package, document the completed work and seek work signoff approval
	• Facilitate website rollout and prepare maintenance environment for support and enhance phase of the website

Functional Area - Operations Management

	3. Exhibit professionalism • Be current, updated with trends of interactive and web development technologies • Apply industries best practices to for creation of interactive websites that meets the organisation business needs and conformed with web standards
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Comprehend the design specification, clarify all requirements issues with designer and/or stakeholders, as well as contributing ideas and suggestions prior starting on development work • Research, plan and gather all the necessary tools for the website development work • Complete and test the interactive web development work that satisfied the design specification and stakeholders requirements
Remark	

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

Functional Area - Operations Management

Title	Develop apps
Code	107988L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in interactive media apps development. Apps development is a board topic involving a wide range of programming languages, tools and techniques. This UoC is concerned with the development of apps based on its design documents and specifications, using specified programming tools and facilities, and following the organisation's related guidelines and standards.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for apps development
	
	• Realise the philosophy and guidelines of the organisation towards interactive media apps 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 and tools commonly used for apps development, for examples:
	    o Object Oriented (OO) concept for native apps development
	    o HTML5 + CSS3 for web apps development, etc.
	• Possess good understanding about the essential features of those programming engines and tools
	• Understand the framework of different platforms
	• Possess knowledge in layout management
	• Understand related copyright, ethics and privacy issues
	
	2. Develop apps:
	
	• Fully explore the advantages offered by those aforementioned apps development tools, such as their:
	    o Ease of understanding
	    o Ease of maintenance
	    o Ease of modifications
	    o Low resources consumption, etc.
	• Plan for the usage of those languages and facilities to develop the original ideation into a real, powerful and unique apps application
	• Devise program modules and decompose them into software components according to their design documentations
	• Create apps in different platforms such as Android and iOS
	• Perform the apps development tasks, which may include but not limited to the followings:
	    o Design and create models for 3-D and digital effects
	    o Make use of SDK features to create apps with suitable functions
	    o Perform basic vision and sound editing
	    o Incorporate and edit digital video
	    o Edit screen content for fast turnaround
	    o Design animation and digital visual effects
	    o Produce a digital animation sequence, etc.

Functional Area - Operations Management

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• Carry out the following programming stages iteratively until completion of the specific apps application:

   o Lay the outlines of what the actual procedure is going to be

   o Create the wire frame of the specifications to achieve and identify what the end product will look like

   o Ensure what have been made suits the end users in every possible way

   o Determine all aspects of the apps including its workability and user friendliness

   o Develop the app in a smooth fashion

   o Adopt third party APIs to enrich the apps contents

   o Test the apps against any bugs or malfunctioning

   o Ensure the layouts can fit different resolution mobile devices

   o Publication and sale of the apps, etc.

3. Exhibit professionalism

• Always perform apps development with full effort and in an efficient and effective manner

• Always perform apps development according to organisational and / or international standards, regardless of those personal preferences
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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

• Complete the apps development work within required time frame and budget constraints; and

• Complete the apps development based on designated program documents and specifications
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Functional Area - Operations Management

Title	Perform server programming for apps request
Code	107989L4
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Server programming is one of the key components in the process of mobile apps development. This UoC concerns competencies in carrying out the tasks for server side programming in the capacity of a developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for server programming for apps request
	
	• Master programming knowhow, concepts and techniques
	• Possess specialized programming skills in areas such as:
	    o Authoring
	    o Engineering
	    o Quality testing, etc.
	• Familiar with programming languages related to server side programming such as:
	    o PHP
	    o Node.js
	    o Python
	    o Java, etc.
	• Familiar with third party server linkage, for examples:
	    o Apple
	    o Google, etc.
	• Keep abreast of the new developments and technological advancements in the ICT industry
	
	2. Perform server programming for apps request:
	
	• Identify the server side programming tasks for the apps to be developed
	• Create the necessary components for the required server programming, which may include but not limited to the following:
	    o RESTful API creation
	    o Socket creation for bi-directional communication
	    o Determine post data payload format, for e.g. JSON to server side and decode
	    o Determine the iteration between server side code and persistence data, etc.
	• Write efficient computer code or script to make the various features work
	• Ensure that sound, graphics, animations and timing all work as intended
	• Make good use of processing and data storage capacity
	• Create and link databases to the user interface such that information can be retrieved, stored and processed
	• Make appropriate adjustments reiteratively to the server programming tasks until the desired outcomes are achieved
	• Present the completed server side programming deliverables to the game development team or supervisor for comment and approval
	
	3. Exhibit professionalism
	
	• Always devote fully to all activities related to the server side programming tasks, and remain current and updated with related technologies

Functional Area - Operations Management

	• Always perform the server programming development according to requirements and expectations, and place the interests of potential users as the highest priority consideration
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the server programming development tasks within time and budget constraints • Grasp users' expectations towards the server programming in concern and produce outputs with appropriate contents and level to satisfy the users
Remark	This UoC also applies to other requests such as web request

Functional Area - Operations Management

Title	Implement data management of apps
Code	107990L4
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Data management is one of the mandatory tasks in any ICT development process and mobile apps are of no exception. This UoC concerns competencies in handling and manipulating data during the apps development process in the capacity of a developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for data management of apps
	
	• Master programming knowhow, concepts and techniques
	• Understand the organisation's policies and guidelines towards data management
	• Possess specialized programming skills in areas such as:
	    o Authoring
	    o Engineering
	    o Quality testing, etc.
	• Familiar with programming languages related to the data management context such as:
	    o SQL
	    o PHP
	    o ASP.net
	    o JSP
	    o JavaScript, etc.
	• Possess good understanding about data manipulation in the process of apps development, such as:
	    o Web-based or local database types
	    o Methods for apps data connection
	    o SQL statements for data manipulations such as Create, Read, Update and Delete (CRUD)
	    o Data operation for remote servers, etc.
	• Keep abreast of the new developments and technological advancements in the ICT industry
	
	2. Implement data management of apps:
	
	• Identify the data needs for the apps to be developed, factors to consider may include but not limited to the followings:
	    o User's geo-location
	    o User behaviour, e.g. how long, frequency, time of the day, etc.
	    o User preferences
	    o User demographic information
	    o Behaviour analytics of the users, etc.
	• Determine the methods and options for the following data management issues:
	    o Rapid backup and recovery
	    o Data availability
	    o Data sovereignty
	    o Data security, etc.
	• Create local, remote, web or cloud based data storage according to the requirements of the apps in concern and guidelines of the organisation

Functional Area - Operations Management

	• Create and link databases to the user interface such that information can be retrieved, stored and processed interactively via the apps application
	• Perform session data creation and removal locally and remotely by actions such as:
	    ○ Get
	    ○ Put
	    ○ Post
	    ○ Delete
	    ○ Data replication, etc.
	• Monitor the operation of data and interaction with the apps to identify possible loopholes and problematic areas
	
	3. Exhibit professionalism
	
	• Always be current and updated with trends of data management technologies
	• Apply industry's best practices to data management that meets the organisation's business needs and conformed with the requirements of the apps in concern

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Grasp the organisation's policy and guidelines towards data management and apply to the apps in concern accordingly • Design and implement the required data management methods that can operate correctly and conform to the requirements of the apps application
Remark	

Functional Area - Operations Management

Title	Test apps deployment on various hardware platforms
Code	107991L4
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. One of the key procedures to determine the success or failure of apps is its stringent testing on hardware platform(s) to be deployed. This UoC concerns the competencies in performing the testing on designated hardware platform(s) and ensure the conformance to requirements.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for apps deployment on various hardware platforms
	
	• Master programming knowhow, concepts and techniques
	• Familiar with the organisation's apps testing guidelines or procedures, if any
	• Possess proficient software test analysis skills
	• Comprehend the complicated environment for apps on various software platforms and versions, such as:
	    o Diverse hardware and form factors
	    o Different network connectivity conditions
	    o Rapid pace of mobile OS updates
	    o Frequent introduction of new devices
	    o Customer expectation of quick upgrades, etc.
	• Possess good understanding about apps development and testing, such as:
	    o Features and limitations of different operating systems
	    o Features and limitations of different hardware platforms
	    o Available apps testing tools and testers
	    o Programming techniques under different platforms, etc.
	• Keep abreast of new research and development in apps testing methods and tools
	
	2. Test apps deployment on various hardware platforms:
	
	• Identify the platforms for deployment of the apps in concern, such as:
	    o Android
	    o iOS
	    o Other possible platforms
	    o Various versions of the above platforms
	• Identify the various aspects of testing that need to be conducted, or according to those laid down in the organisation's apps testing guidelines, for examples:
	    o Functionality
	    o Performance
	    o Network
	    o Security
	    o Compatibility
	    o Conformance
	    o Usability
	    o Installation
	    o Provisioning, etc.
	• Create and maintain test conditions and scripts for apps based on problems and technical requirements identified from the above findings
	• Perform the following tests for the apps in all concerned platforms:

Functional Area - Operations Management

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- o Testing on general cases
- o Stress testing on extreme cases
- o Other related testing
- Perform all essential steps listed in the testing procedure, then analyse the results gathered, such as:
  - o Examine the screenshots (or alike) for each step of the test
  - o Consolidate performance data including memory, CPU, duration, etc.
  - o Compare reports against previous runs to identify regressions and bottlenecks, etc.
- Evaluate and visualize the test results if necessary
- Prepare test report based on the outcome findings, especially on the operations and performance of the apps on various platforms
- Consolidate and present the completed test reports and recommendations to the apps development team or supervisor for comment

3. Exhibit professionalism

- Always conduct the apps deployment testing on various hardware platforms in an objective and fair manner, without any deceive doings
- Always conduct the apps deployment testing according to guidelines and procedures, without any deviation or omission
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The integrated outcome requirements of this UoC are the abilities to:

- Complete the apps deployment testing on various hardware platforms within time and budget constraints
- Produce test reports that fully reflect the information gathered during the testing period, especially those on the operations and performance of the apps on various platforms
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Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

Functional Area - Operations Management

Title	Develop Augmented Reality (AR) application
Code	107992L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of AR applications. Unlike VR which creates a totally artificial environment, AR is the integration of digital information with the user's environment in real time and uses the existing environment and overlays new information on top of it. This UoC is concerned with the abilities in AR application development using specified tools and facilities.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for AR application development
	
	• Realize the philosophy and guidelines of the organisation towards AR application development
	• Master programming knowhow, concepts and techniques
	• Well versed in advanced computer vision skills, desktop, web or mobile programming
	• Possess good understanding about augmented reality and related techniques, such as:
	    o 3D modeling
	    o Rigging & animation
	    o Marker and markerless based tracking
	    o 3D rendering
	    o Intuitive UX/UI design
	    o Simultaneous localisation and mapping (SLAM) tracking etc.
	• Understand software related copyright, ethics and privacy issues
	• Possess the personal traits of a typical AR application developer, such as:
	    o Good understanding of image processing
	    o Good understanding of intuitive user interfaces
	    o Proficient computer vision techniques
	    o Keep abreast of new research in the field, etc.
	• Possess good understanding of Mixed Reality (MR) and related techniques, such as
	    o 3D sensor and scanning
	    o Optic devices, such as: Hololens
	    o Interaction of digital contents with real-time environment
	    o Keep abreast of new research in the related development of Cinematic Reality (CR)
	
	2. Develop Augmented Reality (AR) application:
	
	• Fully comprehend the key requirements for an AR system and apply them in the development process, including:
	    o Useful and highly interactive
	    o Realistic
	    o Captivating
	    o Immersive, etc.
	• Fully explore and exploit the technologies offered by those popular AR development tools, such as:
	    o Global positioning system to pinpoint a user's location
	    o Machine vision that gives a computer the ability to see
	    o Gesture recognition for mathematical interpretation of human motion by computing devices

Functional Area - Operations Management

	o Object recognition, etc.
	• Adopt the marker-based or location-based approaches for AR application development flexibly according to requirements and circumstances
	• Perform routine tasks associated with major milestones in the AR application development life cycle, including:
	   o Research and usability engineering
	   o Prototyping
	   o Development
	   o Testing
	   o Deployment
	   o Technical support and maintenances
	   o Review and assess, etc.
	• Perform the detailed AR application development tasks, which may include but not limited to the followings:
	   o Working with devices such as leap motion and high-end smartphones, tablets, television, smartglasses, etc.
	   o Add custom AR effects
	   o Create 2-D and 3-D models
	   o Programming and coding
	   o 3D depth sensing, body and hand tracking
	   o Content management
	   o Re-engineering the AR apps, etc.
	• Make appropriate adjustments reiteratively to the AR application being developed until the desired outcomes are achieved
	• Present the completed AR application to the game development team or supervisor for comment and approval
	
	3. Exhibit professionalism
	
	• Employ latest skills and technologies to AR application development
	• Always perform AR application development according to requirements and expectations, and place the interests of potential users as the highest priority consideration

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Able to complete the AR application development tasks within the defined time and budget of the requirement specifications • Able to grasp users' expectations towards the AR application in concern and produce outputs with appropriate contents and level to satisfy the users
Remark	

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

Functional Area - Operations Management

Title	Perform location analysis for graphic overlay in AR application
Code	107993L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of VR applications. Augmented reality (AR) involves overlaying computer graphics on a video stream of the real world, and location analysis is one of the key tasks in this process. This UoC concerns with the abilities in performing location analysis for graphic overlay in AR application, in the capacity of a developer.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for location analysis for graphic overlay in AR application - Realize the philosophy and guidelines of the organisation towards AR application development - Master programming knowhow, concepts and techniques - Possess proficient programming skills in areas such as: - Authoring - Engineering - Quality testing, etc. - Familiar with languages for AR application development, such as: - Objective-C - Swift - Java, SQL, PHP, ASP.net, JSP, etc. - Familiar with tools and techniques for location analysis and location sensing in AR, such as: - Audio systems - Infrared beacons - Biosensors - The Simultaneous Localization and Mapping (SLAM) techniques, etc. - Keep abreast of the new developments and technological advancements in the ICT industry 2. Perform location analysis for graphic overlay in AR application: - Work with the application development team to design a solution that meets the requirements of the AR application in concern - Identify areas that involve the performance of location analysis in the process of AR application development, for examples: - Use inertia and location data to identify the position and orientation of mobile devices with reasonable precision, collected by means of : - Accelerometer - Gyroscope - GPS - Wi-Fi - Magnetometer - Barometer, etc. - Localize the camera in a map of the environment and find the pose of the camera relative to that map - Perform visual tracking with a variety of feature trackers and feature matching algorithms

Functional Area - Operations Management

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    o Use feature detectors to detect the different types of features, namely :
- Edges
- Corners
- Blobs
- Patches, etc.

    o Perform feature tracking and motion estimation, with techniques such as :
- Dense optical flow that involves the matching of every pixel in consecutive image frames
- Sparse optical flow that uses only selected features, etc.

- Use gathered information during location analysis for use in graphic overlay
- Conduct the above tasks in an iterative design, testing and development sprints to refine the overall product solution
- Report the progress and results to the development team at appropriate time intervals

3. Exhibit professionalism

- Always devote fully to all activities related to the performance of location analysis in AR application, and follow all prescribed guidelines and procedures
- Always perform all location analysis tasks in an accurate manner, without sacrificing the results due to time or other limitations

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The integrated outcome requirements of this UoC are the abilities to:

- Complete the location analysis tasks orderly and accurately within time and budget constraints
- Perform location analysis for use in graphic overlay, and produce appropriate outputs to the satisfaction of the development team

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

Functional Area - Operations Management

Title	Analyse camera data for graphic overlay in AR application
Code	107994L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of VR applications. Augmented reality (AR) involves overlaying computer graphics on a video stream of the real world, with is done by identifying unique AR patterns in the world and calculates their position with respect to the camera. This UoC concerns with the abilities in analysing camera data for graphic overlay in AR application, in the capacity of a developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for camera data for graphic overlay in AR application
	
	• Realize the philosophy and guidelines of the organisation towards AR application development
	• Master programming knowhow, concepts and techniques
	• Possess proficient programming skills in areas such as:
	    o Authoring
	    o Engineering
	    o Quality testing, etc.
	• Familiar with languages for AR application development, such as:
	    o Objective-C
	    o Swift
	    o Java, SQL, PHP, ASP.net, JSP, etc.
	• Experienced with but not limited to the following software:
	    o Computer Vision
	    o AR
	    o Mobile HCI, etc.
	• Keep abreast of the new developments and technological advancements in the ICT industry
	
	2. Analyse camera data for graphic overlay in AR application:
	
	• Work with the application development team to design a solution that meets the requirements of the AR application in concern
	• Create the prototype and develop aspects of AR technology within both desktop and mobile contexts
	• Use available VR/AR SDK for Windows to perform the followings:
	    o Stereoscopic 3D video
	    o Head tracking
	    o Utilization of the AR camera data, etc.
	• Collect required data by using AR cameras to:
	    o Capture background images such as the relatively distant background objects over a relatively large field of view
	    o Foreground images which may be the images of an object being probed
	    o Obtain representations of areas ordinarily obstructed from view
	    o Measure surroundings, objects, or both surroundings and objects, etc.
	• Use collected camera data for graphic overlay by performing tasks such as:
	    o Threshold a captured image from a video source
	    o Identify all square and rectangular shapes in the image

Functional Area - Operations Management

	○ Examine the inner portion of the shape and compare it to preloaded bitmap files for unique identification ○ Obtain a transformation matrix for each pattern and proceed to overlay computer graphics on the screen ○ Perform subject identification and accurate distancing and target tracking by the unique transformation matrices between the patterns and the camera, etc. - Conduct the above tasks in an iterative design, testing and development sprints to refine the overall product solution - Report the progress and results to the development team at appropriate time intervals 3. Exhibit professionalism - Always devote fully to all activities related to the analysis of camera data for graphic overlay in AR application, and follow all prescribed guidelines and procedures - Always perform all tasks related to graphics overlay for AR applications in an accurate manner, without sacrificing the results due to time or other limitations
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Complete the analysis of camera data accurately within time and budget constraints - Use camera data to successfully complete graphic overlay for the AR application in concern, and produce appropriate outputs to the satisfaction of the development team
Remark	

Functional Area - Operations Management

Title	Apply augmentation data in AR application
Code	107995L4
Description	This unit of competency applies to interactive web designers in the DMT (digital Media Technology) profession. One of key processes in the development of AR applications is cross referencing and overlaying live data we are augmenting and the meta data used for augmentation. This UoC concerns the competencies in applying augmentation data in AR applications in the capacity of a developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for augmentation data in AR application
	
	• Master programming knowhow, concepts and techniques
	• Possess good understanding about AR related techniques and tools, such as:
	    o HTTP and XML parsing
	    o 3D rendering
	    o AR SDK
	    o Head mounted displays
	    o Eye wear and wearable displays, etc.
	• Process proficient knowledge and technique in storing and accessing augmentation data
	• Understand software related copyright, ethics and privacy issues
	
	2. Apply augmentation data in AR application:
	
	• Determine the sources of augmentation data for the AR application in concern, which typically may be:
	    o From own database
	    o From online database
	    o From web service that can filter to nearby points of interest through web or cloud services, etc.
	• Determine when and where to perform graphics overlay by placing augmentation data into live data
	• Implement data sharing solutions with augmentation data, such as taking input from camera and overlaying images in real-time and mesh up with the image
	• Interact objects / data in both the real and virtual world, typically by the following procedures:
	    o Detect and track input data such as coordinate marks or fiducials
	    o Process input data to determine the relative position and orientation between the user and the target objects
	    o Register virtual world objects to the real world objects
	    o Integrate virtual world objects with the real world objects by :
	        ▪ Displaying or projecting an image of the virtual world objects over the real world objects
	        ▪ Electronically combining an image of the virtual world objects with a captured imaged of the real world objects, etc.
	• Use various application program interfaces (APIs) to overlay the augmentation data over live data for creation of augmented experiences, including but not limited to:
	    o Device camera APIs
	    o Graphics APIs
	    o Sensor APIs, etc.

Functional Area - Operations Management

	• Make appropriate adjustments reiteratively to the process of applying augmentation data until the desired outcomes are achieved 3. Exhibit professionalism • Always devote fully to the process of applying augmentation data to the AR application in concern, and remain open and updated with related technologies • Always perform the process of applying augmentation data according to user requirements and expectations, and place the interests of users as the highest priority consideration
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the tasks for applying augmentation data to the AR application within time and budget constraints • Grasp users' expectations and preferences towards the AR application in concern and produce outputs with satisfactory contents and level
Remark	

Functional Area - Operations Management

Title	Develop Virtual Reality (VR) application
Code	107996L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of VR applications. VR refers to a computer simulated environment that creates life-like 3D visualizations, it is a powerful medium for creating interactive and engaging experiences that involves multiple senses such as visual, auditory and tactile, and the virtual environment gives users a more complete representation of the world and a higher degree of engagement. This UoC is concerned with the abilities in VR application development using specified tools and facilities.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for VR application development - Realize the philosophy and guidelines of the organisation towards VR application development - Master programming knowhow, concepts and techniques - Well versed in computer graphics, software engineering and applied mathematics - Possess good understanding about virtual reality and related techniques, such as: - VR software architecture design - VR software prototyping 3D simulation engine development and implementation - Porting VR software to various platforms - High quality standard in software coding, etc. - Understand software related copyright, ethics and privacy issues - Possess the personal traits of a typical VR application developer, such as: - Highly imaginative - Credible industry exposure - Experienced with user preferences and requirements, etc. - Keep abreast of new research in Substitutional Reality (SR) and related techniques, such as: - Create the virtual world using the physical environment - Pair the physical object to its virtual counterpart 2. Develop VR application: - Fully comprehend the key requirements for a VR system and apply them in the development process, including : - Performance - Flexibility - Ease of use, etc. - Fully explore and exploit the advantages offered by those popular VR development tools, such as : 3D modelling tools used for developing VR games products like CAD software, 3ds Max, etc. - Ease of maintenance - Ease of modifications - Low resources consumption, etc. - Perform routine tasks associated with major milestones in the VR application development life cycle, including :

Functional Area - Operations Management

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     ○ Prototyping
     ○ Development
     ○ Testing
     ○ Debugging, etc.
- Perform the detailed VR application development tasks, which may include but not limited to the followings :
     ○ Create high-level and low-level interfaces
     ○ Create graphics interfaces
     ○ Handle the details of user and program interaction
     ○ Edit screen content for fast turnaround
     ○ Design animation and digital visual effects, etc.
- Make appropriate adjustments reiteratively to the VR application being developed until the desired outcomes are achieved
- Present the completed VR application to the game development team or supervisor for comment and approval

3. Exhibit professionalism

- Always devote fully to all activities related to the development of the VR application in concern, and remain open, current and updated with related technologies
- Always perform VR application development according to requirements and expectations, and place the interests of potential users as the highest priority consideration

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The integrated outcome requirements of this UoC are the abilities to :

- Able to complete the VR application development tasks within time and budget constraints
- Able to grasp users' expectations towards the VR application in concern and produce outputs with appropriate contents and level to satisfy the users

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Functional Area - Operations Management

Title	Deploy VR application to different hardware platform
Code	107997L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are involved in the development of VR applications. Deploying a VR application to designated hardware platforms is a key step in the entire application lifecycle and involves a lot of considerations and processing. This UoC concerns with the abilities in and procedures for VR application deployment in the capacity of a developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for deploying VR application to different hardware platform
	
	• Realize the philosophy and guidelines of the organisation towards VR application development
	• Master programming knowhow, concepts and techniques
	• Possess proficient software test analysis skills
	• Comprehend the complicated environment for apps on various software platforms and versions
	• Possess the personal traits of a typical VR application developer, such as:
	    o Highly imaginative
	    o Credible industry exposure
	• Experienced with user preferences and requirements, etc.
	
	2. Deploy VR application to different hardware platform:
	
	• Identify the possible platforms for deployment of the VR application in concern, such as :
	    o Android
	    o iOS
	    o Unity
	    o Other possible platforms
	    o Various versions of the above platforms
	• Extract the essential elements in the application's technical requirements and use them to :
	    o Develop the VR application implementation plan
	    o Select the hardware platform for application deployment, if applicable
	    o Create and maintain test conditions on different platforms
	    o Create the related scripts, etc.
	• Explore the process to evolve and fit VR applications over heterogeneous hardware platforms (retargeting), which may involve :
	    o Determine the methodology for VR application development
	    o Identify a set of tools for development support
	    o Develop a hardware-independent and component-based formal model that describes the execution of VR applications
	    o Choose an XML type language for describing complex and implementation independent VR applications
	    o Work out a manual way to isolate and replace interaction techniques as a contribution to VR retargeting, etc.
	• Review requirements of the application and design proper documentation on a continuous basis

Functional Area - Operations Management

	• Present relevant reports and recommendations to the application development team or supervisor for comment and approval 3. Exhibit professionalism • Always devote fully to all activities related to the deployment of VR application to different hardware platform, and remain open, current and updated with related technologies • Always perform the VR application deployment according to requirements and expectations, and place the interests of potential users as the highest priority consideration
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete the VR application deployment tasks within time and budget constraints • Grasp users' expectations towards the targeted hardware platforms at completion of the VR application deployment in concern, and produce appropriate outputs to the satisfaction of the users
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Implement data management for VR / AR applications
Code	107998L4
Description	This unit of competency applies to development personnel in the DMT (digital Media Technology) profession. Data management is one of the mandatory tasks in any ICT development process and both Virtual Reality (VR) and Augmented Reality (AR) applications are of no exception. This UoC concerns competencies in handling and manipulating data during the AR / VR apps development process in the capacity of a developer.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for data management for VR / AR applications
	
	• Master programming knowhow, concepts and techniques
	• Understand the organisation's policies and guidelines towards data management for VR / AR applications, if any
	• Possess specialized programming skills in areas such as :
	   o Authoring
	   o Engineering
	   o Quality testing
	   o Database management systems (DBMS), etc.
	• Familiar with programming languages related to the data management context such as:
	   o Objective-C
	   o Swift
	   o Java
	   o SQL
	   o PHP
	   o ASP.net
	   o JSP, etc.
	• Possess good understanding about data manipulation in the process of VR / AR applications development, such as :
	   o Overhead in creating plausible application scenarios
	   o Scalability in the data size of the physical world accessible by VR / AR
	   o VR / AR related visual clutter and graphics overload
	   o Data management for very large geographic 3D models, etc.
	• Keep abreast of the new developments and technological advancements in the ICT industry
	
	2. Implement data management for VR / AR applications :
	
	• Identify the data needs for the applications to be developed, with special focuses on VR / AR features
	• Determine the methods and options for data management issues, with special focuses on VR / AR features
	• Determine additional data management options for handling VR and AR, such as:
	   o The higher processing power which requires a 3D VR data management system
	   o The capacity in allowing users to transmit information related to visual and interactive components defined as functions of the time variable
	   o Ownership and privacy of the data, etc.
	• Create local, remote, web or cloud based data storage according to the requirements of the VR / AR applications in concern and guidelines of the organisation

Functional Area - Operations Management

	- Create and link databases to the user interface such that information can be retrieved, stored and processed interactively via the VR / AR applications - Perform session data creation, removal and replication both locally and remotely - Monitor the operation of data and interaction with the VR / AR applications to identify possible loopholes and problematic areas 3. Exhibit professionalism - Always be current and updated with trends of data management technologies - Apply industry's best practices to data management that meets the organisation's business needs and conformed with the requirements of the VR / AR applications in concern
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Grasp the organisation's policy and guidelines towards data management and apply to the VR / AR applications in concern accordingly - Design and implement the required data management methods that can operate correctly and conform to the requirements of the VR / AR applications
Remark	This UoC contains the features mentioned in the other UoC "Implement data management for apps" with additional requirements for VR / AR applications.

Functional Area - Operations Management

Title	Develop interactive infographic for website
Code	107999L3
Description	This unit of competency applies to web developers and digital media technology (DMT) practitioners. Infographics is not new; Applying with web technology interactivity features, it creates an interactive experience in a way of conveying potentially complex or detailed information in an easy to understand and intuitive that engages the visitor. This UoC concentrate on competencies involved in developing web site with interactive infographics, starting from understand the message or objective of the website to infographics design and creation of the infographics for website
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for develop interactive infographic for website
	
	• Possess good communication skills to be able to communicate with all levels particularly to acquire web design requirements and communicate infographic design/storylines to stakeholders
	• Possess good knowledge of interactive web technologies and infographic tools
	• Possess good skills in infographic designs and capable of creating infographics to convey complex information or messages
	• Possess website development skills, including script programming
	
	2. Develop interactive infographic for web site:
	
	• Work with stakeholders to understand needs of the website (collect requirements), For example:
	    o Objectives of the website
	    o What information and message to convey
	    o Target audience
	• Formulate storyline or message theme and the type of infographics to use for presenting the storyline of message, such as but not limited by the following:
	    o Visual articles
	    o Flowchart
	    o Timeline
	    o Versus Infographics
	    o Photo Infographics
	• Create mockup initial design to obtain feedbacks from stakeholders/team members
	• Identify suitable infographic creation tools best for the job and create the infographics with the tools, such as:
	    o Illustrator, Photoshop, Premier, etc.
	    o Adobe Edge Animate CC
	    o Specialised infographic creation tools like VISME, CANVA, INFOGR, etc.
	    o Other vector graphics applications/tools
	• Insert or embed the appropriate contents with the infographics, such as:
	    o Links
	    o Video, animations, music, sound, effects
	    o Texts
	    o Programs
	• Add interactive functions with scripts to enhance interactivity according to the design and requirements

Functional Area - Operations Management

	• Test the infographics and web page to ensure it performed to the required effects • Acquired work sign off from stakeholders and facilitate posting of the content onto the website 3. Exhibit professionalism • Be current, updated and knowledgeable of trends of new web technologies • Apply industries best practices to implement interactive infographics websites that meets the organisation business needs and conformed with web standards
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Work with stakeholders to determine the requirements for the website • Create a design and select the correct infographics type that can covey the storyline or message of the requirement • Develop the interactive infographics with sufficient interactive functions that can engage visitors and increase site traffics
Remark	

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Functional Area - Operations Management

Title	Create a responsive website
Code	108000L3
Description	This unit of competency applies to web developers and digital media technology (DMT) practitioners. With ever growing of web-enabled devices, each with differing size, capabilities and features; it's no longer sensible to build fixed-width websites. A web page should look good, and be easy to use, regardless of the device. This UoC concentrate on competencies for designing/creating a new "Responsive Website" that can resize, hide, shrink, enlarge, or move the content to make it look good on any screen for desktop or mobile devices
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for creating a responsive website
	
	• Possess good communication and literacy skills to be able to understand requirements from stakeholders verbally or from specification
	• Possess good web design skills
	• Possess good knowledge of responsive web technologies
	• Possess good knowledge of HTML 5 and CSS 3 particularly responsive web features
	• Possess knowledge of page description diagram
	• Possess website development skills, including script programming
	
	2. Create a responsive website:
	
	• Work with stakeholders to understand website requirements, including but not limited to the following :
	    o Goals of the website, message or theme of website
	    o Target audience
	    o Specific target devices, if any
	    o Acquire details requirements of each web page, scope of the work, determine creative direction/requirements, level of uniqueness, type of information to show, colour schemes, etc.
	• Create initial design using responsive design techniques which describes the website in components (patterns) that allows easy creation of responsive website and facilities discussion/agreement with stakeholders. Design techniques included but not limited to the following :
	    o page description diagram
	    o Wireframe
	• Perform market research for inspirations and determine suitable responsive templates, if any, that matches the design requirements as well responsive tools that can be in the website creation, such as auto image resizer, etc.
	• Create the components of the web page with techniques includes but not limited to the following :
	    o CSS, HTML5
	    o Match each device
	    o Meta Viewport tag
	    o Media Queries
	    o Responsive web patterns
	    o Fluid/Adaptive images
	• Test the responsive website with different devices and browsers to ensure the outcome as expected

Functional Area - Operations Management

	• Seek work sign off from stakeholders and facilitate rollout of the website 3. Exhibit professionalism • Be current, updated and knowledgeable of trends of responsive web design • Apply industries best practices to implement responsive websites that meets the organisation business needs and conformed with web standards
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Work with stakeholders to determine the requirements for the website • Perform sufficient research to identify suitable tools and methods for the creation of responsive website • Use suitable responsive web design techniques to create the responsive website that meets the organisation business needs and objectives
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Commissioning a Content Management System (CMS)
Code	108001L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible for implementation of the organisation's CMS/DAM (Digital Asset Management) system. Commissioning can be defined as the process of assuring that a new system and components of CMS/DAM are designed, installed, tested, and operated, according to the organsiation's requirements and it is an important issues area identified and dealt with before system is handed over to the operation team. CMS and DAM as well as Enterprise Content Management (ECM) will be used interchangeably for a system that manage digital media contents
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for Commissioning a Content Management System (CMS)
	
	• Possess excellent project management skills
	• Possess good knowledge of digital media contents and assets
	• Understand functions and features of CMS/DAM systems
	• Possess in-depth knowledge of commissioning/decommissioning process
	
	2. Commissioning a Content Management System (CMS)
	
	• Work with stakeholders and developers to gain an understanding of the objectives, the functions and features of the CMS/DAM, type of contents/assets are being managed, etc.
	• Plan for the commissioning procedure including but not limited to the following:
	   o Identify all activities and tasks to be performed during commissioning
	   o Identify responsibilities
	   o Identify schedules/timeline of all commissioning activities
	   o Identify stakeholders
	   o Identify asset meta data/collection/transcription
	   o Identify workflow
	   o Organise security access for all parties involved with the commissioning process
	• Prior commissioning of CMS/DAM
	   o Ensure test plan has been completed and accepted by all stakeholders
	   o Submit plan and agree with stakeholders
	   o Prepare tools for asset collection and entry
	   o Verify all hardware and software have been install and tested
	   o Ensure all documentations are prepared and ready, such as system and operation manuals, asset/content/meta data capture request forms, etc.
	   o Ensure all parties and stakeholders have been informed
	• Perform commissioning of the CMS/DAM system with testing function and features include but not limited to the following:
	   o Verify system, network, and security are properly configured
	   o Content capturing and versioning function correctly
	   o Workflows performed as designed
	   o Content delivered within the designed performance
	   o Monitoring and accounting function as designed
	   o Searching and locating

Functional Area - Operations Management

	• Log and record defects. Major defects may need to be rectified, retested before proceeding to next stage • Perform appropriate training before the system is hand over for operational use • Collect and package all documents related to the commissioning process, including all test plans and signed off test results which are filed for reference 3. Exhibit professionalism • Apply industry best practices to commission CMS/DAM systems and to facilitate the organisation to manage its digital assets effectively and efficiently
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully comprehend the objectives, function and features of the CMS/DAM to produce a comprehensive detail commission plan that can be accepted by all stakeholders • Develop a comprehensive commissioning test plan that can test all functions and features of the CMS/DAM • Manage and complete the commissioning of CMS/DAM system within the designed commissioning schedule and any defects or malfunctions are logged and communicated with appropriate parties
Remark	

Functional Area - Operations Management

Title	Implement a Digital Asset Management (DAM) system
Code	108002L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible for implementation of the organisation's DAM system. DAM, in a digital media production shop, is a must have tool but implementation of an effective DAM system requires good experience IT personnel who manage each implementation stages from planning to deployment. DAM systems can be on premise or cloud based. This UoC will illustrate mainly the former type and the DAM is purchased from a vendor as an "off the shelf" product or custom developed.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for implementing a Digital Asset Management (DAM) system
	
	• Possess project management skills
	• Knowledge of digital media contents
	• Understand functions and features of DAM systems
	• Understand the importance of Asset Management to the organisation
	• Understand the organisation business objectives
	
	2. Implement a Digital Asset Management (DAM) system
	
	• Work with stakeholders to understand the objectives of implementing a DAM system
	• Perform a study of the organisation's digital assets to determine the functional needs such as:
	   o Content security - access control for asset owner, internal users, customers, etc.
	   o Meta data for asset tracking and searching
	   o Version control or workflow control
	   o Compliance functions including audit trail reports
	• Identify a suitable DAM system either as "off the shelf" product or custom developed to integrate with other internal systems, such as CRM, media production system, etc.
	• Formulate an implementation plan, taking into account data conversion at roll out, training, etc.
	• Build a team who will eventually take ownership of the DAM. The team should have knowledge of the organisation operations, technically and DAM system savvy so that it can manage, customise, streamline and automate functions/processes as well as provide user support
	• Establish security procedures for upload, access and download of contents
	• Establish asset tagging procedures with metadata defined that complied with the organisation's standards. The procedure should ensure all incoming assets are consistent before and can be released for consumption
	• Establish training programs for users to ensure users understand how to use day-to-day DAM system features, workflows and collaborating with other users
	• Review DAM periodically to ensure its functions can fit with the organisation business needs
	
	3. Exhibit professionalism
	
	• To implement DAM systems to facilitate the organisation to manage its digital assets effectively and efficiently

Functional Area - Operations Management

	• To implement DAM to reduce total cost of ownership and good return of investment (ROI)
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Study and identify the organisation's functional requirements for the DAM that can be supported by all stakeholders • Work with DAM vendors to roll out the system in-line with planned schedule • Provide the necessary and sufficient training and support to users which enable them to utilise the functionality of DAM in most effective and efficient manner
Remark	

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Functional Area - Operations Management

Title	Formulate media content storage procedure
Code	108003L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating the storage procedure for the organisation. Digital media content are assets of a DMT organisation and they needed to be safeguarded. The use of storage procedures can be helpful in controlling access, preserving data integrity and improving productivity. The procedure is taking into regards the fulfillment of the organisation's various policies but without hindering accessibility of users, customers and production teams. This UoC describes the competency required to formulate those procedures.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating media content storage procedure
	
	• Possess good project management skills to be capable to perform fact finding, analyse and formulate solutions
	• Possess good communication skills to be able to communicate with all levels of stakeholders or users
	• Possess good knowledge of storage technologies (online and offline)
	• Possess in depth knowledge of the organisation's storage and operational structure
	• Possess good knowledge of the organisation's policies
	
	2. Formulate media content storage procedure:
	
	• Study the organisation's various policies and strategies related to digital assets usage which may affect storage procedure, including:
	    ○ Security policies
	    ○ Backup and recovery policies
	    ○ Short, medium and long term storage policies
	    ○ Compliance restriction policies
	• Identify the storage options of the organisation, such as:
	    ○ Online storage
	        ▪ SAN (storage area Network)
	        ▪ RAID (Redundant Array of Inexpensive/Independent Disks
	        ▪ Cloud
	        ▪ NAS (Network Access Storage)
	    ○ Offline storage
	        ▪ Flash media (USB sticks, SD Cards, etc.)
	        ▪ External hard drives
	• Determine the access/usage pattern needs of all stakeholders (customers, users, developers, owners, etc.) in relation to the storage options and document it with a mapping
	• Write storage allocation procedure for online storage option particularly if using tiered storage technology. For example: production contents needed to be on SSD (fastest tier), customer access contents on disks (medium tier), infrequently used contents on near-line optical storage (slowest tier)
	• Write procedures to guide users on "how and what" storage options to comply with the organisation policies
	• Write security procedures (including: access, handling, sharing, transportation, etc.) to guide users and technical support team on safeguarding the contents held on storage

Functional Area - Operations Management

	options. It may be necessary to recommend banning certain storage options when found that it does not fulfil security policies • Write backup and recovery procedures with consideration to different types of storage that needed to be backed up. It also includes how and when the backup to take place as well as type of backup (full, partial etc.). • On completion of drafting of the procedures, seek input from various stakeholders before distribution. Where appropriate include suggestions and next review date • Seek approval from senior management with schedules for general adoption and monitoring 3. Exhibit professionalism • Be updated with current storage technologies and apply industry best practices to develop procedures that fulfil stakeholders' needs to storage usage and safeguarding the organisation's digital assets
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Complete an in depth study of the organisation's available storage options with stakeholder's usage pattern to produce a mapping of "organisation storage needs" • Write storage procedures that fulfil the organisation's policies and provide concise and precise user instructions without any miscommunication • Deploy the procedures on schedule and the adoption rate meets the expectation of the management
Remark	

Functional Area - Operations Management

Title	Create asset inventory
Code	108004L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible for creating the inventory of the organisation digital asset. "Digital asset", in this context, are all the digital media contents which are the property of the organisation. The inventory "list" may be a part of a complex asset management system or just a simple spreadsheet. However, a well-designed and maintained inventory is a very important part of a DMT company's content and business strategy.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for creating asset inventory
	
	• Possess good organisation and analytical skills
	• Good knowledge of the organisation's digital media contents
	• Appreciate the importance of a well implemented inventory system to the organisation operation and content strategies
	• Possess good knowledge of digital media content structures
	• Possess good knowledge of inventory and asset management methodologies
	
	2. Create asset inventory:
	
	• Determine the objectives of the inventory system and its application, including but not limited to the following:
	    o What assets the organisation have
	    o Facilitate production workflow
	    o Tracking of assets
	    o Who and when these assets are created
	    o Control of access
	    o Analytic for business strategies (such as: marketing, product sales, etc.)
	• Determine the type of asset and make related security considerations
	• Work with stakeholders to define the inventory structure, including but not limited to the following:
	    o Media Category
	    o Sub-category
	    o Location (Local, External)
	    o Content ID
	    o Content full description
	    o Content owner
	    o Date created, last updated, version number, last access user
	    o Access rights
	    o Other metadata
	• Create the inventory and coordinate the collection of asset details for inventory list either manually with assistance from all stakeholders (content owner, administrators, developers, etc.) or use a software tool to crawl the content servers to extract details from the stored assets
	• Review the inventory list items with stakeholders to ensure it is complete and correct
	• Optimised (order) the inventory list to match the objectives of the organisation. For example:
	    o Optimised for development use

Functional Area - Operations Management

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○ Optimised for distribution
○ Optimised on most accessed

Formulate inventory list update and maintenance procedures for the inventory list and ensure all stakeholders will follow the procedure when new assets contents are created, updated, deleted

3. Exhibit professionalism

Apply current inventory management technology and techniques to implement an inventory system that matches the organisation's business needs

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<td>Assessment Criteria</td>
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The integrated outcome requirements of this UoC are the abilities to:

Determine the business objectives of creating inventory system
Create the inventory structure to match the organisation's business objectives
Develop a comprehensive procedure that can effectively keep the integrity of inventory

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Functional Area - Operations Management

Title	Define asset management requirements
Code	108005L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible for implementation of the organisation's Digital Asset Management (DAM) system. Before an organisation is committed to commission a DAM system it is necessary to determine the requirements before investing on the long term project.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for defining asset management requirements
	
	• Possess project management and coordination skills
	• Good knowledge of digital media contents
	• Excellent at workflow management
	• Good knowledge of functions and features of DAM systems
	• Detailed knowledge of metadata models for digital contents
	• Detailed knowledge of the organisation business objectives
	
	2. Define asset management requirements
	
	• Setup consultation sessions with different levels of stakeholder of the organisation, including representatives of all areas of the workplace
	• Use focus group sessions and other techniques to help identify functions required of DAM, include but not limited to the following:
	   o Type of content stored: e.g. image, audio, video, graphic, scripts, layout and creative files
	   o Search methods and options
	   o Metadata capabilities: e.g. allow for configurable schemas, have bulk editing capabilities, and be able to append, replace, read, and write embedded file data
	   o Categories and indexing for assets.
	   o Viewing and commenting features to preview assets
	   o File processing and transcoding, or automatically converting files from one master file to other formats
	   o Versioning and manage file updates and track asset history
	   o Asset distribution from system via download, social publishing, and embedded links
	   o Easy uploading and downloading either via drag and drop or other bulk import methods
	   o Reporting and tracking of asset usage throughout the asset lifecycle
	   o APIs to allow connectivity with other systems: i.e. games subscription, delivery, accounting
	   o Service and user support records when answering questions
	   o Roles and permissions to manage and control different levels of access and usage by user group
	• Categorise the collected function requirements to "must haves", "nice to have", and "future need", which will evaluate DAM systems or provide function requirements to developers
	• Prepare and forward the list to stakeholders for review and action

Functional Area - Operations Management

	3. Exhibit professionalism • Comply with asset management standards and respect intellectual property rights • To implement DAM that can reduce total cost of ownership (TCO) and required return of investment (ROI)
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Use suitable research or data collection methodologies to collect DAM requirements from representatives of the workplace • Identify the DAM functions and features for the organisation • Categorise and package the requirements in a format that can facilitate decision making
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Define user access control for media content
Code	108006L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible in managing user access control of the organisation's media content. The media contents are expected to be held in Digital Asset Management (DAM) or Content Management System (CMS). This UoC concentrates on defining general access control of contents at application level and makes no assumption or reference on how it is implemented at server level.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for defining user access control for media content
	
	• Possess project management and coordination skills
	• Good knowledge of digital media contents
	• Good knowledge of security functions and features of DAM and CMS systems
	• Detailed knowledge of the organisation business objectives
	
	2. Define user access control for media content:
	
	• Review the type of user and ROLEs that will be accessing the server system, such as but not limited to:
	    o Guest
	    o Administrator
	    o Staff
	    o Creator
	    o Author
	    o Designer
	    o Programmer
	    o Buyer
	• Review different ATTRIBUTEs of media contents, example may include but not limited to:
	    o Published work
	    o Unpublished work
	    o IP protected document
	    o Internal use
	    o Internet use
	• Review and identify all possible OPERATIONs (characteristic of access management), examples may be:
	    o Replicate from one computer to another.
	    o Render an image on a screen.
	    o Downloadable
	    o View only
	• Define common access control policies in the format acceptable by the system such as: ROLE + ATTRIBUTE + OPERATION. For example: a gamer purchaser may have access policy = (buyer + published work, Internet use + downloadable, viewable)
	• Each user is mapped to ROLE + ATTRIBUTE + OPERATION or a common policy which the system used to control access

Functional Area - Operations Management

	3. Exhibit professionalism • Comply with asset management standards and respect intellectual property rights • To implement DAM that can reduce total cost of ownership (TCO) and required returned of investment (ROI)
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Accurately review categorisation and security structure of digital contents required for content server • Identified all the ROLES, ATTRIBUTES and OPERATIONS of media content and users • Map all users to correct ROLES, ATTRIBUTES and OPERATIONS that can provide the correct access control
Remark	

Specification of Competency Standards
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Functional Area - Operations Management

Title	Manage content distribution performance
Code	108007L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who are responsible in managing digital content distribution performance. Digital content grows rapidly and is getting larger with changing trend of content type to videos. The changing factors affect the distribution system performance and the user's expectation. The DMT practitioner will need to make recommendations and/or take appropriate actions to ensure the distribution system is running at optimum rate.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for managing content distribution performance
	
	• Possess project management and analytical skills
	• Good knowledge of content distribution systems and distribution network infrastructures
	• Good knowledge of performance measuring tools
	• Possess good knowledge of the organisation's business objectives
	• Well in tune of latest content distribution technologies
	
	2. Manage content distribution performance:
	
	• Review and comprehend the organisation's content distribution system's design specification to determine the deigned performance limits including :
	   o The distribution application
	   o Network infrastructure
	   o Storage media and system
	• Regularly use various means to collect content distribution system's performance statistics, including but not limited to the following :
	   o System performance tools
	   o User complaints
	   o Third party monitoring tools
	• Regularly examine factors that affect distribution performance, such as but not limited to the following :
	   o New content growth rate
	   o Business strategy changes and growth
	   o Increasing size of contents
	   o Trends of content type that is increasing
	   o Access/usage pattern (external access vs internal access)
	   o Increase in customer downloads
	• Monitor and regularly review distribution infrastructure to ensure they are operating at its optimal level. For examples :
	   o Server(s)
	   o Network
	      ▪ Routers
	      ▪ DNS
	   o Cache
	• Analyse and compare the "designed performance" of the distribution system with statistics to formulate recommendations and/or action required, if any, include but not limited to the following:
	   o Improve the ways contents are acquired and distributed

Functional Area - Operations Management

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○ Improve the way system categorising contents, i.e. adjust indexing method
○ Restructure storage technologies that hold hot contents on faster storage media technology
○ Explore improvement on distribution infrastructure technology, such as Content Distribution Network (CDN)
○ Upgrade system application modules to increase performance, such as:

▪ Searching
▪ Content capture
▪ Content publishing

• Document results and recommendations for decision making and action

3. Exhibit professionalism

• Apply industry best practices and delivery technologies to ensure the organisation's content distribution system is kept in most efficient status and contents are delivered at committed performance level

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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

• Comprehend the performance limits of the organisation content distribution system
• Setup different means that can capture, monitor, collect statistics of the distribution system's performances which can be used for analysis
• Formulate recommendations and actions to improve and maintain performance of the organisation distribution system

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Functional Area - Operations Management

Title	Select digital rights management system
Code	108008L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with the task of selecting a Digital Right Management (DRM) system. DRM system is used to protect and manage the Intellectual Property (IP) ownership, commerce and privacy rights of organisation's digital assets through control of distribution and access. This UoC concerns control of distribution over network (Internet and LAN) rather than physical media, such as CD-ROM, DVD, blue-ray, USB memory stick (thumb drive), etc.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for selecting digital rights management system
	
	• Possess basic project management skills to be capable to perform fact finding and analysis of various DRM systems, and make recommendation
	• Possess good communication skills to be able to communicate with all levels of stakeholders or users
	• Possess good knowledge of DRM functions and technologies (online and offline)
	• Possess good knowledge of DRM laws and restrictions for owners and consumers, such as: not providing misleading information, public broadcasting of songs, making private copies, etc.
	• Possess basic knowledge of Hong Kong Intellectual Property ordinance and laws
	
	2. Select digital right management system:
	
	• Confirm the term of reference with appropriate stakeholder (senior manager, project manager or supervisor)
	• Determine the type of the DRM system to be selected:
	    ○ Manage distribution and control usage (i.e. games distribution)
	    ○ Enterprise DRM system
	    ○ Both of the above
	• For enterprise DRM, determine what features and functions required to support or integrated with other systems, such as but not limited to:
	    ○ Persistent protection – access control set by rights holders from other system or location are enforced
	    ○ Intercompany transactions – interacting with other companies' systems without compromising security
	    ○ Transfer of rights – staff movement between departments or sister companies, functions needed to perform transfer, assign who can do the transfer, etc.
	    ○ Track usage of DRM works – Monitor access of usage pattern and usage of confidential data
	    ○ Easy identification
	    ○ Easy verification
	    ○ Handle access right at per asset, team and division
	• For managing distribution systems, determine what features and functions that protects IP of assets that are transacted online, such as but not limited to the following:
	    ○ Support the business model – controls on customer purchase, subscription, rental, enable single and/or multiple playback, streaming, downloading, etc.
	    ○ Encryption
	    ○ License management – activation and number of activations, etc.

Functional Area - Operations Management

	- o Access control by asset and brand level (or customisable) - o Able to detect location, hardware/software requirements, and/or device type so that the correct version of media can be provided to the consumers - o Intuitive user/customer interface to facilitate access with concise and precise messages that the users can follow - Prepare a feature list in order of preference - Perform research, to determine whether "canned" products can satisfy the feature list or customised DRM system is needed - Formulate a report and deliver presentation to stakeholders, project managers or supervisors 3. Exhibit professionalism - Apply industry best practices with consideration of local IP laws and consumer rights to select the best DRM system that is fit for the organisation business purpose
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Understand and confirm the term of reference for the selecting the organisation DRM system - Organise fact finding sessions and collect all view points from various stakeholders to formulate a DRM system functions requirement list - Present and recommend a suitable DRM system based on research made on "canned" systems and the required functions and features indicated by stakeholders
Remark	

Functional Area - Operations Management

Title	Utilise compression techniques and CODEC for digital media production
Code	108009L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who utilise compression techniques and CODEC for digital media production. Digital media files can be large which affects distribution, storage and production; compression seems an obvious solution. Viewing and working with compressed digital media files will need CODEC. Hence, selecting a compression method will need to take into consideration of CODEC factors.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for utilising compression techniques and CODEC for digital media production
	
	• Understand the principles of digital media compression strategies such as:
	   o Redundancy reduction
	   o Irrelevancy reduction
	• Good knowledge of lossy and lossless compression techniques
	• Understand the pros and cons of using standard and proprietary compression techniques
	• Possess detailed knowledge of digital media compression technology
	• Possess basic knowledge of CODEC modulation techniques
	
	2. Utilise compression techniques and CODEC for digital media production
	
	• Comprehend the digital media production requirements
	• Determine the objective of utilising compression technology for digital media production, including:
	   o Storage requirements – reduce media files size to save storage space
	   o Delivery requirements – reduced sized will affect delivery speed and require smaller network bandwidth
	   o Processing requirements – some compressed file can be encoded in such a way that it is easier and faster to process its contents than those of a similar-sized file that has not been compressed
	• Evaluate possible standard and proprietary compression techniques available for media content. For example:
	   o Image : JPEG, PNG, GIF, TIFF
	   o Audio : MP3, FLAC
	   o Video : AVI, MPEG, WMV
	   o Streaming: QuickTime, ProRes, WebM, H.264, VP9, and H.265
	• Identify suitable CODEC to be used use in the media compression taking into account the required output quality. For example: art video will need colour explicit encoding and sport video may probably would not.
	• Select the most appropriate compression technique for digital media file
	• Use appropriate systems or devices to apply tests on few files with different setting and adjustments to determine the best result
	
	3. Exhibit professionalism
	
	• Apply industry best compression technology to ensure digital media content production complied with the organisation standards

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

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • fully grasp the compression requirements needed for the digital media content • identify all available CODECs (open or proprietary) for the digital media content • identify correctly one or more CODEC that fulfill the requirement and fit the purpose of the digital media content
Remark	

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

Functional Area - Operations Management

Title	Convert non-digital media to digital format
Code	108010L2
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners who convert non digital media to digital format in their work place. There are many scenarios where conversion of non-digital media to digital format is required which involves complex technical knowledge, skills and decision making. But this UoC is concerned with the DMT personnel following work orders and operate appropriate conversion tools to convert the non-digital media to a required digital output format.
Level	2
Credit	3

Competency	Performance Requirements
	1. Knowledge for converting non-digital media to digital format
	
	• Possess literacy skills to comprehend work orders
	• Possess basic knowledge of digital media compression techniques and its after effects
	• Possess knowledge of operating digital media conversion tools
	• Understand the organisation's digitisation work flow and procedures
	
	2. Convert non-digital media to digital format
	
	• Comprehend and clarify conversion requirements and order
	• Comprehend the organisation's digitisation workflow for conversion of non-digital media to digital format
	• Collect and assess non-digital contents regarding:
	   o Type (e.g. tape, cassette, film, hard copy of image, etc.)
	   o Condition of the non-digital media (e.g. excellent, good, damaged, etc.)
	   o Format (e.g. 35mm, negatives, photograph, sketches, etc.)
	• Identify a suitable conversion tool and prepare any necessary equipment for the conversion task, such as:
	   o Scanner for image conversion
	   o Video capture equipment, video camera and recorder
	   o Audio conversion
	• Perform the digitisation process with appropriate conversion tools that can produce the required output
	• Perform quality control to ensure the output satisfies the required quality, such as:
	   o Visual checks on output colour, no missing items, etc.
	   o The conversion did fully complete
	   o Captured at the required resolution
	   o Compressed with correct compression technique
	• Complete metadata labeling of the newly converted digital file in accordance with the organisation's standard
	• Package and store non-digital media content in accordance with the organisation's procedures
	
	3. Exhibit professionalism
	
	• Being updated with the industry's conversion tools and digital media standards
	• Endeavour to complete the required job to the highest quality and complied with the organisation's standards

Functional Area - Operations Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to:
	• Comprehend the requirements of the conversion and select the correct conversion tools for the job • Convert the non-digital media to digital format successfully • Perform quality control check on the output of the conversion process to ensure it meets the specified work requirements • Complete the after conversion procedures in accordance with the organisation standards
Remark	

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

Functional Area - Operations Management

Title	Observe intellectual property rights
Code	108011L2
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners. Intellectual property rights (IPR) protects ideas and information that are of commercial value and therefore DMT practitioners should understand intellectual property (IP) knowledge so that they would not breach the law inadvertently when trying to purchase DMT products, or design and develop DMT products for sales.
Level	2
Credit	3
Competency	Performance Requirements 1. Knowledge for understanding intellectual property rights: - Possess literacy skills that can understand technical and non-technical documents - Knowledge of common DMT standards - Possess good knowledge of the organisation's IP policies - Understand the importance of production of the DMT products in compliance with IPR 2. Observe intellectual property rights: - Understand the advantages / importance of protecting IPR, such as help to: - Ensure digital images, films and sound recordings in DMT products are protected under the Copyright Ordinance - Identify DMT products traded or related services that are provided under the trademarks - Identify patent claims in DMT products with a short commercial viability - Empower the creativity in DMT branch of the ICT industry - Increase the awareness of IPR and avoid using pirated and counterfeit products - Understand the shared characteristic of IPR to stop others from exploiting the intellectual property without the licence of the right-owner, including the following : - Pirates - Counterfeiters - Imitators - Independent third parties who have independently researched the same ideas - Understand the nature and categories of intellectual property and the relevant ordinance, including the following : - Patents and registered designs - Patentability, ownership, use, registration, infringement and defences, protection and international agreements, etc. - Copyright - Subsistence of copyright, authorship, ownership, use, infringement and defences, computer software, etc. - Trademarks - Registrability and registration, infringement and defences, etc. - International agreements on intellectual property, IP management system - Patent search and drafting - IP licensing and evaluation - Apply the knowledge of IPR in the design and development of DMT products 3. Exhibit professionalism

Functional Area - Operations Management

	• Should keep up with the latest international practices and legislation in the area of protection of IPR in DMT branch of the ICT industry
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Understand the importance of various ordinance in respect of the copyright, trademarks, patents and registered designs in DMT products • Apply IPR to protect ideas and information related to the design and development of DMT products
Remark	

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

Functional Area - Operations Management

Title	Observe digital rights management
Code	108012L2
Description	This unit of competency applies to Digital Media Technology (DMT) practitioners. DMT practitioners should understand the importance of Digital Rights Management (DRM) and its access control technologies to secure digital media contents against unauthorized access and unlawful distribution.
Level	2
Credit	3

Competency	Performance Requirements
	1. Knowledge for understanding digital rights management:
	
	• Possess good literacy skill that can understand technical and non-technical documents
	• Possess good knowledge of the organisation's security policies
	• Understand the importance of information security and assurance for protecting the confidentiality, integrity and availability of information
	
	2. Observe digital rights management:
	
	• Comprehend the digital media production requirements
	• Understand how DRM is designed to manage copying by using various automation and surveillance technologies to identify contents and technologically enforce certain licensing conditions
	• Apply possible DRM techniques to protect digital media files / multimedia contents, including the following :
	   o Encryption
	   o Authentication
	   o Access control
	   o Digital watermarking
	   o Tamper-resistant hardware and software
	   o Risk management architectures
	• Observe an appropriate balance between DRM and privacy
	• Follow the laws related to DRM, such as:
	   o Digital Millennium Copyright Act
	   o EU Copyright Directive
	
	3. Exhibit professionalism
	
	• Apply the best practices of using DRM technologies to prevent unauthorized copying, sharing, piracy and other violations of service terms and partner agreements

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully grasp the DRM requirements needed for the digital media contents • Apply all available DRM technologies for the digital media contents • Follow the laws related to DRM
Remark	

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

Functional Area - Operations Management

Title	Observe information security
Code	108013L2
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners. Digital media personnel are no different to other digital information users. Hence, like other digital information users, they need to observe all rules and procedures layout by the organisation to safeguard all its systems, business information, and assets (digital assets).
Level	2
Credit	3

Competency	Performance Requirements
	1. Knowledge for observing information security:
	
	• Possess literacy skills that can understand technical and non-technical documents
	• Possess basic knowledge of information security concept
	• Possess good knowledge of the organisation's information security procedures and guideline
	• Possess knowledge of who and where to report security incidents
	
	2. Observe information security:
	
	• Understand 3 pillars of information security:
	   o Confidentiality: preventing someone from reading information they are not authorised to read. In addition, confidential information has to be protected from not just malicious people but also their agents, such as malicious software, compromised computer, or other compromised network components
	   o Integrity: prevent information from being inappropriately modified through accidental events or malicious means such as: storage media problems, crashed or buggy programs, and noisy transmission environments can cause accidental data corruption.
	   o Availability: ensure information is all way available which means, in case of temporary loss of information, it can be recovered from backups. Hence, backup or redundancy and speed of recovery are considered to ensure availability
	• Observe user identification and passwords policies, including the following :
	   o Change password regularly
	   o Never keep password visible to others
	   o using only own passwords
	   o log off applications/systems when appropriate
	• Observe guidelines for handling confidential data. It must be stored, transported, transmitted, handled, used, and disposed of in ways that protect the information from unauthorised access, alteration, destruction, disclosure, copying, theft, or physical damage, etc.
	• Observe policies to secure your device, including the following :
	   o Install authorised software
	   o Install anti-virus software
	   o Install anti-spyware
	   o Install personal firewall
	   o Keep system updated and patches current
	• Observe Internet usage guidelines, including the following :
	   o Disconnect from Internet when not needed
	   o Real-time scan for all incoming files before opening them
	   o Do not open emails from strangers

Functional Area - Operations Management

	o Beware of popups, enable pop-up blockers
	     o Beware of phishing
	  • Report any or suspected Information Security incidents in accordance with the organisation procedures and guidelines
	
	3. Exhibit professionalism
	
	  • Always be updated with information security news and follow industry best practices and organisation guideline and procedures to ensure information security is maintained

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to:
	
	  • Understand the importance of information security and follow the organisation guidelines and procedures to safeguard the organisation business assets
	  • Proactively report various suspected information security incidents in accordance with the organisation's procedures

Remark	1. For practitioners involved with information security responsibilities, there are a number of industry standards they should practise, such as: ISO 27000 series 2. For Hong Kong government guidelines to information security best practices, refer http://www.infosec.gov.hk

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

Functional Area - Operations Management

Title	Observe content standards
Code	108014L1
Description	This unit of competency applies to all Digital Media Technology (DMT) professionals. Standards govern the quality of our works and products that we produced. Practitioner should understand the pros and cons of standards as well as the industry's common DMT content standards.
Level	1
Credit	3

Competency	Performance Requirements
	1. Knowledge for understanding content standards
	
	• Possess literacy skills
	• Knowledge of common digital media technologies standards
	• Understand the importance of DMT standards for the production of contents
	
	2. Understand content standards
	
	• Understand the advantages of having content standards at work place, such as:
	 o help to ensure interoperability and compatibility
	 o reduce the risk associated with implementation
	 o provide stability over time
	 o help to identify patent claims
	 o provide a way for many companies and experts to share/combine resources
	• Understand the disadvantages of having content standards, such as:
	 o Standards freeze technology in time that may affect products life span and competitiveness
	 o Slow update of standards impedes development growth
	• Understand usage of common DMT standards, including the following :
	 o Video and Display Resolution
	  ▪ Flash, MPEG 2/4, NTSC, PAL, HDMI, HDTV, UHDTV, etc.
	 o Graphic
	  ▪ JPEG, BMP, Vector graphic etc.
	 o Audio
	  ▪ MP3, WMA, Dolby, THX, AES, SMPTE (Cinema sound system), etc.
	 o Digital media format
	  ▪ CD, DVD, Blu-ray, etc.
	 o Computing display format
	  ▪ VGA, XGA, UXGA, etc.
	 o Broadcasting and Streaming
	  ▪ AAC, H.264, MPEG-DASH, DAB, DVB, etc.
	• Apply the knowledge of DMT content standards in learning or at work place
	
	3. Exhibit professionalism
	
	• Be an advocate of DMT content standards

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • understand the benefits of DMT content standards in work place • apply DMT standards for production of contents
Remark	

Functional Area - Strategic Management

Title	Formulate global and local business strategy
Code	108015L7
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating strategies for the organisation. DMT organisations continuously look to expand their market and Hong Kong being an international city is in a well position to allow DMT organisations to reach into global market. This UoC concerns competences for formulating business strategies that can link the organisation's local and global business objectives. When formulating business strategies Mainland China would be among the agenda, but this UoC will exclude business strategy for Mainland China as it will be covered by a separate UoC.
Level	7
Credit	6

Competency	Performance Requirements
	1. Knowledge for formulating global and local business strategy
	
	• Possess good project management skills and capable of formulating business strategies
	• Possess in-depth knowledge of the organisation's products
	• Possess good knowledge of current and upcoming digital media trends and technologies
	• Possess in-depth knowledge of global and local digital media marking culture
	• Possess in-depth business analytic skills and knowledge on use of business analytic tools, such as : SWOT (Strengths, Weaknesses, Opportunities and Threats), PESTLE (Political, Economic, Social, Technological, Legal and Environmental), etc.
	• Possess in-depth skills in business management and strategy formulation
	• Possess good knowledge of global and local business environment, such as business law, tax, culture, market, etc.
	
	2. Formulate global and local business strategy
	
	• Pinpoint factors that would drive business success and can be converted to the organisation's global and local business goals. For example :
	  o What important *market trends* are now taking place? Area of Growth? Major new product innovation and IT acceptance
	  o How does the organisation's marketing compare with the competitors – expenditure, range, innovation, etc.?
	  o What business opportunity Internet offers? Is the organisation utilising it?
	  o How are the organisation positioned locally and globally? Are the products a global product?
	• Formulate global (International) business strategy with consideration to the following :
	  o Perform in-depth analysis of the global market
	    ▪ Customer demand in the main broad geographical areas: market size, growth and history
	    ▪ Competitors and risks
	    ▪ International and regional infrastructures, particularly for online gaming
	    ▪ Country's politics and economic trends, business laws, IP laws, etc.
	  o Perform product competitive market analysis against local competitors
	  o Identify the resources requirements for international expansion
	  o Setting the organisation's international objectives after realistic context of what opportunities exist in the market place and what resources the organisation possesses
	    ▪ Formulate suitable business model to achieve the business objectives
	    ▪ How is the profitability, over what timescale and with what risk

Functional Area - Strategic Management

	o Make judgements on market entry policy in the absence of complete information
	          ▪ Online purchase/subscribe
	          ▪ Partner or franchised
	      o Formulate product or service offering strategy (pricing, distribution, etc.)
	• Formulate local strategy with regard to but not limited to the following :
	      o Formulate business goals and objectives
	      o Analyse local business opportunities and product competitiveness
	      o Formulate new and/or adjust business model/strategies
	          ▪ Product pricing, marketing and sales
	          ▪ Product development, customer support, resources, innovations, etc.
	          ▪ Asset protection, security, product delivery
	• Make judgements on areas where the global and local business strategy can share implementation strategies in the absence of complete information
	• Present strategies with financial projections to senior management/board to gain support
	
	3. Exhibit professionalism
	
	• Always take into consideration and strike a proper balance among all related technological, political, social, environmental and legal factors when developing global and local business strategies
	• Be knowledgeable of global and local digital media industry so that the right strategy can be developed for the organisation to achieve its business objectives

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Formulate a global and local business strategy that has considered all possible business factors which lead to achieving the global and local business major goals • Formulate a strategy that delivers new and/or adjusted business models that can ensures business sustainability and drive new DMT innovations
Remark	

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

Functional Area - Strategic Management

Title	Formulate uptake of disruptive technologies
Code	108016L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating strategies in the organisation. Disruptive technologies, in the interest of digital media industry, not just to help create new markets by doing things the market does not expect, it is also engaged in disrupting and displacing the existing market by creating and exploring new economic models and new economies. However, it does also create a dilemma – the need to use and try out disruptive technologies to stay ahead of competitors. There are many strategies which an organisation can take, including "blocking strategy", "milk strategy", "invest strategy", "redefine core business strategy" or "exit strategy". This UoC concerns competence on formulating strategy for uptaking of disruptive technologies at business level.
Level	6
Credit	3
Competency	Performance Requirements 1. Knowledge for formulating uptake of disruptive technologies - Possess good project management skills and capable of formulating business strategies - Possess in-depth knowledge of current and upcoming digital media trends and technologies - Possess in-depth knowledge of SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis tool - Possess in-depth knowledge of business management and strategy formulation skills - Possess good knowledge of Hong Kong business laws 2. Formulate uptake of disruptive technologies - All disruptive technology strategists will ask when formulating their strategies. Questions include but not limited to the following: - What actions might the competitors take tomorrow that would keep the organisation awake at night (in fear)? - What new technologies could potentially impact existing business model of the organisation? - What new legislation could potentially destroy the organisation's business model? - Be knowledgeable with digital media trends and actively pursue disruptive technology information from different sources, such as: - Industry and market reports from market intelligence organisation, such as IDC, ITEuropa - Experts' predictions - Reports of Hong Kong trade statistics in digital media/creative media industry. For example: HKSAR's Census and Statistics Department - Overseas, specialised research organisations, For example: Centre of Disruptive Media in UK - Formulate a disruptive team with assigned duties and responsibilities, included but not limited to following: - Research, identify and evaluate disruptive technology - Perform prototyping of implementation of new disruptive technologies - Draw up implementation plans for mass uptake of the technology , when found viable and beneficial to the organisation - Encourage development of disruptive innovations within the company

Functional Area - Strategic Management

	o Test of internal disruptive innovations
	• Perform SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of the concerned disruptive technology to determine the effects it will have on the organisation and provide information for building the adoption strategy
	• Formulate a report for handling disruptive technology within the company, which should comprised of but not limited to the following:
	      o Technical aspects of the disruptive technology, including evaluation details
	      o Effects, risks & potentials it has on the organisation
	      o Implementation plan with timeline, cost and goals
	      o Users or customer acceptance level, etc.
	• Present and review the report with senior managers or board to gain their support and approval for adoption/implementation of the strategic plan
	
	3. Exhibit professionalism
	
	• Be aware of Intellectual Property (IP) rights and ensure developed products comply to the IP regulations
	• Always take into consideration and strike a proper balance among all related technological, political, social, environmental and legal factors when developing disruptive technology strategies

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully understand the organisation's level of endorsement on disruptive technologies by either adoption or internal bred • Manage a team that can promote and identify disruptive technologies in just in time (JIT) and help develop and implement the uptake of disruptive technologies strategies that can help the organisation's business to be competitive • Use appropriate tool to analyse any identified disruptive technologies accurately and formulate strategies with implementation plans that can gain support from senior management or board
Remark	

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

Functional Area - Strategic Management

Title	Formulate risk management strategy
Code	108017L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for formulating risk management strategy for the organisation. Risk is the threat that an event or action will adversely affect an organisation's ability to achieve its objectives. Risk management is the process by which risks are identified, evaluated and controlled. It is important for digital media organisation, with risks exposure greater than normal organisations, to have the right strategy to control and mitigate its risks so to minimise effects on its business. This UoC concentrates on competence of formulating risk management strategy at business level
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating risk management strategy
	
	• Possess good project management skills and capable of formulating business strategies
	• Possess in-depth knowledge of the organisation's mission, vision, business goals and strategies
	• Possess good knowledge of business analysis tools such as SWOT (Strengths, Weaknesses, Opportunities and Threats), PESTLE (Political, Economic, Social, Technological, Legal and Environmental), etc.
	• Possess basic knowledge of industry risk management standards such as: ISO 31000
	
	2. Formulate risk management strategy:
	
	• Be totally familiar with the organisation's overall business strategies to ensure all strategical risks can be identified in its adoption and execution. Key strategical risks include but not limited to the following:
	    o **Political** : changes in political control or significant policy changes at national or local level
	    o **Economic** : changes in the economic climate leading to, for example, lower employment levels – Internet/mobile/cinema charging fees
	    o **Social** : unanticipated effects of changes in demographic, residential or social trends
	    o **Technological** : unanticipated technological change might render significant investments obsolete or undermine key assumptions
	    o **Legal** : legal change could place significant new obligations on the executive or render particular practices illegal
	    o **Environmental** : unexpected adverse environmental impacts of organisation's service delivery
	    o **Customers** : unexpected changes in adoption of social network, etc.
	• Determine operational risks, such as but not limited to the following (with example):
	    o **Professional** : risks associated with production staff's competence, etc.
	    o **Financial** : inadequate financial planning resulting in lack of funding
	    o **Security/recoverability** : the organisation assets protected but not hindering access, and if there is a recovery plan
	    o **Technological** : over-reliance on one cloud service provider, are there backup plan, etc.
	    o **Reputational** : the organisation's reputation and product brand, etc.
	• Establish a risk management team including but not limited to the following responsibilities:

Functional Area - Strategic Management

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o Identification of risks (strategical risks, operational risks, etc.)
o Analysing and profiling the risks
o Determining actions required to reduce and mitigate the risks
o Determining how to monitor and control the risks
o Developing and implementing plans as well as production of reports

• Develop risk management policies and implementation plan that can convince management team and board to approve adoption
• Develop training programmes and procedures to build a risk awareness in the organisation and assign responsibilities/accountabilities
• Regularly review and enhance the risk management strategy to fit the business changes

3. Exhibit professionalism

• Totally committed to ensure the organisation is risk free
• Apply industry best practices and standards to develop the organisation risk strategy
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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

• Develop a comprehensive strategy that can mitigate the organisation's business risks
• Guide the risk management team to develop various risks management framework and implementation plans with monitoring and evaluation functions
• Develop risk management strategy that can convince management buy-in and promote risks awareness culture in the organisation
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<td>Remark</td>
<td>Other generic Risk Management UoCs in the Software Products and Software Services branch:
ITSWGS609A - Identify and assess the risk factors related to IT
ITSWGS610A - Develop risk mitigation strategies and plans related to IT
ITSWGS611A - Review risk factors related to IT, and execute and monitor risk mitigation plans
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Functional Area - Strategic Management

Title	Formulate commercialisation of Intellectual Properties strategy
Code	108018L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating strategies in the organisation. Intellectual Property (IP) is the lifeblood of a digital media organisation. Many organisations are looking to commercializing IP either licensing its own IP or licensed IP from another organisation to develop and integrate as part of its own product to achieve better competitive edge and faster "goto market". This UoC concerns competence related to the formation of commercialisation of Intellectual Property strategy.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating commercialisation of Intellectual Properties strategy
	
	• Possess excellent project management and interpersonal skills that are acute to formulating business strategies formation
	• Possess in-depth knowledge of commercialising a wide range of different types of IP (know-how, copyright, patent and trademarks, etc.)
	• Possess in-depth knowledge of SWOT (Strengths, Weaknesses, Opportunities and Threats) and other analysis tool
	• Possess excellent negotiation skills
	• Possess good knowledge of Hong Kong IP and common laws
	
	2. Formulate commercialisation of Intellectual Properties strategy:
	
	• Familiarised with the organisation overall business strategies particularly policies related to IP commercialisation
	• Study the organisation strategies and identify how/where the IP commercialisation aligns with and benefits the general business strategy over the short to medium term as well as perform "IP due diligence" by assessing values and risks of intangibles
	• Evaluate different types of IP partnership, such as the following :
	    o IP licensing or franchise
	    o Joint venture or Spin-off
	    o Technology licensing
	    o Contract R&D
	• For licensing organisation IP to third party organisation the following actions may be performed :
	    o Study the business environment of the licensee and not to any assumptions, such as:
	        ▪ Emerging markets will have the same attitude to the license relationship, as those in mature markets
	        ▪ Have IP protection that is same as those in Hong Kong
	        ▪ Registered Trademarks are automatically and correspondingly registered in licensee's country
	    o Ensure licensee have sufficient means to protect the licensed IP, such as taking actions against brand name copying, leaking of source code or technology, etc.
	    o Ensure licensee have the full commitment to marketing and not damaging the IP brand
	• For seeking IP partnership the following actions may be performed:

Functional Area - Strategic Management

	○ Assess and analyse the organisation technology/brand gaps and identify options for filling those gaps. Consider how the various IP partnership models might help address these technology/brand gaps ○ Identify potential target partners that has the desire technology/brand that can fill the gaps ○ Research the target technology/brand on if it is well known and its acceptability to local market • Draft and formalise various documents, including: ○ Non-Disclosure Agreement ○ Contract • Assemble a negotiation/contract drafting team to study, including but not limited to following areas: ○ IP laws and contract laws ○ Technical issues and implementation ○ Risk evaluation ○ Exit clause • Assemble a team to develop implementation plan proposal • Present commercialisation of IP strategy and partnership proposal to management or board for approval 3. Exhibit professionalism • Be aware of Intellectual Property (IP) rights and ensure developed products complied with licensed contractual agreement • Always safeguard the organisation's Intellectual Properties
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Identify the most beneficial/optimal IP commercialisation approach for the organisation's IP assets or partner IP of other organisations • Identify gaps in the organisation current business which commercialising IP can help generate more competitive edge • Perform a complete study of all aspects related to IP partnership that can eliminate any uncertainties in the drafting of agreements • Develop a commercialised IP strategy that complements the organisation's business strategy and can be approved by management
Remark	

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

Functional Area - Strategic Management

Title	Formulate content management and distribution strategy
Code	108019L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for formulating risk management strategy for the organisation. The media and entertainment industry is all about content creation, management, distribution, and delivery. Its potential also brings challenges. Content management and distribution are only 2 components of the digital asset life cycle. This UoC concerns competence for formulating content management and distribution strategy at strategic level
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating content management and distribution strategy
	
	• Possess good project management skills and capable of formulating business strategies
	• Possess in-depth knowledge of the organisation's mission, vision, business goals and strategies
	• Possess good knowledge of business analysis tools such as PESTLE (Political, Economic, Social, Technological, Legal and Environmental), SWOT (Strengths, Weaknesses, Opportunities and Threats), etc.
	• Possess good knowledge of the digital asset lifecycle (production, content management, distribution and preserving)
	
	2. Formulate content management and distribution strategy
	
	• Be totally familiar with the organisation's overall business strategies and understand various factors that affect the formation relating to the content management and delivery strategy. Factors include but not limited to the following:
	    o How contents are held, cloud based or inside the firewall
	    o Location of content production (in-house, branches, overseas, etc.)
	    o SLA (Service Level Agreement) commitments, if any
	    o Level of security required
	    o How many geographic locations will distribute the contents
	• Strategy comprises of:
	    o Develop policies and procedures to perform content analysis to determine how much content preparation is required that influence the distribution network. Contents needed to be analysed, including but not limited to the following:
	        ▪ Content involved (video, music, games) which could be on-demand, live, webcast, download, etc.
	        ▪ Content size and quantity
	        ▪ Interactivity involved with the content such as Augmented Reality (AR)
	    o Develop action plan to manage the content including but not limited to the following:
	        ▪ Define and provide the right access to user and customers
	        ▪ Versioning
	        ▪ Naming/meta tagging convention
	        ▪ Identify and setup digital asset management tools
	        ▪ Develop storage policies and procedures
	        ▪ Investigate and define storage options (local server, or use Storage as a Service, etc.)

Functional Area - Strategic Management

	○ Investigate delivery infrastructure requirements and formulate delivery and distribution plan, including but not limited to the following:
	    ▪ Define how and what contents needed to be published and the required tools to deliver it to the users/customers
	    ▪ Determine devices that production team, customers that currently accessing the contents and emerging devices
	    ▪ Identify production and customers distribution needs and define a suitable acceptable performance service level to be committed by the strategy
	    ▪ Commission Content Distribution Network (CDN) services, if more applicable
	    ▪ Determine best method of distribution, from central location or multi-point or both
	    ▪ Define backup and recovery strategies
	 • Document the strategy with estimate of cost and ROI (Return on Investment) where appropriate and present to management and/or board to seek approval
	
	3. Exhibit professionalism
	 • Apply Asset Management standards (For example: ISO 55000) and industry best practices when formulating the content management and distribution strategy

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Formulate content management and distribution strategy that are in-line with the organisation business goals • Formulate content management and distribution strategy that satisfies the needs of production work flow and still can deliver it securely and speedily that meets the user requirement specifications • Formulate and present the strategy that are accepted and approved by management or board
Remark	

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

Functional Area - Strategic Management

Title	Formulate conducive customer centric environment and delivery
Code	108020L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating implementation strategies at functional level. Digital media products are about providing what customers want. Hence, the whole organisation needs to develop a customer-centric culture to offer products and customer service that are customer-oriented. This UoC concerns competence for formulating a customer centric environment and delivery strategy for digital media production unit.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating customer centric environment and delivery
	
	• Possess good project management skills and capable of formulating functional strategies
	• Possess in-depth knowledge of the basis and the concept of customer centricity and the correlation between a customer centricity and the organisation's mission, vision & business goals
	• Possess in-depth knowledge of building and sustaining a customer centric culture with the solution focused skill sets and policies set ups
	• Possess in-depth knowledge of providing and delivering customer centric products and services
	• Possess in-depth knowledge of the update customer centric knowledge management
	• Possess in-depth knowledge of the operations of the DMT unit and the product designs
	
	2. Formulate conducive customer centric environment and delivery
	
	• Develop strategy to foster customer centric culture by enhancing the following:
	    o Customer focused management team with accountability
	    o How to aware, listen and understand customers' needs
	    o Design customer experience products
	    o Empower the front-line to provide customer centric service, engage customer experience, suggesting and recommending based on customers' expectation
	    o Measure the customers' priorities comparing with organisation's focus and resources that include staff, budget and time
	    o Provide a feedback platform with appropriate tools for continuous improvement
	    o Provide induction training
	    o Provide rewarding schemes for new customer centric innovations
	• Define the organisation's structure and alignment to cater such customer centric demands
	• Work with other units, such as marketing and sales, to understand customer centric aspirations so that products and services can include those customer centric factors
	• Develop procedures and guidelines for creating and developing customer centric products
	• Develop customer centricity analysis, planning and implement a carefully formulated customer strategy that focuses on creating and keeping profitable and loyal customers
	• Establish review sessions to evaluate and enhance all areas of customer centricity, including:
	    o Commitment on customer centricity

Functional Area - Strategic Management

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o Design and deliver DMT products that are solution-based, user friendly, and fulfilling customers' wants
o High transparency of knowledge sharing of valuable data captured from customers' insights internally
o Taking references from concepts of Customer Relationship Management (CRM) and Customer Life-time Value (CLV) designed to maximise the customers' product and service experience delivered

3. Exhibit professionalism

Be consistent with the deployment of a customer centric environment within the unit
Always update with current digital media industry that align with customer centric focus and develop the latest and appropriate strategy for the organisation to achieve its objective
Take into consideration of the balance between the DMT products development and the customers' expectation and trend, and provide timely knowledge sharing

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The integrated outcome requirements of this UoC are the abilities to:

Fully grasp the customer centricity and delivery requirements of digital media production unit
Develop a conducive customer centric strategy that fulfills the essence of customer centricity and provide sufficient and appropriate knowledge management and resources to production teams to deliver the necessary results
Develop policies, plans, process and procedures that can be applied with easy understanding within the entire team the concept and implementation of the customer centric strategy and delivery

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Functional Area - Strategic Management

Title	Formulate human resource strategy
Code	108021L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating the human resource (HR) strategy related to the area of their responsibility. With ever fast changing of new digital media technologies and the need to stay ahead of competitors it creates some big challenges for digital media production organisations to recruit and retain sufficient quantity of staff with the right skill set. This UoC concerns competence for formulating HR strategy for digital media production unit of the organisation which contributes to the organisation overall HR strategy.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating human resource strategy
	
	• Possess good project management skills and capable of formulating business strategies
	• Possess in-depth knowledge of digital media production life cycle and skill set requirement
	• Possess in-depth knowledge of digital media industry and trends
	• Possess in depth of HR's "employee lifecycle" (Attract, Integrate & Measure, Develop, Motivate & Retain, Identify)
	• Possess in-depth knowledge of the organisation's mission, vision, business goals, and HR policies
	
	2. Formulate human resource strategy:
	
	• Follow the organisation's overall HR strategy and the organisation mission and vision so that the HR strategy can align with the organisation's overall business strategies
	• Identify the allocated HR resources for DMT operation unit and be familiar with the effectiveness and efficiency of human capitals in the operation unit
	• Determine and define staffing structure for DMT operation unit, which may include but not limited to the following:
	    o Teams' structure, number of teams and its function
	    o Staff number per team
	    o Skill factors or job description of teams
	    o Any type of staff can be outsourced
	• Formulate staff recruitment policy based on different factors, including but not limited to the following:
	    o Essential/critical technical skills, such as game designer, video editors
	    o Creativity skills
	    o Essential posts
	    o Market availability vs. budget
	    o Job/project requirements, such as: testers, actors
	    o Use of external agents to supply people resources for temporary jobs, etc.
	• Work with HR unit to develop recruitment and selection procedures taking into considerations, but not limited to the following:
	    o Sourcing of personnel via agents, social media, general advertisement etc.
	    o Selection methods: For example
	        ▪ Screening
	        ▪ 1st Interview to determine experience
	        ▪ 2nd Interview with situation simulation and practical test, etc.

Functional Area - Strategic Management

	• Develop plan and procedures on identification of talents, training, staff development, retention and recognition to complement with the overall HR including:
	    ○ Staff career development
	    ○ Training via external courses, social training, or self-learning
	    ○ Staff appraisal and progression
	• Work with HR unit to develop employee policies and procedures, such as:
	    ○ Working culture that matches digital media staff (i.e. flexible working hours, dress code, etc.)
	    ○ Time available to experiment with new software
	    ○ Personal time on the Internet
	    ○ Creative break areas
	• Regularly review staff head counts, procedures and adjust policies and plans to ensure the organisation have the right HR resources to fulfill its business objectives
	
	3. Exhibit professionalism
	
	• Be updated with current digital media industry HR requirements and develop the right strategy for the organisation to achieve its business goals

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully grasp the human resource requirements of digital media production unit • Develop a comprehensive HR strategy that fulfills the HR employee lifecycle and provided sufficient and right HR resources to production teams to deliver required results • Develop plans and procedures that can be used in the implementation of the HR strategy
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Strategic Management

Title	Manage information strategy to facilitate product development and marketing
Code	108022L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating strategies in the organisation. Information is a valuable corporate asset and getting the right information, to the right people at the right time is a key management objective. This UoC concerns competence for managing information strategy to facilitate product development and marketing by the users and creators of information in a digital media organisation. Also the generation of information differs - production team mainly creates internally, in production work flow, whereas marketing will acquire lots of information externally.
Level	5
Credit	4

Competency	Performance Requirements
	1. Knowledge for managing information strategy to facilitate product development and marketing
	
	• Possess good project management skills and capable of implementing business strategies
	• Possess in-depth knowledge of current and upcoming digital media trends and technologies
	• Possess detail knowledge of various lifecycles, including: digital media product development lifecycle, information lifecycle, marketing lifecycle, etc.
	• Possess in-depth knowledge of business management and strategy formulation skills
	
	2. Manage information strategy to facilitate product development and marketing
	
	• Understand the organisation information strategy to ensure the management of the strategy are aligned with the corporate strategy
	• Assess various aspects of the organisation in relation to information strategy, including but not limited to the following:
	    o Business objectives and goals, such as improving productivity, developing marketing knowledge with analytics to assist product sales, etc.
	    o Range of legacy systems
	    o Data governance, if any
	    o Roles and responsibilities
	• Determine the 4 Vs (volume, velocity, variety, value) of information, such as:
	    o Product data
	    o Voice of customers
	    o Other internal and external stakeholder (R&D, external experts, etc.)
	• Develop information architecture with models, metadata, and business rules that map to the corporate enterprise architecture
	• Develop information policies, processes, and procedures governing information use and protection
	• Develop an information management plan and a plan for implementation, including but not limited to the following :
	    o Methodology for evaluating the suitability of information management solutions within the context of the organisation
	    o Tools and systems that enable and control the information flow
	    o Architecture for capture, storing and transferring/delivering information
	    o Mechanism to monitor usage and acquisition of information
	    o Develop guidelines for :
	        • Optimisation of information

Functional Area - Strategic Management

	▪ Risk tolerant ▪ How information is disposed ▪ etc. ○ Develop training sharing sessions to communicate standards, procedures and adoption of information systems - Develop monitoring and review mechanisms that can evaluate tangible benefits and improvement of the information strategy - Document and present management plan to senior managers or board to gain their support and approval for adoption/implementation 3. Exhibit professionalism - Apply industry best practices when developing management and implementation plans
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Fully understand the organisation's information strategy and the objectives of the strategy - Comprehensively identify and assess all factors that affect the success in management of the information strategy - Identify and create 4Vs of the information related to the production development and marketing - Develop, present and gain approval for the management and implementation plan
Remark	Although the title is target for production and marketing, which may be as a first project to roll out, the competence in this UoC can also be applied generally across the whole organisation

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

Functional Area - Strategic Management

Title	Formulate innovative use and adoption of DMT to enhance market share capability
Code	108023L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for business development. A digital media production organisation's main objective is to gain as much of profit from the product they produce. With Internet as a driver for revenue, digital media organisations are exploring how to leverage DMT to enhance market share or revenue. DMT, in this context, are not limited to internally developed products, instead, it can be any form of digital media or technology. This UoC concentrates on competences on formulating innovative use and adoption of DMT at business levels
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating innovative use and adoption of DMT to enhance market share capability
	
	• Possess good project management skills and capable of formulating business proposals
	• Possess good interpersonal and communication skills
	• Possess in-depth knowledge of all the organisation's digital media business functional areas
	• Possess good knowledge of business analysis tools such as PESTLE (Political, Economic, Social, Technology, Legal and Environment), SWOT (Strengths, Weaknesses, Opportunities and Threats), etc.
	• Possess good knowledge of the organisation business strategies, including:
	    o Business objectives and goals
	    o Innovation development/promotion
	
	2. Formulate innovative use and adoption of DMT to enhance market share capability
	
	• Perform research to determine what, and how competitors and other organisations apply additional usage of DMT. For Example, in:
	    o Marketing and promotion
	    o Online and offline branding or product sales
	    o Social communication
	    o Part of product packaging (such as user manual)
	    o Website, in improvement of User Experience to drive greater visitors/potential customers
	• Identify current "hot" uses of DMT and coming trends of DMT
	• Setup brainstorming teams to identify innovative usage of current and future DMT. For example:
	    o Application of Augmented Reality (AR) in marketing,
	    o Play virtual reality game on organisation website to drive sales
	    o Deliver video via IoT (Internet of Things) products or other wearable products (watch, etc.)
	    o Creation of higher user experience contents
	    o Application of DMT to shorten production cycle
	    o etc.
	• Use analysis tools to determine the suitability and plausibility of identified DMT to facilitate product sales, brand building or other benefited area that helps drive greater market share

Functional Area - Strategic Management

	• Perform a risk analysis of the concerned DMT when applied and not applied in the organisation. Make suitable recommendation for countering risks • Develop a proposal of implementation plan with cost and benefit which can be used in presentation to management or board for support 3. Exhibit professionalism • Critically evaluate the latest DMT trend and utilize the innovative DMT applications • Design and apply appropriate DMT extensively to improve production and revenue generation
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Perform a complete research of application of DMT by competitors and other organisations and generate the relevant information for the next-step analysis • Motivate and lead innovation team to generate innovative usage of DMT to greater benefit of the organisation's business • Critically evaluate and propose an implementation that can gain support from management
Remark	

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

Functional Area - Strategic Management

Title	Formulate resource management strategy
Code	108024L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating strategies in the organisation. Business resources can usefully be grouped under several categories: financial resource, human resource and physical resource. It is essential that a good and viable strategy is in place to manage these business resources to ensure they are aligned with scope and direction of the organisation. This UoC concerns competences for formulating resource management strategy associated with the DMT production business area.
Level	5
Credit	3
Competency	Performance Requirements 1. Knowledge for formulating resource management strategy - Possess good project management skills and capable of formulating business strategies - Possess in-depth knowledge of the organisation mission and vision - Possess detail knowledge of accounting, human resource planning, budgeting, etc. - Possess excellent quantitative and analytical skills, etc. - Possess knowledge on operating Resource Management/Planning tools - Possess good knowledge of Resource Allocation Model (RAM) and methodology 2. Formulate resource management strategy - Understand the organisation overall strategy to ensure this resource management strategy can work effectively. For example: resource forecasting for 1 year, 3 years, etc. - Determine the overall resources/budget allocation for DMT business - Define a mechanism to perform resource needs, demand and utilisation analysis of DMT related business, such as: - Internal - Product development (manpower, systems, tools, equipment, etc.) - Marketing and promotion activities - R&D and innovation development - Facilities, media storage - External: - IP partner licenses - Contractors, venues, materials, etc. - Set procedures to acquire resource forecasting from different areas of operation units (project teams, section heads, etc.), for resource planning to allow resource allocation. For example, the normal forecasting may be one month, six months, or more dynamic for certain type of resources - Formulate resource allocation methodology that can allocate resources with "right resource loading" based on the result of needs analysis. The methodology should be transparent that is accepted and committed by all stakeholders - Define procedure to record resource allocation/utilisation with schedules - Define procedure on how to monitor the effectiveness of the resources allocation and its usage - Schedule briefing/reviews session to identify area of enhancement of the resource management strategy - Document and present strategy to senior managers or board to gain their support

Functional Area - Strategic Management

	3. Exhibit professionalism • Apply industry best practices to ensure the organisation's resources are managed appropriately and is aligned with business goals
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Perform a complete need analysis which can be used as the foundation to develop a correct resource management strategy for the organisation • Formulate a resource allocation strategy that can be accepted by all stakeholders and can allocate most effective resource loading • Present the resource management strategy and gain approval from senior management/board
Remark	Although this UoC is mainly targeted at DMT organisations, the competences can be applied to other IT related organisations.

Functional Area - Marketing Management

Title	Formulate digital marketing strategy
Code	107914L7
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating the digital marketing strategy of the organisation. Digital marketing seeks to provide a cost-effective medium to communicate the message of the brand across to a wider audience. For this, it is necessary to formulate a digital marketing strategy that is in sync with the overall marketing strategy of the company
Level	7
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating digital marketing strategy
	
	• 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
	• Possess extensive policy formulation skills
	
	2. Formulate digital marketing strategy:
	
	• 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:
	   o Economic and budget
	   o 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
	   o Targeted audiences, with matching compelling online value proposition to help positioning and differentiation of brands
	   o Reach out to larger audience using desktop and mobile devices to get visibility and awareness
	   o 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:
	   o Single channel techniques: Example:
	      ▪ Banner ad, SEO (Search Engine Optimisation), SEM (Search Engine Marketing)
	      ▪ Social media
	   o Multi-channel (direct marketing + inbound marketing)
	   o Ecommerce
	   o Mobile platform (apps, mobile commerce, social media marketing, etc.)
	   o Innovative techniques/technology (from special team) : Example
	      ▪ Growth hacking

Functional Area - Marketing Management

	• 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 3. Exhibit professionalism • Be updated with current digital marketing ethics ensuring digital marketing strategies are linked with business ethics with social responsibilities
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • 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
Remark	

Functional Area - Marketing Management

Title	Formulate content marketing tactics
Code	108025L6
Description	This unit of competency applies to all practitioners who are involved with developing contents marketing tactics in the organisation. Content marketing builds brand awareness, loyalty and trust between organisation and their customers or potential customers. Competitions are fierce. Types of contents and development methods are many, with digital media technology newer and greater options are appearing every day. A viable content marketing tactic is to have content that can be innovative and unique as well as taking advantage of new technologies to captivate customers.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating content marketing tactics
	
	• Possess in-depth project management skills
	• Possess in-depth knowledge of digital marketing and content marketing
	• Possess good marketing and competitive analysis skills
	• Possess good communication and interpersonal skills that can communicate with all levels of content production team, either internal or external
	• Possess good knowledge of digital marketing content production life cycle
	• Possess in-depth knowledge of digital marketing techniques
	• Possess in-depth knowledge of the organisation's content development policies and guidelines
	
	2. Formulate content marketing tactics
	
	• Follow the organisation's digital marketing strategy
	• Listen and engage in relevant social discussion about the company, competitors and industry to analyse competitors' content marketing approaches. For example:
	    o What is their social media presence like which platforms do they use; how often do they interact with customers, and how do they speak with their customers?
	    o How innovative are the posted contents
	    o How well they use new technology
	• Identify tools that can help the content development team develop innovative and unique content, such as:
	    o Competitive intelligence tools
	    o Market research tools
	    o Design tools that can allow the team to create current trend contents, such as: infographics, interactive contents
	    o Tools that allow content creation without the need of IT or developers
	• Formulate and define the types of contents that are needed to achieve the marketing goals and can explore greater opportunities available to the content marketing team. For Example:
	    o Blog Posts
	        ▪ How-to - Posts that teach readers how to do something
	        ▪ Thought Leadership - Posts that may explain fundamental shifts in an industry, or ask the reader to rethink conventional wisdom,
	    o Visual Contents
	        ▪ Infographics - These can be embedded in blog posts, and shared on social media to tell a visual story

Functional Area - Marketing Management

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- SlideShares
- Video - YouTube or a blog post embed, short videos for the sake of entertainment or education
  - o Personalisation contents
    - Dynamic substituted content – based on visitor's profile
  - o Interactive contents
    - Games
    - Quiz
    - Marketing apps
- Formulate policy on recruitment of content creation team. A mixture of internal and external as appropriate. External members give flexibility of having most updated knowledge and skills on new content marketing techniques
- Lead team to perform marketing campaigns using most suitable channels (Search Engine Optimisation (SEO), social media, email, Pay-Per-Click (ppc), etc.)
- Monitor and review the effectiveness of the marketing tactics and make adjustment when required

3. Exhibit professionalism

- Apply most innovative content marketing techniques and technology to achieve the organisation's marketing goals

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The integrated outcome requirements of this UoC are the abilities to:

- Build a complete profile and analyse competitors' content marketing approaches
- Build a development team that is innovative and able to apply new content marketing technologies and techniques to create innovative and unique contents
- Develop a tactic that can create contents that have the extra elements which can captivate customers and achieve the organisation's marketing goals

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Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Formulate digital marketing strategy for Mainland China
Code	108027L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with defining Mainland China marketing strategies. Digital marketing in Mainland China is a challenge for Hong Kong organisations operating in the Mainland. It has its very own digital landscape. Almost every online service from the Western world is either unavailable or displaced by a domestic alternative. Most Hong Kong organisations feel that there are many variables and continuous changing of Mainland laws, thus preferring to work with Mainland agencies. This UoC concerns the competence for formulating digital marketing strategies for the Mainland China with minimal operations resided in the Mainland.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating digital marketing strategy for Mainland China
	
	• Possess good project management and analytic skills
	• Possess good interpersonal and communication skills that can communicate with stakeholders of various levels and able to manage Mainland marketing service agencies/providers
	• Possess extensive and in-depth knowledge of various local and Mainland China 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 digital marketing and overall market objectives and goals
	• Possess in-depth knowledge of Mainland China marketing and business practices as well as its laws related to online commerce and online marketing
	• Possess good knowledge and application of digital marketing measurement tools that can measure Mainland digital marketing platforms
	
	2. Formulate digital marketing strategy for Mainland China
	
	• Follow the organisation's business strategies, including:
	    o Short and medium business and operating strategies for the Mainland
	    o Overall marketing and/or digital marketing budgets
	    o Partnership and franchising
	• Identify which of the organisation's products will be marketed on the Mainland China and various goals and Key Performance Indicators (KPIs)
	• Perform in-depth market research of potential competitors and understand customers' culture trends
	• Pinpoint the internal team's knowledge level on Mainland China's digital marketing to formulate implementation strategy:
	    o Commission Mainland China marketing agency to provide different levels of assistance
	    o Perform all marketing activities and campaigns by local internal team
	    o Delegate all marketing to Mainland China partners or franchisees
	• Pinpoint target customers and which most effective digital media technology to use and limitations of digital marketing in Mainland China
	• Formulate Mainland China marketing communications strategy, including:

Functional Area - Marketing Management

	○ What communication message to convey ○ Tailoring the message to Mainland China's aesthetic and taste ○ Translating marketing materials to simplified Chinese and/or Putonghua ○ Developing/converting website content targeting Mainland customers ○ Defining how digital messages can be distributed to and/or access by Mainland customers ○ Establishing social media presence ▪ Determine which social media platform best to reach the customers ▪ What and how to post contents to influence target customers - Define timelines and schedules for digital marketing campaign activities - Define digital marketing monitoring and tracking requirements and how experiences can be used to improve strategy - Formulate policy and service requirements with Mainland China marketing agency and ensure procedures are in place for the agency to perform marketing activities as seamless as possible like a part of internal team - Document the strategy and seek approval from senior management and/or board 3. Exhibit professionalism - Be updated with Mainland Digital marketing culture and digital laws - Always take into consideration all related technological, political, social and legal factors of Mainland China when planning digital marketing in Mainland China
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Specify the profile of Mainland China marketing agency required and able to define the type of services needed to be commissioned from the service provider - Define the communication strategy that is aligned with the organisation's business strategy and goals for Mainland China - Present the marketing strategy and provide sufficient details to gain support from the management/board for implementation of the strategy
Remark	

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

Functional Area - Marketing Management

Title	Formulate inbound marketing strategy
Code	108026L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating the inbound business strategy of the organisation. Technology has disrupted the way we conduct business and traditional marketing and sales methods may not produce the results they once did. Today's customers are researching online before ever speaking with a salesperson. Inbound Marketing is the natural response to this customer-driven shift. Inbound marketing is about building relationship with customers. Is it fitted for used in the organisation? This UoC concentrates on competences for formulating inbound marketing strategy at business level.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating inbound marketing strategy
	
	• 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 of inbound marketing methodology (Attract, Convert, Close, and Delight)
	• Possess good knowledge of the organisation overall marketing strategy
	
	2. Formulate inbound marketing strategy
	
	• Evaluate and determine whether the organisation fits in with inbound marketing business profile
	    o The product or service have a value high enough and a sales cycle long enough to properly utilise Inbound at each stage of the buyer's Journey
	• Identify business and marketing goals of the organisation, ideally growth related, for example:
	    o Increase Number of Leads
	    o Increase Quality of Leads
	    o Increase Sales
	    o Increase Brand Awareness
	• Research to determine what percentage of the prospect customers are active online. Build customer's profiles to know what they care about, how they make decisions, where they are and how to speak to them as a company
	• Pinpoint the best inbound channel to reach prospects that are beneficial to the organisation, such as:
	    o Social media
	    o Mobile
	    o Blogging
	    o Content marketing
	• Perform competitive and gap analysis. Comparing the web presence (website, social, mobile) to competitors should know what they are doing, how aggressive the organisation's marketing needs to be
	• Formulate policies to optimise the website. Give the visitors a personal feel when they visit online the landing pages. Show them the organisation products/services are exactly what they need. Offer visitors something of value such as a detailed guide or white paper that would require them to submit contact information to download it

Functional Area - Marketing Management

	• Define policies to maintain a high Search Engine Optimisation (SEO) position by applying targeted SEO strategy within an inbound programme (not necessary via luxury spending program). This is done by creating original, useful content to target customers' interests, problems and questions to boost organic traffic
	• Define tool requirements to maximise the inbound marketing:
	    ○ Leads scoring tools which inform sales team how far along a potential customer is in the sales process and how ready they are for manual contact
	    ○ Tracking tools to track progress on campaign; identifying what marketing activities and channels are producing business value. i.e. Customer Relationship Management (CRM)
	• Document the inbound strategy and present to responsible key stakeholders to buy-in
	
	3. Exhibit professionalism
	
	• Be updated with prevailing inbound marketing technologies and critically evaluate and utilize new inbound tools
	• Critically review and consolidate organization's interests before formulating the inbound marketing strategy

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Formulate an inbound strategy that can lead to buy-in from all key stakeholders by demonstrating that it can fulfill the organisation's business objectives • Create a strategy that can build relationship with prospect customers that can generate growth for the organisation
Remark	

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

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	Performance Requirements
	1. Knowledge for managing digital marketing tactics
	
	• 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.
	
	2. Manage digital marketing tactics:
	
	• Evaluate and comprehend the vision and objectives for the organistion'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:
	    o Interactive web site
	    o SEO (Search Engine Optimisation)
	    o PPC (Pay Per Click)
	    o Social media
	    o Mobile
	    o 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:
	    o Identify budgets and ensuring activities
	    o Create schedules of activities with checkpoints
	    o Set Key Performance Indicators (KPIs) and tools to monitor activities
	    o Coordinate content development
	    o Assemble the team with right skills
	    o Coordinate external resources
	    o 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.

Functional Area - Marketing Management

	3. Exhibit professionalism • 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	The integrated outcome requirements of this UoC are the abilities to: • 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	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Identify marketing strategies for digital media products
Code	108029L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for marketing management of the organisation. This UoC applies to the considerations, policies and activities involved in establishing the marketing strategies for the digital media products in concern. Once established, its implementation will involve a broad range of staff members at all levels and functional areas, especially those at the front-end.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for marketing strategies and digital media products
	
	• Master the development and competitive environment of the overall digital media products market, including the overseas and local markets
	• Possess good knowledge of the organisation's overall marketing strategy and related budget allocation
	• Possess extensive and in-depth knowledge about:
	   o Various digital marketing technologies
	   o Various market positioning theories
	   o Techniques for research and analysis of market strategic plans
	• Possess good management skills and capable of formulating business strategies
	• Comprehend the possible outcomes and subsequent effects due to:
	   o The choices of different marketing strategies
	   o The generally short life cycle of digital media products
	   o The significant price elasticity for digital media products
	   o The consumer psychology and demand of different consumer groups, etc.
	• Understand related legislations and regulations governing digital media products
	
	2. Identify marketing strategies for digital media products
	
	• Consolidate all guidelines, intelligences and opinions towards marketing for the organisation's own digital media products, such as from:
	   o Management directives
	   o Research findings
	   o Sales and marketing teams' advices
	   o Observable industry trends
	   o Actions and pricings of competitors, etc.
	• Consider feasible alternatives marketing strategies for the digital media products in concern, with special attention to:
	   o The nature and characteristics of digital media products in general
	   o The special features of individual product types such as:
	      ▪ The rapidly changing versions for games products
	      ▪ New technologies applied in digital AV products, etc.
	• Exercise accurate predictions about the responses of the market and consumers to those marketing campaigns and activities being considered
	• Ensure reckoning with good accuracy the financial requirements for the different marketing strategy alternatives
	• Effectively communicate with different levels of employees regarding the pros and cons of the different marketing alternatives, including:
	   o Senior management

Functional Area - Marketing Management

	○ Finance and marketing personnel ○ Front line sales personnel, etc. - Make recommendations on the final marketing strategies to be adopted - Make suggestions on actions, activities and channels for implementation of the chosen marketing strategies - Ensure continuous and close tracking of the latest developments in: ○ Market responses ○ Competition environment ○ Customer preferences, etc. - Make timely changes to the marketing strategies as appropriate and on a continuous basis 3. Exhibit professionalism - Always stick to established policies, procedures and legislative requirements in the process of identifying and establishing marketing strategies - Always maintain a proper balance between return maximisation and customer satisfaction - Always take into consideration all related technological, political, social and legal factors
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Propose an appropriate set of marketing strategies for the digital media products in concern, incorporation considerations of all related factors such as resources and return; and - Propose a set of feasible and effective activities for subsequent implementation and operation of the chosen marketing strategies
Remark	

Functional Area - Marketing Management

Title	Formulate mobile marketing strategy
Code	108030L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating mobile marketing strategy for the organisation. Mobile devices have brought about a cultural shift in how people use their free time. This cultural shift with customers potentially being available 24/7 has prompted a corresponding shift on how corporate performs marketing. More than ever a good strategy is required to compete for consumers' attention in the mobile arena. This UoC concentrates on competences of formulating mobile marketing strategy at business level
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating mobile marketing strategy
	
	• Possess good project management skills and capable of formulating functional strategies
	• Possess extensive and in-depth knowledge of mobile marketing technologies and channels
	• Possess good knowledge and application of analytic tools such as SWOT (Strengths, Weaknesses, Opportunities and Threats), PESTLE (Political, Economic, Social, Technological, Legal and Environmental), etc.
	• Possess good knowledge of the organisation overall business and marketing strategies
	• Possess in-depth knowledge of Mobile Engagement Loop: Download, Onboard, Conversion, Retention and Re-engagement,
	
	2. Formulate mobile marketing strategy:
	
	• Familiarise with the organisation primary marketing objectives and understand various considerations of mobility, such as:
	   ○ Speed of mobile marketing innovations
	   ○ App is not a must
	   ○ User experience is everything
	   ○ Mobility is not a bolt on
	• Evaluate different mobile solutions that are suited for marketing use. Solutions include but not limited to the following:
	   ○ Mobile marketing – QR code, MMS, email, mobile DB, loyalty programs
	   ○ Mobile service – service alert, customer service Apps
	   ○ Mobile experience – Customer Apps, mCommerce, Mobile Web
	   ○ Mobile Advertising – Adwords, display ads LBS, SMS ads
	   ○ Mobile sales – Mobile payment, pricing discount, CRM integration, One-on-One sales Apps
	   ○ New innovative mobile technology – mobile watch, NFC, RFID
	• Evaluate marketing in relation to market opportunities, business values, mobile suitability, competitive edge and readiness
	• Formulate scenarios with business drivers against mobile solutions and prioritise key scenarios in order. For example:
	   ○ Business benefits
	   ○ Organisational and technical readiness
	   ○ Easiness of implementation
	   ○ Innovation

Functional Area - Marketing Management

	• Formulate directional plan for mobile marketing implementation with monitoring and data collection guidelines • Document the mobile strategy and convey directional plan to implementation team and other stakeholders and seek buy-in 3. Exhibit professionalism • Develop mobile strategies comply with industry best practices as well as laws and regulations of Hong Kong • Respect privacy of customers and ensure all marketing activities complied with privacy laws
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Formulate the mobile strategies that can be implemented to meet the organisation's business and marketing objectives • Formulate different mobile marketing scenarios with suitable mobile solutions that matches different business objectives • Formulate directional plan for implementation that can lead to buy-in by all stakeholders
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Formulate digital marketing objectives
Code	108031L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with defining digital marketing objectives. To fulfil the organisation's business objectives, digital marketing objectives need to be aligned with them and the overall marketing goals. The digital marketing objectives will guide the implementation, hence KPIs (Key Performance Indicators) and measurements need to be defined.
Level	5
Credit	3
Competency	Performance Requirements 1. Knowledge for formulating digital marketing objectives - Possess good project management skills and analytic skills - Possess good communication skills that can perform presentations at management level - 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 SMART objective setting technique - Possess good knowledge and application of digital marketing measurement tools, such as: Google analytics, Radian6, etc. 2. Formulate digital marketing objectives - Follow the organisation's business objectives and goals - Follow the organisation's overall marketing goals and strategies - Use analysis tools such as SWOT (Strengths, Weaknesses, Opportunities and Threats) to analyse environmental, product, brand and markets factors that affect the success of digital marketing activities and the organisation's business strategy - Formulate digital marketing goals and objectives that meet the following criteria: - Specific - Measurable - Achievable - Relevant - Timely - Plan and define measurement model for the objectives by setting Key Performance Indicators (KPIs) for goals and objectives. Also identify targets and set parameters represent success and failure for each KPI - Present and agree objectives with senior management - Regularly review the digital marketing objectives ensuring they are aligned with the organisation's overall business objectives 3. Exhibit professionalism - Be updated with current digital marketing technologies - Apply industry best practices for developing digital marketing objectives that are aligned with the organisation's business goals
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: Comprehend the organisaion's business and overall marketing objectives

Functional Area - Marketing Management

	• Define digital marketing objectives that are aligned to the organisation's business and marketing objectives • Define measurable model with measurable KPI and clearly set parameters that indicate success or failure of the objectives
Remark	

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	Performance Requirements
	1. Knowledge for formulating digital marketing analytics strategy
	
	• 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)
	
	2. Formulate digital marketing analytics strategy
	
	• Determine what the primary business objectives and goals for marketing, such as:
	    o increase sales revenue for products
	    o improve conversions across different channels
	    o 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:
	    o 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
	    o Determine the data analytic tools to measure the data available that are presented in measurable metrics
	    o 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:
	    o Obtain data regarding the predictive behavior of target customers for persona data collection
	    o 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.

Functional Area - Marketing Management

	o 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. 3. Exhibit professionalism • 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	The integrated outcome requirements of this UoC are the abilities to: • 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	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Formulate social media marketing strategy
Code	108034L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating social media marketing strategy for digital marketing. Social media is one of the most powerful tools in the marketing arsenal. To benefit from social media, a clear strategy that takes into account of what needs to achieved, who the customers are and what the competition is doing. This UoC concerns functional level strategy
Level	5
Credit	3
Competency	Performance Requirements 1. Knowledge for formulating social media marketing strategy - Possess good project management skills and capable of formulating functional strategies - Possess extensive and in-depth knowledge of social media techniques - Possess good knowledge and application of analytic tools such as SWOT (Strengths, Weaknesses, Opportunities and Threats), PESTLE (Political, Economic, Social, Technological, Legal and Environmental), etc. - Possess good knowledge of the organisation overall business and marketing strategies - Possess good knowledge of inbound marketing 2. Formulate social media marketing strategy: - Identify the primary objectives of using social media marketing. If there are more than one objective, rank their priority and tackle one at a time. Goals include: - Traffic - Follower growth - Engagement - Reach/impressions - Conversions - Determine factors and requirements related to social media marketing campaign, including but not limited to the following: budget, type of audience to interact in social media, the demographic and psychographic characteristics, etc. - Pinpoint channels to use in social media marketing campaigns by performing social media survey to understand which sites the audience frequent visit, how often, their primary purposes for using these sites, etc. - Perform audit of target audience, how often the social media site is used, their primary purposes for using these sites, the sites they most likely to use, etc. - Evaluate which channels to use in social media marketing campaigns - Identify what products and features in the organisation appeal to the heart of audience - Formulate requirements for implementation plan, including: how and what to channel to use, create a content plan and editorial calendar, and how to measure social media strategy success - Document and agree the strategy with stakeholders and disseminate to implementation team 3. Exhibit professionalism - Be updated with current digital marketing ethics ensuring digital marketing strategies are linked with business ethics with social responsibilities

Functional Area - Marketing Management

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Formulate the social media strategies that can be implemented to meet the organisation's business and marketing objectives - Perform complete audit of target audiences and collect the factors/requirements for marketing campaigns that can be used to formulate social media marketing strategy - Formulate the implementation plan requirements that can be agreed by stakeholders, with concise and precise details of how and what social media contents be used for which the implementation team can follow
Remark	

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

Functional Area - Marketing Management

Title	Implement inbound marketing strategy
Code	108032L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in using inbound marketing for the company. Inbound marketing consists of attracting prospects and efficiently converting those prospects to leads, and then to customers. Understanding prospects, creating attractions and conversion is the essence of inbound marketing. This UoC concentrates on implementation competences of inbound marketing, following the organisation's inbound marketing strategy.
Level	4
Credit	6

Competency	Performance Requirements
	1. Knowledge for implementing inbound marketing strategy
	
	• Possess good project management and team management skills
	• Possess good communication and interpersonal skills that can work and communicate with people of all levels
	• Possess in-depth skills in implementing inbound marketing
	• Possess good knowledge of SMART (Specific, Measurable, Attainable, Relevant, and Timely) principle
	• Possess in-depth knowledge of inbound marketing methodology (Attract, Convert, Close, and Delight)
	
	2. Implement inbound marketing strategy
	
	• Familarise with the organisation's inbound marketing strategy and the marketing objectives
	• Identify goals of inbound marketing that are measurable. For example: Increase organic search traffic by 10% each quarter for the next 12 months, Increase online leads by 15%
	• Define persona of prospects and customers. It needs to be aligned with the overall marketing and inbound strategy
	• Develop a plan to **Attract** prospects, **Convert** those prospects into leads, and **Close** those leads into customers:
	    ○ Attract:
	        ▪ Evaluate different channels where most of the prospects likely to be attracted, such as: Blogging, SEO, Search Engine Marketing, Social Media, etc.
	        ▪ Identify what offers that can be used to attract prospects
	    ○ Convert
	        ▪ Review and optimise website, including: website speed, user experience, optimise for Search Engine Optimisation (SEO), mobile, etc.
	        ▪ Design the contents that will be used in the conversion path
	            ▪ **Call-To-Action**: A button or text that promotes your offer to prospects
	            ▪ **Landing page**: Further describes the offer which should be personalised to the prospects
	            ▪ **Form:** A landing page that capture visitor information before producing the promised content
	            ▪ **Thank You Page**: After the form is submitted, visitors are brought to this page to gain access to their content

Functional Area - Marketing Management

	▪ **Confirmation email**: An email sent to the email address provided by the visitor when they downloaded the content
	    ○ Close
	        ▪ Establish a lead scoring process to segment leads into various buckets based on persona and stage in the buying process
	        ▪ Identify targeted groups that are closer to a purchase decision and forward to sales team for action
	
	• Identify and commission tools that can assist the implementation plan to launch the inbound marketing campaign on identified channels/platforms. Tracking and monitoring tools needed to be setup to provide analytics that can tell what channels provide the most traction, lead quality, content performance, website performance, social sharing statistics, email open rates, etc.
	• Produce regular reports to various stakeholders with required information to support and facilitate business activities
	
	3. Exhibit professionalism
	
	• 'keeping ahead of the game' and be aware of the constantly shifting state of inbound marketing, technologies and techniques
	• Respect privacy of customers and ensure all inbound marketing activities complied with privacy laws

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Grasp the inbound marketing strategy and produced an implementation pan that can deliver the objectives • Define a comprehensive persona of prospects/customers that is targeted enough for use in the Attract and Conversion process • Design and create contents that can build relationship with the prospects/customers and convert to leads • Select and commission tools that can deliver the required information for analytic use
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Plan marketing of digital media products
Code	108035L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in planning marketing campaigns and activities for digital media products. Marketing planning demands for the ability to devise marketing campaigns and activities to sell the organisation's own digital media products in accordance with established marketing strategies. This UoC concentrates on the knowledge and competencies on planning such marketing campaigns.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for marketing and digital media products
	
	• Comprehend the organisation's marketing strategies and guidelines for digital media products
	• Possess in-depth knowledge about the quality and characteristics of the organisation's own products
	• Possess good project management and planning skills
	• Possess good communication and interpersonal skills for dealing with people at all levels
	• Possess good knowledge in:
	   o Market demand trend
	   o Customers' consumption behaviour
	   o Marketing and promotion skills
	   o Marketing campaigns implementation, etc.
	• Understand related legislations and regulations, such as:
	   o The privacy and The Unsolicited Electronic Messages Ordinance (UEMO)
	   o The Trade Descriptions Ordinance, Chapter 362
	   o The Copyright Ordinance, Chapter 528, etc.
	
	2. Plan marketing of digital media products:
	
	• Consolidate the targets and requirements of the organisation's marketing strategies towards digital media products, such as:
	   o The exact product or product mix
	   o Target customers
	   o Target market share
	   o Budget allocation, etc.
	• Determine the best modes and means for marketing the digital media products in concern, for examples:
	   o Traditional media and channel such as newspapers, TV, etc.
	   o Digital direct marketing such as the web, email, mobile, etc.
	   o Across a variety of channels including both digital and traditional
	• Highlight the nature and characteristics of digital media products during marketing planning, such as:
	   o They are ever-growing sources of entertainment, news, shopping and social interaction nowadays
	   o The rapidly changing versions for games products
	   o New technologies applied in digital AV products, etc.
	• Choose the means and tools to deliver marketing messages to target customers, subject to but not limited to the following considerations:

Functional Area - Marketing Management

	○ Matching expenditures for marketing activities with the budget ○ Effectively reaching the target customers ○ Tailor to individuals or customer groups to match their needs ○ Collect customer profiles and their feedbacks for analysis and subsequent marketing references, etc. - Define schedule or calendar for conducting the marketing activities and campaigns - Identify suitable monitoring and data collection tools to measure the effectiveness of the marketing activities and collection of statistics - Document the plan with implementation schedule and present to senior management for approval 3. Exhibit professionalism - Always be fully conversed and updated with the marketing trend of digital media products - Ensure the chosen marketing plans, campaigns and activities will comply with related ordinances and regulatory requirements
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Devise effective marketing campaigns and activities for the organisation's own digital media products, which can assist the overall business development; and - Review and report to senior management the effectiveness of the implementation of the marketing plans, and make suggestions for improvement
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Implement digital marketing plan
Code	108036L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in implementing the organisation's digital marketing plan. The benefits of digital marketing are high when it's done correctly. With so many options and variety of channels together with fast changing of dynamics in digital media industry, performing digital marketing is not a simple task. This UoC concerns competence on implementation of digital marketing plan, which is about knowing the plan, carrying out and ensuring all the planned actions are successfully completed and fulfill the business objectives.
Level	4
Credit	6

Competency	Performance Requirements
	1. Knowledge for implementing digital marketing plan
	
	• Possess good project management and team management skills
	• Possess good communication and interpersonal skills that can work and communicate with people of all levels
	• Possess in-depth skills in implementing digital marketing
	• Possess good knowledge of SMART (Specific, Measurable, Attainable, Relevant, and Timely) principle
	• Possess in-depth knowledge of digital marketing models such as 5Ss model (Sell, Speak, Serve, Save, Sizzle)
	
	2. Implement digital marketing plan
	
	• Grasp the organisation's digital market strategy and overall marketing plan and gather various information prior launch of digital marketing plan. Information including but not limited to the following:
	    o Has the target audience been selected
	    o Customer persona's in place
	    o The website is setup for the purpose
	    o What budget are allocating for digital marketing
	    o Objectives and goals needed to achieve
	    o Marketing tactic
	• Prepare digital marketing contents, including but not limited to the following:
	    o Select best marketing channels to reach target audience
	    o Develop contents that differentiate from competitors and encourage interaction with audience
	    o Develop website landing page
	    o Create marketing calendar
	• Define roadmap for implementation with tasks including but not limited to the following:
	    o Develop activities schedules
	    o Prepare implementation team, ensure every member is aware of responsibilities
	    o Select and implement tools, such as social marketing tools
	• Execute and monitor digital marketing campaigns
	    o Setup tools to monitor marketing activities, lead generations, Customer Relationship Management (CRM) collection results, etc.
	    o Setup tools to generate reports for refinement of digital marketing activities and reports for sales and other stakeholders

Functional Area - Marketing Management

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Produce reports to stakeholders with reference to digital marketing goals to facilitate decision making and sales generation
Refine or provide assistance to refine digital marketing strategy/plan/campaign with consideration to the following:

New trending customer segments
New markets
New digital marketing techniques
New digital marketing tools for better customer interaction

3. Exhibit professionalism

Apply industry best practices for implementing digital marketing and ensure it complements traditional marketing to achieve the best outcome for the organisation

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<td>Assessment Criteria</td>
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The integrated outcome requirements of this UoC are the abilities to:

Develop a road map for implementation that meets the business and marketing goals and objectives
Identify and setup needed tools that can monitor digital marking progress and produce the reporting required which can be used by stakeholders to enhance business functions
Continuously adjust and refine digital marketing processes to align with changing factors of customer patterns, markets, digital marketing technology and techniques
Complete the implementation within the planned schedule and budget

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

Functional Area - Marketing Management

Title	Implement digital marketing in Mainland China for digital media products
Code	108037L4
Description	This unit of competency applies to all Digital Marketing Practitioners who are involved in using social media for company branding. Internet is the main source of information in Mainland Chain. Naturally this would be the most effective platform to reach the largest customers in the shortest time. Most Hong Kong DMT organisations, currently, prefer to perform digital marketing remotely from Hong Kong when not outsourcing their digital marketing in Mainland China. This UoC concerns competences for implementing digital marketing in Mainland China.
Level	4
Credit	6
Competency	Performance Requirements 1. Knowledge for implementing digital marketing in Mainland China for digital products - Possess good project management, team and vendor management skills - Possess good communication and interpersonal skills that can work and communicate with people of all levels - Possess extensive and in-depth knowledge of various local and Mainland China digital marketing technologies - Possess in-depth knowledge of Mainland China's marketing and laws related to online commerce and online marketing - Possess good knowledge of the organisation's marketing strategy for Mainland Chain and its business goals 2. Implement digital marketing in Mainland China for digital products - Follow the organisation's Mainland marketing strategy and determine any set goals and KPIs (Key Performance Indicators) for digital marketing campaigns as well as budget allocation - Work with appropriate internal business units to determine most suitable digital media product to be marketed in Mainland China and comprehend various product characteristics that is most favourable to highlight the digital media product in the marketing campaigns. For example: ○ Interactive/multi-player for game ○ Realistic CG (Computer Graphics) ○ Virtual Reality (VR) and AR (Augmented Reality) with Artificial Intelligence - Identify target audience or potential customer profiles for the concerned digital media products and/or brands. For example: ○ May be initially target at tier-one Chinese cities (Beijing, Shanghai, Guangzhou, etc.) due to more appreciative of IT products, or more affluent, etc. ○ Age, gender, income ○ Their personal interests (e.g. How they spend their time on weekends?) - Identify traffic sources that are suitable for the concerned digital media products/ brands and use the source to drive traffic to the organsiation's web portal, such as: ○ Search engines: for example, Baidu, Google, 360/So.com, Sogou, Soso, Youdao. Search engines can be split into 2 main categories: paid search and organic search ○ Social Media: for example, Weibo, Weixin (WeChat), Youku, etc. ○ Partner/Agent's sites: Sites that are selling the organisation's products ○ Chinese web directories: for example, Hao123. ○ Mobile search and mobile apps: mobile users growing fast everyday

Functional Area - Marketing Management

	- Enhance the web portal for Mainland China customers, including: - Considerations for the web portal, for example: - Hosting considerations (speed of access, laws, support and maintenance, etc.) - Payment gateway - Have contents that can captivate the audience and provide all the details of the products - Once a customer decides to buy he/she is taken through a purchase process. It should be an assuring and simple journey - Built-in customer relationship management (CRM) program in the portal so that the sales team can regularly communicate with customers - Schedule and perform marketing campaigns with monitoring tools setup to monitor the effectiveness of online marketing campaigns - Review the effectiveness of the campaigns against marketing KPIs and revise and improve future marketing plans where appropriate 3. Exhibit professionalism - Be aware of the constantly shifting state of the Mainland Internet laws and ensure all digital marketing activities are complied with the laws - Ensure the organisation image and brands are well protected
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Identify all characteristics of the digital media products that can be used in the marketing campaign - Ensure the preparation of the web portal is well set up that can sell the organisation products - Ensure the digital marketing campaign completed and fulfills the target KPIs and within budget
Remark	

Specification of Competency Standards
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Functional Area - Marketing Management

Title	Implement social media marketing plan
Code	108038L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in using social media for company branding. Social media gives opportunity to reach the target audience and enhance brands among the audience. It will increase website traffics, build trusts and raise brand awareness. This UoC concerns the competences on implementing product brand building using social media either on owned (company portal) or public social platforms.
Level	4
Credit	6

Competency	Performance Requirements
	1. Knowledge for implementing social media branding
	
	• Possess good project management and team management skills
	• Possess good communication and interpersonal skills that can work and communicate with people of all levels
	• Possess good knowledge implementing marketing with social media
	• Possess good knowledge of different social media branding techniques
	• Possess good knowledge of the organisation's social policies/guidelines
	
	2. Implement social media marketing plan:
	
	• Perform pre-implementation tasks, which include but not limited to the following:
	   o Familiarise with organisation marketing and branding strategy
	   o Familiarise with implementation/marketing goals and objectives
	   o Determine budget allocated for the implementation
	   o Time limits, if any
	   o Target audience, demographics, etc.
	   o Analyse product's SWOT (Strengths, Weaknesses, Opportunities and Threats) results of previous branding exercises and competitor analysis report
	   o Evaluate different social media techniques best suited for the branding project (traditional for new)
	• Formulate an implementation plan,
	   o Create a brand image (if it does exist) with:
	      ▪ Standardised logo
	      ▪ Colour scheme
	      ▪ Font, etc.
	   o Identify which social network site where the brand can easily communicate, connect and interact with your target audience
	   o Integrate these social networking sites with existing website, e.g. a link to the news pages
	   o Create unique, sharable "killer" content for deployment, including
	      ▪ Images give the message and uniquely associated with the brand
	      ▪ A catch phrase
	      ▪ Write "explosive" blogs
	   o Setup a team of brand advocates or influencers to help with the posting of contents and communicate with audiences/customers. Recruit from external agency if necessary
	   o Schedule social campaigns and content postings
	   o Identify tools to be used for monitoring of social media campaigns
	• Document the plan and distribute to all stakeholders (managers, team members, etc.)

Functional Area - Marketing Management

	• Schedule training and briefing sessions to ensure all team members are familiarised with the plan • During implementation, regularly review the plan to ensure all activities are progress as scheduled and/or newer social media techniques are better fit, etc. Adjust if necessary 3. Exhibit professionalism • 'Keeping ahead of the game' and be aware of the constantly shifting state of social media practices, technologies and techniques • Look after the interest of the organisation and ensure the brands are well protected
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Gather all the pre-implementation details and branding requirements without affecting the planning process • Create an implementation plan that is able to persuade all stakeholders to buy-in • Use appropriate monitoring tools to monitor social media campaigns and measure the brand's increase in visibility • Ensure the implementation proceeded as planned and the social media campaigns achieve all the branding objectives
Remark	

Specification of Competency Standards
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Functional Area - Marketing Management

Title	Implement mobile marketing
Code	108039L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in implementing mobile marketing for the organisation. Mobile marketing landscape is complex, lively and dynamic, having a solid strategy and implementation plan is critical to the success of implementation. This UoC concentrates on competence related to planning and implementing mobile marketing campaigns that is part of the organisation's overall marketing.
Level	4
Credit	6

Competency	Performance Requirements
	1. Knowledge for Implementing mobile marketing
	
	• Possess good project management and team management skills
	• Possess in-depth knowledge mobile marketing channels
	• Possess good knowledge of "push" and "pull" mobile marketing techniques and why "pull" is most effective for mobile marketing
	• Possess in-depth knowledge of the mobile customer lifecycle and Mobile Engagement Loop: Download, Onboard/Acquire, Conversion/Engage, Retention/Retain, Re-Engagement/Re-activate and Analyse & Report
	
	2. Implement mobile marketing:
	
	• Comprehend what your marketing wants, including: marketing objectives, Key Performance Indicators (KPIs) and targets which set for the mobile marketing campaign
	• Comprehend what the customer needs through building customer profile by employing different acquisition tools including but not limited to the following: email, web site, social media, paid ads, etc.
	• Determine how to engage the customer by knowing what can be offered as "value" to customer which can be categorised below :
	    ○ Location base information. e.g. how to find certain stores (Map)
	    ○ Timely information. e.g. price alert
	    ○ Make life easier. e.g. rack workout rate, calorie consumption
	    ○ Financial Incentive. e.g. coupons, discounts
	    ○ Entertainment. e.g. treasure hunt or other games
	    ○ Connection. e.g. messaging to interact with other customers
	• Align target mark wants (customer needs) with desired outcomes (marketing objectives). For example : acquisition of new customers done by mobile coupon driving customers to web promotion web site which involves: search, advertising, pay-per-click or through location-based marketing
	• Choose the right mobile marketing tool for this campaign that can gives value to customer and accomplish the marketing objectives. Tools included but not limited to the following :
	    ○ Text messaging
	    ○ Mobile search
	    ○ Mobile web site
	    ○ Social network
	    ○ Mobile advertising
	    ○ Proximity marketing (using Bluetooth or NFC technology)
	• Design and develop the campaign contents and the communication message for various mobile devices (smartphone, watch, etc.)

Functional Area - Marketing Management

	• Launch mobile marketing campaign.
	    o May require to breakdown into phases (design, test, pre-launch, launch, post-launch, etc.),
	    o List of tasks assigned to people and their responsibilities
	    o Budget for each phase or activity
	• Document the plan and distribute to all stakeholders (managers, team member, etc.)
	• Setup monitoring tools to track mobile campaign and customer responses
	• Schedule training and briefing sessions to ensure all team members are familiarised with the plan
	• During implementation, regularly review the plan against information collected from monitoring tools to ensure all activities are progressing as scheduled and whether the campaign needs refinement
	
	3. Exhibit professionalism
	
	• Develop mobile strategies comply with industry best practices as well as laws and regulations of Hong Kong
	• Respect privacy of customers and ensure all marketing activities complied with privacy laws

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Collect and construct customer profiles that can determine the customers' needs and what the campaign can attract the customer • Select the correct mobile tool that can deliver the required results of the marketing campaign • Design, develop and test the communication message fit for the mobile marketing campaign and can engage customers • Develop the implementation plan that is concise, precise and implementable with all members of the implementation team aware of their roles and deliverable
Remark	

Specification of Competency Standards
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Functional Area - Marketing Management

Title	Analyse market trend for digital media products
Code	108040L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in implementing digital marketing for digital media products. Digital technologies change very rapidly. Staying ahead, especially in digital media business, is not easy. Keeping abreast with changing trends and technology will enable organisations to optimise marketing and business strategies to be more competitive. This UoC concentrates on competence on identifying tools for performing analysis and/or predicting market trends for marketing or business use.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for analysing and predicting market trends for digital media products
	
	• Possess good project management and team management skills
	• Possess good communication and interpersonal skills that can work and communicate with people of all levels
	• Possess good knowledge in marketing of digital media products
	• Possess in-depth knowledge of statistics, analytical and trend analysis tools
	
	2. Analyse market trend for digital media products
	
	• Familiarise with the organisation's trends analysis requirements and develop a list of market intelligence information or reports that are needed for marketing and business use. For example:
	    o Buyer/seller trends
	    o Competitors product trends
	    o Product trends by segmentation
	        ▪ sustainability
	        ▪ targets demographics
	        ▪ buy/user age group
	    o Trends in consumer needs and behaviour related to the digital media product
	    o Shifts in consumer perception related to the product
	• Identify best source and prediction tools to capture the required trends information. Also verify credibility of the acquired information. For example, from:
	    o Social media channels
	    o Market experts
	    o Public marketplaces
	    o Trade journals
	    o Data analytic agents
	    o Internet search
	• Identify and commission tools that can extract the needed trends information, including but not limited to the following:
	    o Amazon and eBay best seller section for the related digital media product
	    o Google trends
	    o Trend watching
	    o Government released statistics
	• Configure auto report generation in trends analysis tools or manually extract and build the required reports to deliver the information required for marketing or business use
	• Enhance trend analysis report with value added information, including:
	    o Reformat or Tailored format for a specific stakeholder or groups of stakeholders

Functional Area - Marketing Management

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      ○ Break downs of trend information
      ○ Provide recommendation
• Work with stakeholders through discussion or presentation sessions to walk through the trend analysis report to facilitate ease of comprehension

3. Exhibit professionalism

• Keep abreast with data analytic techniques and digital marketing technologies
• Committed to deliver trend analysis that reflects the true market that can benefits formation of business strategies
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<td>Assessment Criteria</td>
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The integrated outcome requirements of this UoC are the abilities to:

• Grasp the trend analysis report requirements and able to formulate a list of requirements
• Formulate trend information capture plan that can capture industry data related to the product and can be used to generate a comprehensive marketing trend
• Deliver trend reports that are easy to comprehend and provide the correct information to stakeholders that can facilitate marketing and business strategies formation
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Functional Area - Marketing Management

Title	Plan direct digital marketing
Code	108041L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in planning implementation of digital marketing. Direct Digital Marketing (DDM) is an method where relevant marketing communications are delivered to individuals through the e-mail, Web, and mobile channels. Many companies consider this the most cost effective and best method to market their product. This UoC concentrates on competencies on planning DDM campaign.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for planning direct digital marketing
	
	• Possess good project management and planning skills
	• Possess good communication and interpersonal skills that can work and communicate with people of all levels
	• Possess in-depth knowledge of DDM techniques
	• Possess good knowledge of planning digital marketing communication tools
	• Possess good knowledge of implementing digital marketing campaigns
	• Possess good knowledge of privacy and The Unsolicited Electronic Messages Ordinance (UEMO)
	
	2. Plan direct digital marketing:
	
	• Familiarise with the objectives of the marketing campaign and any KPI (Key Performance Indicator) that has been set for the campaign. If no KPI has been defined, then work with marketing colleagues to define KPIs which will be used to monitor the performance of the campaign
	• Gather other details regarding the marketing campaign, such as but not limited to the following :
	   o The marketing product/brand
	   o Target audience
	   o Budget
	• Determine which of the DDM best are for the marketing campaign, such as:
	   o Web
	   o email
	   o Mobile
	• Review the organisation's databases to determine whether it has the needed list of target audience's contact information (i.e. email address, mobile phone number, etc.) or it needed to be acquired from 3rd party database (purchase or rent)
	• Identify which tools to use and how to deliver DDM communication message to target audiences that can deliver the "AIDA" effect (See Section 8). When selecting tools some areas may need to consider including but not limited to the following:
	   o Matching the budget of the campaign
	   o User registration/opt-in/op-out control
	   o Can tailor promotional materials to individuals or group of users to match their need
	   o Can collect user feedbacks and user profiles
	• Determine the resource requirements for the implementation of the DDM communication
	• Define marketing campaign schedule on marketing calendar, ensuring the user is not over saturated with receiving the DDM materials

Functional Area - Marketing Management

	• Identify suitable monitoring and data collection tools that can measure the effectiveness of the marketing campaign and collect statistics for further sales/marketing usage • Document the plan with implementation schedule that can complement the marketing schedule and present to appropriate stakeholders for comment and approval 3. Exhibit professionalism • Be fully conversed and updated with digital marketing trends • Fully complied with the Hong Kong privacy laws and The Unsolicited Electronic Messages Ordinance (UEMO)
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully grasp all the objectives for the DDM marketing campaign and create a DDM campaign plan that is approved by stakeholder • Able to identify a database with target audience details for DDM campaign use • Identify suitable tool for use in the implementation of the DDM campaign that can monitor the effectiveness of the campaign and collect additional user data that can be used in product sales
Remark	AIDA principle – Attention, Interested, Desire, Action

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Functional Area - Marketing Management

Title	Plan measurements on the effectiveness of digital marketing
Code	108042L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in planning implementation of digital marketing. In any digital marketing campaigns, irrespective of whether it is social media, Search Engine Optimisation (SEO), Search Engine Marketing (SEM), Pay Per Click (PPC), or others, it's essential to determine how effective they are and/or to facilitate decision making. For example, re-targeting or switching strategies mid-way through. This UoC concerns the competencies on planning measurement of digital marketing effectiveness at implementation which is the first step of the implementation process.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for planning measurements of the effectiveness of digital marketing
	
	• Possess good project management and planning skills
	• Possess good communication and interpersonal skills that can work and communicate with people of all levels
	• Possess in-depth market research techniques
	• Possess the skills of taking objectives and raw data and turn it into valuable metrics and understand what metrics to look at in each stage of a marketing funnel
	• Possess good knowledge of implementing digital marketing campaigns
	
	2. Plan measurements of the effectiveness of digital marketing:
	
	• Familiarised with the organisation's marketing and business objectives. For example:
	   o Build closer relationship with customers
	   o Build brand awareness
	   o Sell products
	• Map those objectives to goals which should be implementable, measurable and understandable. For example, the objective "build closer relationship with customers" with following goals:
	   o Collect information about user via opt-in form
	   o Successfully reach audiences
	   o Increase customer leads
	• Map goals to marketing and campaign metrics (KPI) with targets. For example:
	   o KPI: Cost per lead, target= <\$5
	   o KPI: Visitor's loyalty, Target = >60% after visiting site
	• Identify best tools to measure marketing efforts. Such as:
	   o Google analytics, KISSmetrics
	   o Sproutsocial, Hootsuite or Buffer
	   o Buzz Stream, Inky Bee
	• Design and specify reporting procedure format as well as regularity for presentation of measured results, which should conform to the organisation's documentation standards or guidelines
	• Document the plan and seek stakeholder's buy-in
	
	3. Exhibit professionalism
	
	• Be fully conversed and updated with digital marketing measurement techniques and tools

Functional Area - Marketing Management

	• Be able to collect and measure the true status of digital marketing activities which can be used for decision making
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully grasp all the organisation's objectives for the marketing campaign • Transform objectives to measurable KPIs that can be used to measure the effectiveness of the digital marketing campaign • Solicit the correct digital marketing measurement tools that can measure the effectiveness of digital marketing campaigns • Produce measurement plans for implementation of digital marketing which can persuade stakeholders to buy-in
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Coordinate and manage digital marketing contents production
Code	108044L4
Description	This unit of competency applies to practitioners who are involved in creating contents for digital marketing. With the commonly adopted belief of "Content is the king", the contents will draw the prospects in and prompt them to share marketing messaging across their networks. Contents will also fuel social marketing, email marketing, lead nurturing, and scoring. Hence, contents need to be thought provoking, inspiring, and it needs to have the right ingredients to incite an emotional response from the audience. This UoC concentrates on competencies to manage or coordinate the production of these essential elements for digital marketing campaigns. Content production may be in-house or outsourced. The coordinator needs to ensure the requirements are conveyed to the creators and ensure the delivered contents complied with requirements and standards.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for coordinating and managing digital marketing contents production
	
	• Possess basic project and people management skills for managing digital content production
	• Possess good communication and interpersonal skills that can communicate with all levels content production team either internal or external
	• Possess good knowledge of digital marketing content production life cycle
	• Possess in-depth knowledge of digital marketing techniques
	• Possess in-depth knowledge of the organisation's content development policies and guidelines
	
	2. Coordinate and manage digital marketing contents production
	
	• Familiar with the digital marketing implementation plan for digital marketing campaign
	• Work with the Product Marketing team and other stakeholders to obtain information needed for development of contents production plan, such as:
	   o Campaign activities
	   o Campaign objectives
	   o Audience profile
	   o Type of content requirements
	   o Publishing channel (Web site, social media, Search Engine Optimisation (SEO), banner, mobile, etc.)
	   o Timeframe
	• Develop content production plan with schedule and responsibilities. Plan should include:
	   o Create a list of every piece of content to be developed
	   o Decide when contents should be created (e.g. 2 weeks before publishing date)
	   o Coverage period (e.g. covering whole month)
	   o Which and what content are produced in-house
	   o Which and what contents are produced by outsourced content creators
	• Consolidate the content production plans into a single marketing (content) calendar. Add that list of content to the marketing calendar with clear deadlines. Get entire team and stakeholders using the same tool so that everyone is one that same page
	• Formulate content brief that can communicate details of marketing and contents requirements precisely and concisely to production team
	• Develop proofing procedure

Functional Area - Marketing Management

	• Perform proofing of completed contents and perform regular review sessions with production team to improve quality of produced contents and ensure the produced contents achieve marketing goals • Coordinate the publishing of completed contents on appropriate digital marketing channels • Monitor the effectiveness of the published contents with monitoring tools and collect statistics, records and reports which can be used for campaign review purpose 3. Exhibit professionalism • Keep abreast with trend of content marketing techniques and new tools for creation of digital media contents effectively and efficiently • Contribute new and innovative ideas for contents creation but always comply with organisation's guidelines
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Collect all the needed information for the production of content production plan and drafting of content brief • Produce a content production plan with full complete list of all required digital contents for the marketing campaign that are correctly scheduled and allocated to creators. Additionally, ensure all content production team members use the same marketing calendar and aware of deadlines • Draft and communicate content briefs with internal and external content creators to ensure they fully understand the content requirements and have all the necessary information required for the production of the digital contents with no delay • Collect all monitored information related to the published contents that can be used for the overall marketing campaign reviews
Remark	

Functional Area - Marketing Management

Title	Conduct marketing research with social media
Code	108045L4
Description	This unit of competency applies to all digital marketing practitioners who are involved in using social media for marketing. Market research was previously only affordable by large organisations. But in the age of social media, millions of unsolicited opinions available every single minute of the day and now large and small organisations can afford to perform social research to understand how people are using, discussing, and recommending both products and categories. This UoC is about competence in conducting marketing research with social media as a component of the organisation's overall marketing activities
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for conducting marketing research with social media
	
	• Possess good project management and team management skills
	• Possess good knowledge implementing marketing with social media
	• Possess good knowledge of different social media marketing research methodologies
	• Possess in-depth social media data analysis skills
	• Possess good knowledge of the organisation's marketing and social media strategies
	
	2. Conduct marketing research with social media:
	
	• Develop research objectives based on the goals and objectives of marketing campaign. For example: competitive analysis; product extensions; product strengths and weaknesses; new uses of products; and reactions to advertising and promotions
	• Identify key search terms or phrases. For successful analysis of social media data this may be an iterative step with broader searches being followed by searches using combinations of terms or newly discovered synonyms or phrases. For example: product's brand name, competitors' brand names and the product class or activities related to brand name
	• Identify social media data sources/channels for collection of data. For example:
	    o social network sites (e.g. Facebook)
	    o video-sharing sites (e.g. YouTube, Tumblr)
	    o photo-sharing sites (e.g. Flickr)
	    o product and service review sites (e.g., Yelp)
	    o blogs (e.g. Blogger), and microblogs (e.g. Twitter)
	• Organise captured data so that it can be used for analysis. Organisation of the data should be flexible that allows for diverse forms of media (text, video, photos, artwork, literature, etc.). Tools may be used to help. Such as: SocialMention, Google Alerts, Nvivo, etc.)
	• Analyse the data. The analysis needs taking into account various factors, including but not limited to the following:
	    o Multi-language
	    o Multiple forms (text, photo, etc.)
	    o Explosive large quantity and unmanaged data - must place limits, by topics or time periods
	    o Marketing goals
	• Compile the research report with concrete examples and illustrations of quotes from social media platforms, as well as any limitations found during the research, such as:

Functional Area - Marketing Management

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<td>online consumers are not necessarily demographically representative, population selection, etc.

• Document the analysis result and present the report

3. Exhibit professionalism

• Evaluate the constantly shifting state of social media practices, technologies and techniques
• Keep abreast with laws and best practices to respect social media users' privacy</td>
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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

• Identify and develop the goals for the social media research project
• Identify key search terms or phrases for successful analysis of social media data
• Produce a comprehensive analysis report that fulfills the objectives of the research</td>
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Functional Area - Marketing Management

Title	Design and create effective digital marketing contents
Code	108049L4
Description	This unit of competency applies to practitioners who are involved in creating contents for digital marketing. The success of content marketing strategy depends on how well the contents are created and posted to reach the customer/audience. There can be a wide contents variety (blog posting, video, audio, infographics, etc.) to be created for digital marketing, and whether they are the most effective type to use depends on the marketing channel/network used and the desired method to communicate with the audience. This UoC concerns competence for creating digital marketing contents, with simple design, from instructions or requirements of supervisor
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for designing and creating effective digital marketing contents
	
	• Possess good literacy skills to comprehend requirements and manuals of content editing tools
	• Possess good communication and interpersonal skills that can communicate with people of all levels
	• Possess good knowledge and operation of various content editing tools
	• Possess basic knowledge of digital marketing
	• Possess good knowledge of the organisation's content development policies and guidelines
	
	2. Design and create effective digital marketing contents
	
	• Preparation for content creation.
	    ○ Understand some basic factors related to the campaign, such as:
	        ▪ Desirable effects
	        ▪ Target audiences profiles
	        ▪ Marketing channels/network
	    ○ Content requirements
	        ▪ The marketing message or story the content need to convey
	        ▪ The content required type (text, infographic, animation, video, etc.)
	        ▪ Any required format, theme, colour scheme need to follow, etc.
	        ▪ Timeframe
	• Gather ideas for design of content which may require tapping into various sources, including but not limited to the following:
	    ○ Brainstorm with the team members
	    ○ Library of contents (purchased or company owned) and past marketing campaigns
	    ○ Competitors' campaigns
	• Define the format of the design (text, infographic, video, animation, etc.)
	• Create a content wireframe that lists all important points that needed to cover and also their flow. This ensures nothing is missed that is absolutely crucial for making an impression on target audiences
	• Create the contents:
	    ○ Create attention-grabbing titles which must be click-worthy and searchable
	    ○ Decide to curate or create the contents

Functional Area - Marketing Management

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Use appropriate tools to create the required contents. For example: video editor for video, animation editor for cartoon or animation, photo editor for picture or images, etc.

Test and refine the content by seeking feedbacks from team members or other stakeholders with following example lines of questions:

The content is readable
The user flow is spot on
They understood the points that the designer is trying to make
The content had added-value
They will share this content with their friends and followers
There is something about the content they do not like

Package the content with documentation in the required format for use in the next stage of digital marketing campaign and provide assistance with publishing in digital marketing campaign, when required

3. Exhibit professionalism

Keep abreast with trend of content marketing techniques and new tools for creation of digital media contents effectively and efficiently
Contribute new and innovative ideas for contents creation but always comply with organisation's guidelines

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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

Collect and understand all the requirements for the design and creation of the contents
Design and create the digital content that fulfills the marketing campaign requirements
Package the contents that are in correct format for publishing in digital marketing campaigns, with supporting documentation that are complied with the organisation guidelines/standards

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Specification of Competency Standards
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Functional Area - Marketing Management

Title	Monitor effectiveness of inbound marketing activities
Code	108043L3
Description	This unit of competency applies to all digital marketing practitioners who are involved in planning implementation of inbound marketing. Inbound marketing has three key aspects : getting found online, converting visitors & leads, and analysing and improving. This UoC concerns the competence for measuring results of inbound marketing campaigns.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for monitoring effectiveness of inbound marketing activities
	
	• Possess good project management and planning skills
	• Possess in-depth inbound marketing research techniques
	• Possess the skills of taking objectives and raw data and turn it into valuable metrics and understand what metrics to look at in each stage of a marketing funnel
	• Possess good analytic skills
	• Possess good knowledge of implementing inbound marketing campaigns
	
	2. Monitor effectiveness of inbound marketing activities
	
	• Familiarise with the inbound marketing implementation plan, its goals and Key Performance Indicators (KPIs) for the inbound marketing campaign as well as the plan of the implementation. Examples of goals to be measured:
	    o How many repeating visitors does the organisation have? Target increase 15%
	    o Which are the most (and least) popular product pages?
	    o How much of the site traffic is to the blog (and what are the sources)?
	    o What is the blog's visitor-to-lead conversion rate?
	    o What is the conversion rate from social media?
	• Plan where measurement will take place, at implementation stages of the inbound marketing campaign
	• Determine and setup tools to use to perform the measurement of activities. Example of tools:
	    o Google analytics, Piwik KISSmetrics
	    o Sproutsocial, RJ Metrics' CloudBI, Hootsuite or Cyfe
	    o Buzz Stream, Inky Bee
	• Acquire campaign data, analyse and compare with historic data. Collect, organise and input of historic data may be required and converted to a format that can be used for analysis
	• Create regular reports for the management team, conformed to the organisation standards. The report may include but not limited to the following information:
	    o Prime goals performance
	    o KPIs by funnel section
	    o Key findings and analysis
	    o Campaign snapshots
	    o Priority actions for the coming month
	• Review and adjust campaigns/activities based on performance
	
	3. Exhibit professionalism

Functional Area - Marketing Management

	• Be fully conversed and updated with inbound marketing measurements techniques and tools • Be able to collect and measure the true status of digital marketing activities which can be used for decision making
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Understand all goals of the inbound marketing campaign and identify what KPIs are needed to be measured • Select the right tools to measure the inbound marketing activities • Produce reports with required information and recommendation for decision making purposes
Remark	

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

Functional Area - Marketing Management

Title	Source analytic tools for digital marketing
Code	108046L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners involved with implementation of digital marketing projects. Digital marketing is a very dynamic and challenging process which needs analytic tools to help collect and interpret data with speed and accuracy that is useful for business use. This UoC concerns competence on sourcing analytic tools for digital marketing campaigns
Level	3
Credit	3
Competency	Performance Requirements 1. Knowledge for sourcing analytic tools for digital marketing - Possess good project management skills - Possess good knowledge of digital marketing and digital marketing analytic tools and techniques, including predictive analysis tools - Possess in depth knowledge of functions and features of analytic tools - Possess basic knowledge of the organisation procurement procedures - Possess good knowledge of designing customer experience models and campaigns around big data 2. Source analytic tools for digital marketing: - Be clear about the project backgrounds - Project goals and analytics are needed - Identify what marketing channels data are being collected (website, mobile, social media, etc.) - Identify what method of collecting data. For example: cookies for collecting passive user information and online survey for collecting online active users willing to fill in survey forms - Determine the budget available - Identify who will be using the tools. For non-specialist, visual reports are essential - Create an analytics requirement feature list. Elements include but not limited to the following: - Ease of use features - Ease of integration with other internal systems, such as internal Customer Relationship Management (CRM) system - Able to track individual customer behaviour rather than just analysing the masses - Has A/B test function for comparison of results - Support analysis for the campaign's marketing channels - Provide prediction analysis - Robust and flexible enough to grow and accommodate the future needs - Customisation abilities - Automation requirements - Supports provided - Within budget - Perform research (online, recommendation, etc.) to identify a number of tools that has close match to the requirement feature list, ideally producing scored card/value for each tool

Functional Area - Marketing Management

	• Select top 5 tools (or follow the organisation's procurement guideline) for pricing gathering (including free tools) • Document the tools result with recommendation in accordance with the organisation's guidelines. Present and seek authorisation for purchase of tools. If no suitable bespoke tools can be found, it may be required to source for agencies to provide analytic services/tools to perform data interpretation 3. Exhibit professionalism • Committed to identify most suitable analytic tools for capturing and interpreting the data that benefits the organisation's business functions • Adhere to the organisation procurement procedures and be unbiased in making sourcing recommendation
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully grasp the background details and have all the necessary information for sourcing correct tools that can perform the analytic functions effectively • Produce a comprehensive requirement feature list that can be used in the selection of analytic tools • Select and recommend analytics tools in accordance with the organisation's guidelines
Remark	6.2 indicates the normal steps for organisations with strict rules and governance. However, a more radical approach may be desirable in a fast changing dynamic digital marketing environment where quick information is the key to success of business. For example, a budget is given to the project team and the team is allowed to select and commission the tool. The selection procedure can be documented later in the campaign report.

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

Functional Area - Marketing Management

Title	Implement direct digital marketing
Code	108047L3
Description	This unit of competency applies to all digital marketing practitioners who are involved in implementation of direct digital marketing. Direct Digital Marketing (DDM) is based on a proven marketing principle, using email address, phone number and other direct means. DDM delivers targeted communications to individual consumers through email, web, and mobile. This UoC concentrates on competence of implementing DDM campaign after the production of a marketing plan.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for implementing and monitoring direct digital marketing
	
	• Possess good project management and planning skills
	• Possess in-depth knowledge of implementing DDM techniques
	• Possess good knowledge and application of DDM tools
	• Possess good knowledge of privacy and The Unsolicited Electronic Messages Ordinance (UEMO)
	
	2. Implement direct digital marketing
	
	• Familiarise with the implementation plan, objectives of the marketing campaign and be unambiguously clear on all the KPI (Key Performance Indicator) set for the campaign
	• Prepare and confirm marketing campaign details with stakeholders including but not limited to the following :
	    o Budget
	    o Schedule (also from the organisation marketing calendar)
	    o Target audience
	    o Theme of promotion or communication message
	    o Which DDM channels to use (email, web or mobile)
	• Prepare the target segment address list, which may require consolidating various business databases. Should campaign database is required to be purchased or rented from external source, follow the organisation's procurement procedures to commission the needed databases
	• Setup teams and allocate resources to perform various DDM preparation tasks of chosen DDM channels. Tasks may include, but not limited to the following:
	    o The campaign landing page in the web site
	    o Design email or Short Message Service (SMS) message
	    o Keywords for Search Engine Optimisation (SEO)
	    o Mobile website optimisation (responsive website)
	    o Pay Per Click service
	• Set tools and commission services for use in the DDM campaign. For example:
	    o Google analytics – analytic tool
	    o Optimzely – Land page tool
	    o Mailchimp – Customer interaction email and automation tool
	    o Google Adword – SEO optimisation tool
	    o Marketo, ExactTarget – Market automation tools
	    o email tracking tools
	• Construct the promotion message/content. For example:
	    o Web landing page, insert SEO keyword into meta tags of web site

Functional Area - Marketing Management

	- o Banner ad - o SMS - o email - o Develop cookies - Test the communication message to determine its effectiveness before using in the marketing campaign. Message may include following elements: - o Personalised - o Have corporate image (i.e. logo, colour, etc.) - o Appeal to consumers' emotions - o Make it Track-able (email tracking, cookies, etc.) - Run the campaign, collect responses and result of the campaign. Perform follow up actions, such as channel orders to sales, etc. - Manage team members and suppliers to meet agreed production schedule and budget - Monitor direct digital marketing activities and record/capture users responses - Generate campaign performance reports from statistics and information collected from various monitoring and analytic tools - Review the campaign results against marketing objectives and KPI with stakeholders 3. Exhibit professionalism - Be fully conversed and updated with digital marketing trends - Fully complied with the Hong Kong privacy laws and The Unsolicited Electronic Messages Ordinance (UEMO)
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Implement the DDM campaign in accordance with the implementation plan - Organise, prepare and run the DDM campaign that meets the schedule of the plan and without exceeding the allocated budget - Collect campaign statistics, analyse results and produce reports that follow the organisation's standards which can clearly be evaluated to KPI results
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Handle outsourced digital marketing
Code	108048L3
Description	This unit of competency applies to all digital marketing practitioners who are involved in planning implementation of digital marketing. The digital marketing world has undergone quite the evolution in recent years. Early on, it involved little more than strategically placed banner ads and targeted e-newsletters. But today, it's normal to involve multiple channels and platforms. Some companies are able to accomplish this in-house, while others completely outsource the task or take a hybrid approach. This UoC concentrates on competence of the latter two, particularly in competencies of managing outsource service provider (outsourced partners) in digital marketing with hybrid strategy.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for handling outsourced digital marketing
	
	• Possess project management, planning and people management skills
	• Possess good communication and relationship management skills
	• Possess good knowledge of implementing outsourced digital marketing projects
	• Possess basic contract management skills
	• Possess in-depth knowledge of digital marketing and coordinating digital marketing campaigns
	
	2. Handle outsourced digital marketing:
	
	• Identify and create a list of digital marketing tasks and marketing roles that the organisation prefers to be outsourced after weighted out the advantages and disadvantage. For example:
	    o Full digital marketing agent
	    o Audio/video editor
	    o Content writer
	    o SEO (Search Engine Optimisation)/SEM (Search Engine Marketing)/Web Marketer
	    o Social media blogger
	• Identify and select reputable outsource service providers for each component of digital marketing with following or combination of following methods:
	    o Publicly advertised and invited service providers
	    o Personal recommendations
	    o Through research tools include asking peers on Linkedin
	    o Study service provider's previous clients and portfolio
	• Adhere to the organisation's purchasing policies and guidelines to commission the outsource services provider. Identify and be directly in contact with the services provider's allocated account handler
	• Plan how to manage the outsourced partner's team members, as well as deciding how work are delivered, quality controlled, and distributed, that are comparable to internal team. This will need to be communicated to the outsourced partner and setup a workflow procedure for outsourced partner's team to follow
	• Write project brief to the outsourced partners that clearly states the exact task requirements with timeframes. Also provide the outsourced partner with all the necessary information, materials and other necessities to help the services provider complete the required task

Functional Area - Marketing Management

	• Carry out quality assurance of delivered work and provide support to marketing campaigns when required • Complete services report, in accordance with the organisation standards, and perform reviews with various stakeholders, including outsource service providers 3. Exhibit professionalism • Continuously improve outsourcing project management skills and ensure outsourced partners and the internal project team are working to the same goals • Always look after the interest of the company but with respects to outsourced partners
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Determine and compile a complete list of digital marketing tasks and roles that the company prefers/decides to be outsourced • Source and commission an outsourced partner in accordance with the organisation guidelines • Formulate a work plan and communicate effectively to the outsourced partner with agreed deliverables • Perform quality control on completed tasks of the outsourced partners that fulfill the requirements and complied with the organisation standards
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Marketing Management

Title	Develop social media contents for marketing
Code	108050L3
Description	This unit of competency applies to all digital marketing practitioners who are involved in creating social media contents for marketing. Social media can foster a culture of self-expression and an exchange of ideas from both consumers and businesses. However, one cannot just waltz into a conversation, make demands, collect comments and collateral materials, and walk away. The practitioner, as well as creating and posting captivating contents, he/she needs to respect fellow community members and follow the proper engagement etiquettes.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for developing social media contents for marketing
	
	• Possess strong reading, writing, and grammar skills
	• Possess good interpersonal skills and able to work collaboratively to all level of people
	• Possess good awareness of social media practices and etiquettes as well as the organisation guideline for social media marketing practices
	• Possess good understanding of marketing and various social media platforms
	• Possess good knowledge and skills to operate various social media content creation tools
	• Possess some basic knowledge of graphic design, video editing and other graphic editing
	
	2. Develop social media contents for marketing:
	
	• Comprehend the required marketing objectives
	• Work with team members to identify best social channel (pick and choose most suited social communities) and content strategy for the marketing campaign
	• Identify suitable tools for creating the required social media content. For example:
	   o AddThis, ShareThis
	   o Facebook Ads
	   o Buffer
	   o Shorify
	   o Hootsuite
	• Create social media content that is memorable (tells a story, plays to audience emotions, promotes engagement) and shareable, as opposed to disposable. It can be in variety of formats, including a catchy slogan, messages in different fonts that attract attention, a clever ad, a viral video, or a witty meme, etc.
	• Create a content calendar documenting when the content are planned to be shared via social media to maintain followers and keep those followers interested
	• Assist or help the digital marketing team to monitoring the effectiveness of the social media campaign
	
	3. Exhibit professionalism
	
	• Follow the Code of Ethics for Bloggers, Social Media and Content Creators
	• Produce the contents that can deliver the marketing message and linked with audiences

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to:

Functional Area - Marketing Management

	• Understand the objectives and requirements of the social media marketing campaign and can create social media contents that fulfills the campaign objectives • Select the most suitable social media channel for the marketing campaign • Create the social media contents that are correctly targeted, commutative, can attract the attention of the audience and entice the audience to participate • Create social media content that complied with the organisation's guidelines for social media marketing practices
Remark	

Functional Area - Marketing Management

Title	Develop an analytic mindset for digital marketing
Code	108051L2
Description	This unit of competency applies to all digital marketing practitioners who are involved with digital marketing projects. The most significant culture shift today for marketing teams is adopting an analytical marketing approach. Hence, it is essential that practitioners, in the age of big data, understand the information which will help them achieve their objectives. Having analytic mindset is not just about being able to determine success or failure of marketing campaigns, but helps them see how everything plays off each other, and how it help decision making, re-prioritised time and resources etc. This UoC concerns core competence on developing an analytic mindset for digital marketing
Level	2
Credit	3

Competency	Performance Requirements
	1. Knowledge for developing an analytic mindset for digital marketing
	
	• Possess good literacy skills that can read various technical manuals, work instructions, work procedures, organisational guidelines and procedure, etc.
	• Possess basic knowledge of data security
	• Possess basic knowledge of the organisation's guidelines for staff development
	• Possess basic knowledge of digital marketing
	
	2. Develop an analytic mindset for digital marketing
	
	• Understand the meaning of analytics and relationship of data, information, and intelligence
	• Understand marketing analytics that is the measurement and optimisation of the marketing activities
	• Appreciate the importance of analytic to the organisation and self, For example:
	    o Be competitive, adaptable, and capable of risk prediction
	    o Ensuring Return on Investment (ROI) and probability in marketing campaigns
	    o Digital media and many other organisations are seeing the business and talent-related benefits of Big Data
	    o Organisations need for analytical skills and are including these in hiring policies
	    o A skill that is needed to determine or evaluate how tasks are completed or failed and seek optimisation methods
	    o A skill that is a prerequisite for career growth
	• Apply the learnt analytic skills to assist digital marketing activities of the organisation
	• Proactively learning analytics:
	    o Proactively participate in the organised training sessions offered by the organisation
	    o Work and learn analytic techniques during marking activities and ask superior to help with learning reasons for selection of analytic tools for different marketing activities
	    o Read industry best practices
	• Apply and practice analytics in work even if not totally related to marketing activities. For example:
	    o Define and understand objectives of tasks
	    o Define targets for task
	    o Collect statistics or data during the execution of the task

Functional Area - Marketing Management

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<td>   o   Evaluate and review the tasks to determine if objectives and goal are meet, how it can be performed better next time

3. Exhibit professionalism

• Have the learning attitude and wants to deliver the best results for assigned tasks
• Always look for methods to improve and willing to explore using right tools to assist with the improvement of tasks</td>
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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

• Understand why analytics is important to the organisation and self
• Identify route of learning analytics at work place
• Apply analytic skills to assist digital marketing</td>
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Specification of Competency Standards
for the Information & Communications Technology Industry
Unit of Competency

Functional Area - DMT Architecture

Title	Develop content delivery network strategy for digital media business
Code	108052L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating the network architecture strategy at business level. Digital media organisations heavily depend on delivering their contents to their customers when they want with minimal delay. Organisation needs to formulate the best strategy for its Content Delivery Network (CDN) including: selecting the right performance, cost, security, bandwidth control, scalability (configurability), reliability, recoverability, etc. This UoC concerns competence on developing CDN strategy based on using CDN service provider rather than in-house built.
Level	6
Credit	3
Competency	Performance Requirements 1. Knowledge for developing content delivery network strategy for digital media business - 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 media distribution technologies, including: - 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. 2. Develop content delivery network strategy for digital media business: - Determine performance needs and actors that the CDN needs to satisfy, including but not limited to the following: - 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 have - Develop CDN service selection policy with following criteria: - Performance: deliver all contents to users/customers at expected performance - Control: - 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

Functional Area - DMT Architecture

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○ 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 optimisation and front-end optimisation
○ 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:

○ Complex knowhow on building server nodes world wide
○ High cost of building and maintaining network
○ Specialised layer 3 tools for managing routing and optimising network functions

Present to senior management/board for support

3. Exhibit professionalism

Be updated with current CDN technologies and committed to ensure contents are delivered to the users/customers at the expected performance

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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

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

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Functional Area - DMT Architecture

Title	Formulate cloud strategy for digital media content
Code	108053L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners entrusted with formulating the network architecture strategy at business level. Cloud has become viable with maturing of cloud technology and is becoming the trend for DMT organisations. A good cloud strategy is needed to identify business challenges, understand business needs, define cloud objectives and achieve Return on Investment (ROI), create a roadmap to transform on-premise business processes to the cloud.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating cloud strategy for digital media content
	
	• Possess good project management skills and capable of formulating business strategies
	• Possess in-depth knowledge of the organisation's digital media business and content production cycle
	• Possess in-depth knowledge of the organisation's infrastructure architecture
	• Possess in-depth knowledge of cloud technologies/services, such as:
	    ○ IAAS – Infrastructure As A Service
	    ○ SAAS – Storage As A Service and Software As A Service
	    ○ PAAS – Platform As A Service
	• Possess good knowledge of virtualisation technology
	• Possess good knowledge of public cloud platforms (e.g. AWS, Google, Azure, etc.)
	• Possess good knowledge of Cloud advantages and disadvantages, including:
	    ○ Reduce cost and ownership of infrastructure equipment
	    ○ Flexibility - on demand expansion of infrastructure needs
	    ○ Greater demands for security monitoring and tracking
	    ○ etc.
	
	2. Formulate cloud strategy for digital media contents
	
	• Determine motivation and goals for adopting cloud, such as:
	    ○ Investment flexibility in infrastructure
	    ○ Improve IT efficiency and better OPEX (Operating Expenditure) returns
	        ▪ Reduce ownership of expensive infrastructure hardware
	        ▪ Reduce supporting staff and costs
	        ▪ Aligning dynamic provisioning of rendering servers and storage on demand
	    ○ Accelerate content delivery
	• Assess current cloud maturity and determine the organisation's strengths and knowledge gaps for adoption of cloud
	• Determine what blend of cloud options (Private, Hybrid, Public) that fulfill specific business and technical requirements by taking a thoughtful look in reality and research of processes (content production, delivery, access, etc.), vendors, customers and tools
	• Identify possible challenges and formulate strategies to overcome those challenges, including:
	    ○ Mastering (public) cloud security
	    ○ Delivering reliability
	    ○ Optimising cloud expenditure

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

Functional Area - DMT Architecture

	○ Developing a cloud culture: encourage staff to adopt cloud and virtualisation technology ○ Compliance and regulatory requirements - Formulate cloud management strategy and disaster recovery strategy to avoid single point of failure. For example: adoption of multi-cloud service providers and /or use cloud backup services - Formulate implementation strategy: ○ Selection of service provider ○ Schedule ○ Estimated cost ○ Deployment methods (such as: prototype, phased or "big bang" approach) ○ Responsible people ○ Review and update infrastructure strategy - Formulate cloud service selection policy - Document strategy and present to senior management/board for approval 3. Exhibit professionalism - Apply industry best practices to constantly improve communication channels, processes, infrastructure and tools to remove bottlenecks and allow a consistent flow of value to the customers
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Determine clearly goals for taking the organisation's infrastructure to the cloud - Analyse and determine any knowledge gaps and challenges which the organisation needs to bridge to enable a smooth journey to the cloud - Formulate a cloud strategy with sufficient implementation details that can convince and gain support from senior management/board
Remark	

Specification of Competency Standards
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Functional Area - DMT Architecture

Title	Develop a business case for selecting infrastructure for DMT project
Code	108054L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners formulating business strategies. With such a tantalising assortment of clouds to choose from it makes difficult to develop a business case for deployment an Infrastructure as a Service (IAAS). The business case needs to consider all different options of infrastructure provisioning, including private, public clouds. Also it should include the likely costs, potential savings, procurement and contractual arrangements and an overview of the perceived risks, which may contribute to the weaknesses of the option.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for developing a business case for selecting infrastructure for DMT project
	
	• Possess in-depth project management skills
	• Possess in-depth knowledge of financial management and accounting
	• Possess in-depth experience in formulating business cases and capable of applying cost and benefit analysis techniques
	• Possess in-depth knowledge of the organisation's digital media business and infrastructure
	• Possess good knowledge of cloud technologies
	• Possess good knowledge of infrastructure design and network risk management methodologies
	• Possess in-depth knowledge of the organisation business missions and goals
	
	2. Develop a business case for selecting infrastructure for DMT project
	
	• Lead a team to research cloud technologies that can enhance the organisation's competitive advantage and still fulfilling its business goals
	• Formulate business case structure that matches senior management reading style and have sufficient information to facilitate decision making, For example:
	    o Executive summary
	    o Problem statement
	    o Analysis of the problem
	    o Solution
	    o Cost & benefits
	    o Recommendation
	• Based on the business case structure justify the business case, for example:
	    o Better ROI (Return on Investment), with CAPEX (Capital Expenditure) reduction and OPEX (Operation Expenditure) reduction, various costs: servers, storage, etc.
	    o Cloud promises speed, flexibility, especially in video production where number of rendering servers required is project dependent. i.e. on-demand resource
	    o Allow IT staff to concentrate on production work rather on support
	    o Able to deliver products to customers faster and wider without the draw backs of having the skills for building, maintaining the CDN (Content Delivery Network)
	• Develop the business cases based on the research results and scenario analysis of issues including but not limited to the following:
	    o CAPEX and OPEX
	    o Security and asset protection

Functional Area - DMT Architecture

	○ Manpower ○ Effects on customers and production team - Recommend an implementation case through a critical cost-benefit analysis and a final statement why the project should go ahead - Present the business case to senior management. Prior the presentation the following checking is needed: ○ Ensure problem statement follows naturally from the analysis of the situation ○ Ensure problem statement clearly indicates that action should be taken ○ List of potential solutions to the problems ○ Ensure data and calculations in the budget section are correct ○ Ensure the executive summary includes all essential elements and follow the same order as the complete document 3. Exhibit professionalism - Always take into consideration and strike a proper balance among all related technological, political, social, environmental and legal factors - Apply industry standards and organisation guidelines
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: - Guide the research team to analyse and identify benefits of cloud services that can provide better competitive edge to the organisation and collect the necessary information needed for compiling the business case - Develop the business case that match the style of the organisation's senior management and the content have the required information that facilitate decision making - Present the business case based on critical cost-benefit analysis
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - DMT Architecture

Title	Develop infrastructure performance testing
Code	108055L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for infrastructure performance testing. With internal infrastructure connected to CDN one would expect performance to be comparable or better than the origin, since CDNs should have highly optimised servers and the first packet should not have too far to go. The content download should be much faster, since the edge nodes are closer to the end user than the origin is. This UoC concerns development of testing to monitor performance of CDN.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for Developing infrastructure performance testing - Possess good project management skills and capable of formulating business strategies - Possess in-depth knowledge of developing and implementing network test plans and protocols - Possess in-depth knowledge of IP network and CDN technologies - Possess good knowledge of infrastructure network design and network risk management methodologies - Possess in-depth knowledge in network congestion, network inspection tools, OS kernel parameters impacting the overall network bandwidth - Possess good understanding of CDN delivery requirements for different platforms, such as PC, mobiles, tablets, and Virtual Reality (VR) wearable devices, etc. 2. Develop infrastructure performance testing: - Work with CDN service provider: - to map out and confirm the infrastructure - to understand their specific algorithms that ensure the stability and the availability of the CDN nodes - CDN service configurations - Formulate a list of testing matrices, including but not limited to the following: - DNS time: determine no faulty DNS setup slowing access - Connection time: determine CDN has great network connectivity, low latency and no packet loss - Wait time: shows the hot content is fetched from edge node or needs to fetch from the server. Also ensure CDN is not slow during peak period - Throughput: shows the throughput of the CDN test is higher than the origin (i.e. no CDN) no matter what the file size is - Develop test plans with methodology to perform tests, including: - Static content tests through CDN URL vs. original URL - Different file sizes (1K, 5K, 50K, 500K, etc.) - Different geographical locations - Identify tools that can be used to measure/monitor performance of internal infrastructure (content server, storage, etc.) and Real User Monitoring (RUM) - Develop procedures with guidelines on when and how to perform different tests to achieve the expected test matrices with reporting presentation format. Some tests may need to be run continuously and automatically to monitor status and performance of overall architecture

Functional Area - DMT Architecture

	3. Exhibit professionalism • Be updated with current CDN technologies and committed to ensure contents are delivered to the users/customers at the expected performance • Passionate about traffic optimisation and associated technologies
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Work with CDN service provider effectively, to develop full mapping of organisation's infrastructure with true picture of configuration settings which can be used in testing adjustments and result formation • Formulate a full list of test matrices that can present a true picture of the CDN performance • Develop test plans and testing procedures that can guide the testers to carry out tests and deliver the result in the required format
Remark	

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

Functional Area - DMT Architecture

Title	Implement cloud strategy of digital media content
Code	108056L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for implementation of cloud services. Implementing the cloud strategy should be well planned and avoid too much interruptions to business and users. It should achieve expected business values and results. The plan should consider different methodologies of implementation that enable data migration, performance, compatibility and interoperability with the organisation business functions.
Level	4
Credit	6
Competency	Performance Requirements 1. Knowledge for implementing cloud strategy of digital media content - Possess in-depth project management skills - Possess good communication and interpersonal skills that can manage people at all levels - Possess in-depth knowledge of the organisation's digital media business - Possess good experience with private and public cloud such as: IAAS (Infrastructure as a Service), SAAS (Software as a Service), PAAS (Platform as a Service), CDN (Content Delivery Network) - Possess in-depth knowledge of infrastructure network design and CDN - Possess in-depth skills in implementation of cloud solutions for enterprise 2. Implement cloud strategy of digital media content: - Follow the organisation's content strategy and develop a content audit that will be used to determine effectiveness of implementation, including but not limited to the following: - Target audience's needs - Geographic flow of contents - Category and quantity of contents (dynamic and static) - Access patterns, storage requirements, security and protection needs - Follow the organisation's cloud strategy, including: - Trial, prototype or full implementation - Single or multi-tenancy - Governance and standards - Work practices - Develop implementation plan, including but not limited to the following: - Identify and evaluate suitable cloud providers - Implementing security strategy - Data in transit, secure use of service - Asset protection and resilience - Operation and personal security, identity and authenticity - Tools to control access, distribution of contents, content migration - Task's schedules and responsible person - Preparation requirements prior implementation - Coordination with service provider - Systems and contents backup - Fallback procedures - Test and acceptance plans - Perform following implementation processes

Functional Area - DMT Architecture

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○ Create an inventory of existing systems, software, infrastructure and their setting that will be used in virtualised manner
○ Develop RFP (Request for Proposal) for suitable cloud service provider
○ Compare service providers proposals and perform due diligence on all prospective partners. Examples of selection criteria:

▪ Flexible solutions
▪ No vendor lock-in to cloud architecture, tools or hosting
▪ Robust networking with advanced load balancers and application delivery controllers
▪ Dedicated team available to support with 24/7/365
▪ Online dashboard updated in real-time with all relevant specifications

○ Provide recommendation to the selection panel (team)

Perform rollout of cloud services

○ Rollout and evaluate trials.
○ Adjust and refine main implementation plan
○ Perform full deployment and monitor cloud services. The deployment will require data migration, testing of apps, infrastructure, ensuring all stakeholders requirements have been catered for and performing reviews with all stakeholders and service providers, etc.

3. Exhibit professionalism

Apply industry best practices to rollout cloud services with no disruption to organisation's business and users

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<td>Assessment Criteria</td>
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The integrated outcome requirements of this UoC are the abilities to:

Develop a very comprehensive implementation plan that enable a smooth journey to the cloud and fulfill the organisation's goals
Formulate comprehensive RFP and a list of selection criteria that can identify and recommend the most suitable cloud service providers
Perform the rollout tasks on schedule with minimal disruption to users and customers

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Specification of Competency Standards
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Unit of Competency

Functional Area - DMT Architecture

Title	Coordinate implementation of network for content delivery with cloud service provider
Code	108057L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for managing the implementation of cloud services. Most of the current DMT organisations will have on-premise infrastructures. When the organisation decided to elect using cloud services, it is important to have well formulated implementation plan and have good coordination with service vendors to create a smooth journey (migration) to the cloud and deliver the contents to customers at committed performance. This UoC assumes the practitioners were not necessarily involved with the cloud service selection process.
Level	3
Credit	3
Competency	Performance Requirements 1. Knowledge for coordinating implementation of network for content delivery with cloud service provider - Possess good project management and good vendor management skills - Possess good knowledge of the organisation's digital media business - Possess good experience with private and public cloud architectures, and migration considerations - Possess good knowledge of infrastructure network design and network risk management methodologies - Possess in-depth skills in coordinating implementation of solutions for enterprise infrastructure 2. Coordinate implementation of network for content delivery with cloud service provider - Evaluate the cloud service contract which the organisation purchased including: - Cloud packages - Service Level Agreement (SLA) committed by cloud service vendor - Tools available for migration and general operation - Execute implementation/migration plan including items not limited to the following: - Understand organisation goals for cloud service - Selection of pilot projects - Scheduled dates - People assigned to the project - Coordinate with service provider in preparation for implementation/migration, including: - Schedules, milestones/checkpoints - Security settings of cloud infrastructure - Test plans (integration, acceptance), monitoring and reporting setups - Contact points, support and emergency - Fallback procedures - Domain name for CDN (Content Delivery Network) - CDN and other cloud configuration - Identify type of reports needed to be generated for infrastructure users - Organise training and collect user and technical documentation for operation of cloud infrastructures - Assist and liaise with services providers to perform the pilot implementation/migration and review results with all stakeholders to refine process and procedures for the full implementation/migration

Functional Area - DMT Architecture

	• Assist and liaise with cloud service providers during the full implementation/migration and ensure all contracted services are setup correctly • Liaise with service providers to setup and perform monitoring of all commissioned cloud services, collect feedbacks from all internal stakeholders and perform review internally and with cloud service vendors to ensure constant and reliable performance can be maintained 3. Exhibit professionalism • Apply industry best practices such as ITIL (Information Technology Infrastructure Library) service integration and management for coordinating with cloud service providers
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Execute the implementation/migration from on-premise infrastructures to cloud services • Coordinate all tasks with cloud service providers which have successfully and smoothly implemented/migrated the organisation to cloud without creating adverse effect on production team or customers
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - DMT Architecture

Title	Monitor performance of digital media infrastructure
Code	108058L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for supporting and monitoring the organisation's infrastructure. With more and more DMT organisations joining the cloud bandwagon, it also presents supporting challenges, such as how to monitor performance of infrastructure that organisation doesn't own. Detailed knowledge of cloud services is required to develop monitoring plan and procedures that can monitor the provisioned infrastructure to ensure it performs as expected.
Level	3
Credit	3
Competency	Performance Requirements 1. Knowledge for monitoring performance of digital media infrastructure - Possess in-depth knowledge of various network technologies and protocols - Possess in-depth knowledge of the organisation's infrastructure architecture - Possess in-depth knowledge of cloud technologies/services, such as: - IAAS – Infrastructure As A Service - SAAS – Storage As A Service and Software As A Service - PAAS – Platform As A Service - Possess good knowledge of public cloud service platforms (e.g. AWS, GAE, Azure, etc.) - Possess good network problem solving and public cloud configuring management skills - Possess good knowledge of network and cloud performance monitoring tools - Possess good vendor management skills 2. Monitor performance of digital media infrastructure - Determine and understand the 3Vs (volume, velocity and variety) of the organisation's data for which matrices will be formed for monitoring. For example: - Volume of data flow during different time (peak, non-peak period, etc.) - Velocity of speed it needed for delivery - Variety of data type (text, video, interactive media, audio, etc.) - Acquire and be familiar with baseline performance statistics of the cloud services and the contracted Service Level Agreement (SLA) from cloud services vendor - Develop monitoring methodology and procedures including: - Real time monitoring or periodic monitoring - What to monitor, for example : - Infrastructure – throughput, average lag time, page fetch time - Server performance – calculation and response time - Data store – read/write time - What benchmarks to use and where to acquire the benchmarks: from subscribed cloud service vendor or public or internal experience measuring tools - Responsive actions to take when performances are below thresholds. Drills should be planned and tested to ensure these actions are performing as expected, such as, contacting the cloud service providers - Work with cloud service providers to formulate realistic performance measuring matrices taking into account various factors, including: - client latency - server latency - node and controller latency - end to end performance

Functional Area - DMT Architecture

	○ number of service request (number of clients accessing) • Identify suitable monitoring tools (purchased or internal developed) and perform set up and configuration tools to monitor performances. Also, set alerts and reports when performance thresholds fall below the required level • Document the monitoring routines and ensure all stakeholder are aware of the monitoring routines, procedures, etc. 3. Exhibit professionalism • Apply industry best practices to monitor the organisation's infrastructure performance to ensure contents are delivered at the committed level of service
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Determine all information cloud usage and operating factors that can be used to form monitoring matrices • Develop clear monitoring methodologies and procedures that can effectively monitor the organisation's cloud infrastructure. Additionally, develop procedures to provide very clear and concise instructions for monitoring staff on action to take when performance falls below expected level • Develop effective procedures that provide very clear and concise instructions to monitor staff on actions to take when performance of cloud infrastructure falls below expected level
Remark	

Functional Area - DMT Architecture

Title	Develop mapping and documentation of infrastructure
Code	108059L2
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners involved with cloud implementation. Infrastructure documentation provides a bird's eye view of network layout and set up. The importance of a clear picture of the layout that depicts the mapping of the organisation's infrastructure cannot be over emphasised in support, maintenance, upgrade, change, etc. Ideally, this documentation should be done while implementation team can still be gathered.
Level	2
Credit	3

Competency	Performance Requirements
	1. Knowledge for developing mapping and documentation of infrastructure
	
	• Possess good understanding of network technologies and components in the 7 layers of OSI (Open Systems Interconnection) reference model
	• Possess good knowledge of the information needed to show in infrastructure documentation:
	    o Network connectivity, protocols
	    o Routing and switching capabilities and configurations
	    o Various settings
	        ▪ Network security
	        ▪ Access control
	    o Systems & devices (physical and virtual): routers, switches
	    o Software: monitoring apps, licenses, etc.
	• Possess basic knowledge on operation of network documentation tools
	• Possess good communication skills
	• Possess good knowledge of the organisation's documentation procedures and guidelines
	
	2. Develop mapping and documentation of infrastructure:
	
	• Preparation for documentation – to gather
	    o Past and current network diagrams, documentation
	    o Floor maps of the organisation
	    o Network patch panel diagrams
	    o Past and current infrastructure documentation
	    o Network design diagrams from network designer
	    o Cloud and other network service diagrams from service providers
	    o Setup documentation tools
	• Clarify or determine key elements:
	    o Which physical hardware components (network, storage, cloud connection devices, etc.) are needed for the network infrastructure which have been implemented/changed/removed
	    o Which software components installed or updated in the network infrastructure?
	    o Specific location of these components (hardware, software, virtual and physical)
	    o How and when the components were installed
	    o What components configuration settings are
	• Use appropriate tools to draw network diagrams of the infrastructure with location of each component with a matching identifier (the device and the diagram) clearly

Functional Area - DMT Architecture

	• Assemble and package all the network diagrams with all the component templates to form the "latest version" infrastructure document. Label the documentation in accordance with the organisation's standards 3. Exhibit professionalism • Always follow the organisations documentation standards and procedures
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Apply tools and infrastructure templates for mapping documentation • Gather the most current information that truly reflects the organisation's infrastructure from different parties and documents • Develop documentation using format that complied with the organisation's standards
Remark	

Specification of Competency Standards
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Functional Area - Content Security

Title	Formulate Digital Rights Management (DRM) strategy for business
Code	108060L6
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for digital content security. Digital Rights Management (DRM) is a systematic approach to copyright protection for digital media. The purpose of DRM is to prevent unauthorised redistribution of digital media and restrict the ways customers can copy content they have purchased. But there are well known issues and barriers which organisations need to surmount before implementing DRM.
Level	6
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating DRM strategy for business
	
	• Possess good project management and business strategies formulation skills
	• Possess in-depth knowledge of information and cyber security
	• Possess good knowledge of digital media security and business operations
	• Possess in-depth knowledge of Digital Rights Management (DRM)
	• Possess good knowledge of content security & content development lifecycle
	
	2. Formulate DRM strategy for business
	
	• Determine how better use DRM for business, for example:
	    o Servers can be set to block the forwarding of content
	    o Server can control access to copying of and printing of material based on constraints set by the copyright holder of the content
	    o Movie studio limits the number of copies a user can make
	    o Encryption technology can be used as a form of licensing
	• Categorise the organisation's media contents and evaluate different DRM technologies to protect them
	• Perform gap analysis to determine how DRM ready the organisation is for adoption of DRM technologies
	    o Content – Amount of time and effort needed to convert and prepare contents for DRM control
	    o Production workflow – How many production systems needed to be updated or replaced to enable produced contents to automatically be controlled by DRM systems
	    o Delivery systems – Can one DRM system control delivery of all the contents or multi-system is required
	    o Inter-operability with different customer devices
	    o Evaluate the effects it will have on customers and agents
	    o Proprietary or open DRM technologies to adopt
	• Define DRM components needed for implementation. For example:
	    o IP Asset Creation and Capture
	        ▪ Right creation
	        ▪ Right validation
	    o IP Asset Management
	        ▪ Repository functions
	        ▪ Trading functions (payments, licenses)
	    o Permissions Management
	    o Tracking Management

Functional Area - Content Security

	• Define policies
	    o Content rights (protection rules)
	    o Staff (DRM knowledge update, training, procedures, responsibilities)
	    o DRM monitoring
	    o Reporting and reviews
	• Define implementation schedule with estimation and breakdown of implementation cost
	
	3. Exhibit professionalism
	
	• Apply industry standards and best practices when formulating and establishing security polices, such as ISO27000 standards family
	• Always take into consideration and strike a proper balance among all related technological, political, social, environmental, business and legal factors

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Critically evaluate and determine the most applicable content security approach that matches the organisation business • Formulate a complete set of metadata for the organisation's contents that can be used by content management tools • Create a concise and precise content security policy that can protect the organisation's asset (contents) with complete sets of guidelines for implementation which all stakeholders can adhere to
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Content Security

Title	Develop cloud disaster recovery strategy
Code	108061L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for digital content security. Cloud computing is vulnerable to the same genetic flaws that plagues traditional IT operations: Everything fails (servers, networks) sooner or later, not to mention human mistakes and failure. When this happens there will be lots of unhappy users and customers. Protecting the organisation from unplanned downtime is widely dependent on building redundancy and diversity directly into the disaster recovery (DR) and business continuity strategy. Cloud strategy is unique to every orgnaisation which depends of cloud strategy adopted (private cloud, hybrid or public cloud).
Level	5
Credit	3
Competency	Performance Requirements 1. Knowledge for developing cloud disaster recovery strategy - Possess good project management and business strategies formulation skills - Possess in-depth knowledge of risk and impact analysis techniques - Possess in-depth knowledge of information security and business continuity - Possess in-depth knowledge of traditional DR and cloud DR technologies - Possess good knowledge of cloud and virtualisation DR methodology - Possess good knowledge of business analytic tools - Possess good knowledge of the organisation infrastructure and operation workflow 2. Developing cloud disaster recovery strategy - Perform risk assessment and business impact analysis on the orgnaisation when loss of cloud systems and loss of contents. For example: - Impact to the production and customer on loss of cloud infrastructure components - Content security, control effects on Digital Rights Management (DRM) and Digital Asset Management (DAM) system - Financial impacts when cloud payment systems and customer records are incapacitated - Reputation of the organisation - Determine Recovery Time Objectives (RTO) and Recovery Point Objectives (RPO) during the business impact analysis - Determine DR model/approaches based on RTO and RPO needs, such as: - Hot site (mirrored cloud) or active/active approach - Absolutely minimal downtime - Expensive, mirrored site/cloud running continuously - Synchronisation issues with multi-cloud providers - Warm or cold site active/passive - Some downtime is allowed, but not prolonged - Less expensive and can be adopted under a "pay-as-you-use" cloud model - Still have issues with bring the data current - Cloud backup-based recovery - Downtime is not a major factor – but the application, or workload is still very important and needs to be brought up quickly

Functional Area - Content Security

	▪ Cloud services replicate data, applications or other services to a cold VM-based backup • Determine the additional network bandwidth required to support the DR strategy • Determine cost and additional resources required for the implementation of DR strategy. Additionally the DR strategy needs to complement the other security and business continuity aspects of the organisation • Document and present strategy to management for support 3. Exhibit professionalism • Apply industry best practices when developing cloud DR strategy • Always take into consideration and strike a proper balance among all related technological, political, social, environmental, business and legal factors
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Perform a complete risk assessment and business impact analysis of the organisation's cloud infrastructure and contents with their RTO and RPO • Determine the best DR approach to adopt which can minimise downtime of the organisation cloud infrastructure and the contents hosted at the cloud systems • Present and gain support from management to implement the DR strategy
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Content Security

Title	Formulate DRM implementation plan
Code	108062L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for digital content security. Protecting data in storage and transit is no longer enough. The ability to share contents for business collaboration such as merger and acquisition plans, employee data or documents outlining the next product line with employees, partners and customers on intranets, extranets and the Internet requires the extra level of protection that require granular and flexible control that only DRM (Digital Rights Management) can offer. To avoid negativity, careful planning of DRM implementation is necessary.
Level	5
Credit	3

Competency	Performance Requirements
	1. Knowledge for formulating DRM implementation plan
	
	• Possess good project management and communication skills
	• Possess in-depth knowledge of developing implementation plans
	• Possess in-depth knowledge of information and cyber security
	• Possess in-depth knowledge of Digital Rights Management (DRM) technologies and trends
	• Possess good knowledge of DRM lifecycle
	• Possess good knowledge of digital media content security and business operations
	• Possess good knowledge of pros and cons of DRM systems
	
	2. Formulate DRM implementation plan
	
	• Familiarised with the DRM business strategy and goals, for example:
	    o Control access to copying and use of the organisation's assets
	    o Limit the number of copies users can make
	    o Track users' habits and personal information
	• Determine the organisation digital media contents and create a matrix of contents against "protection rights/ rules" (e.g. no. of downloads, no. of copied, opened, licensed period, etc.) to apply. Clarify with stakeholders on the type of contents and DRM protection rules
	• Determine the type of DRM solution to implement after considering its pros and con, such as:
	    o Software platform
	    o Hosted service (cloud)
	    o Application that include DRM capabilities
	• Determine components of DRM needed to implement, such as:
	    o Content creation and capture management
	    o Asset management (payment system, license control system)
	    o Permission management
	    o Tracking management
	• Determine and develop DRM systems sourcing criteria guidelines, such as but not limited to the following :
	    o Standard or proprietary based cryptography algorithm
	    o How keys are distributed, authenticated, revoked, and renewed
	    o Does it work with all kind of content or multi-DRM is needed
	    o Can it support the range of current customers devices
	    o How well it handles contents sent between users at different organisations

Functional Area - Content Security

	o How well it integrates with existing security systems, such as:
	        ▪ Web server and portal
	        ▪ Database and content repositories
	        ▪ Email systems
	        ▪ Billing systems
	        ▪ Security logs
	    o How many of the features are performed automatically
	• Identify possible DRM systems and vendors that can supply the required systems
	• Draft implementation plan with schedules and milestones. Also develop procedures for implementation teams to follow
	• Seek comments from various stakeholders and refine implementation plan, if required
	
	3. Exhibit professionalism
	
	• Apply industry standards and best practices to implement DRM systems, such as ISO 27000 standards family
	• Committed to protect the organisation's properties

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Fully grasp and confirm the organsiation's DRM business strategy • Identify the type of DRM system that is best fit to be implemented to protect the organisation's contents • Create a DRM sourcing guideline with all the expected sourcing criteria • Develop a representative implementation plan fulfilling all stakeholders' expectation and achieve the organisation's business goals
Remark	

Specification of Competency Standards
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Unit of Competency

Functional Area - Content Security

Title	Establish content security policies
Code	108063L5
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for digital content security. For digital media publishers, organisation contents is their bread and butter; they would make sure those content's intellectual property is not stolen or illegally reproduced. But with the volume of content, the speed of creation and the reach of collaboration, accidental content exposure, purposeful content leakage and piracy are creating challenges. A clear policy is needed for the organisation to how the contents can be shared, accessed with minimal risk of security.
Level	5
Credit	5

Competency	Performance Requirements
	1. Knowledge for establishing content security policies
	
	• Possess good project management and policy formulation skills
	• Possess in-depth knowledge of information and cyber security
	• Possess good knowledge of digital media security
	• Possess in-depth knowledge of Digital Rights Management (DRM)
	• Possess good knowledge of laws and regulations related to information and cyber security, especially Internet laws of Mainland China when operating in the Mainland
	• Possess good knowledge of content security and content development lifecycle
	
	2. Establish content security policies
	
	• Study and identify best approach in content security that is suited to the organisation:
	   o Network-centric approach to content security concerns mainly:
	      ▪ Authentication and authorization
	      ▪ Firewalls (perimeter security)
	      ▪ Servers
	      ▪ Networks
	      ▪ Operating systems
	   o Object(Document)-centric approach to content security concerns:
	      ▪ Metadata associated with each content object
	      ▪ Versioning and changes are tracked
	• Conduct a content review, how the contents are handled, transported, internally and externally, etc.
	• Categorise contents, evaluate risks and develop policies and procedures across all content, at any level, in context:
	   o Document management
	   o Web content management
	   o Workflow/BPM (Business Process Management)
	   o Enterprise rights management/Digital rights management
	   o Identity management/User authentication
	   o Policy-based encryption
	   o Content authentication
	   o Content addressed storage
	   o Trusted time stamps
	   o Data loss/Leak prevention
	   o Public key infrastructure (PKI)
	   o Digital signatures and Hierarchical storage management

Functional Area - Content Security

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Formulate guideline for implementing tools and systems

Metadata requirements
Define rules and policies for access control
Types of tools and systems to be considered, such as: DRM systems, Asset Management Systems (AMS), etc.
Monitoring and reporting requirements

Human aspects

Create and build security culture
Develop procedures/guidelines for staff to follow and enforce training
Ensure guidelines are easily reachable by all shareholders
Assign responsibilities

Define monitoring mechanism and appropriate action to take to ensure the security policy is kept aligned with business and technology trends

3. Exhibit professionalism

Apply industry standards and best practices when formulating and establishing security polices, such as ISO 27000 standards family
Always take into consideration and strike a proper balance among all related technological, political, social, environmental, business and legal factors

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<td>Assessment Criteria</td>
<td>The integrated outcome requirements of this UoC are the abilities to:

Analyse and determine the most applicable content approach that matches the organisation business
Define a complete set of metadata for the organisation contents that can be used by content management tools
Develop a concise and precise content security policy that can protect the organisation asset (contents) with complete sets of guidelines for implementation which all stakeholders can adhere to

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Specification of Competency Standards
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Functional Area - Content Security

Title	Implement DRM for online and offline digital media products
Code	108064L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for digital content security. A DMT organisation's asset comprises of online and offline digital media products. Once a DRM (Digital Rights Management) plan has been established the next stage of the cycle is implementing the plan. This will need a team to perform tasks ranging from meta tagging, selecting and configuring tools to automate the DRM, etc. It will also include testing and monitoring the effectiveness of the DRM and continuing refinement of the DRM process.
Level	4
Credit	3

Competency	Performance Requirements
	1. Knowledge for implementing DRM for online and offline digital media products
	
	• Possess good project management and vendor management skills
	• Possess good communication and interpersonal skills
	• Possess in-depth knowledge of different DRM technologies, for example:
	    o Widevine (Google)
	    o PlayReady (Microsoft)
	    o PrimeTime (Adobe)
	    o Fairplay (Apple)
	    o Bitmovin and ExpressPlay - offline DRM
	• Possess in-depth skills in implementing DRM systems, on premise or on the cloud
	• Possess good knowledge of digital media content security
	Possess good knowledge of DRM technologies that can protect online and offline products
	
	2. Implement DRM for online and offline digital media products
	
	• Familiarised with the DRM strategy, implementation plan, protection requirements, organisation infrastructure, current protection systems, etc.
	• Plan the implementation tasks, including but not limited to the following:
	    o Schedule all the tasks
	    o Assemble the implementation team
	    o Brief the team on assigned tasks
	• Sourcing the DRM systems that can support online and offline products
	    o Draft RFP (Request for Proposal) with list of required functions
	    o Identify suitable DRM service providers
	    o Summarise all returned proposals and make recommendation on selection of service providers
	    o Assist purchasing department with finalising the service contract
	• Prepare for installation and commissioning of DRM systems
	    o Notify all stakeholders on implementation dates (start and completion)
	    o Formulate test plans and acceptance testing procedures (online and offline products)
	    o Create an inventory matrix of all the contents with required security protection rules
	    o Perform backup of all contents and systems settings/configurations
	• Coordinate with service provider to install and commission the DRM system either on premise or on the cloud

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Functional Area - Content Security

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- Configure DRM system. For example:
  - Indicate key system (e.g. DASH, CENC, etc.)
  - Certificate server (e.g. EZDRM, ExpressPlay, Axinom, DRMtoday, Conax, etc.)
  - Setup license server and authentication
  - Players/clients information
- Upload or migrate contents to storage server (on premise or cloud),meta tag the contents and enter content security protection rules to DRM system
- Perform DRM testing with different clients for online and office products
- Analyse testing reports and refine configurations, settings, procedures to tailor the DRM to match business needs

3. Exhibit professionalism

- Apply industry standards and best practices to implement DRM systems, such as ISO 27000 standards family
- Committed to protect the organisation's properties
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<td>Assessment Criteria</td>
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The integrated outcome requirements of this UoC are the abilities to:

- Fully grasp the online and offline DRM protection requirements when selecting DRM products/service providers
- Coordinate with vendors to implement the DRM systems that fulfill the security protection requirements of the contract and complete on schedule
- Complete a full inventory matrix mapping of all the organisation's contents with protection requirements and enter into the DRM system
- Demonstrate the implementation is concluded satisfactorily by completing all the designed implementation testing and with reports demonstrating expected results
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Specification of Competency Standards
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Functional Area - Content Security

Title	Implement cloud disaster recovery strategy
Code	108065L4
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners responsible for digital content security. Just as with traditional disaster recovery (DR), there is not a single blueprint for disaster recovery in the cloud. Every organisation is unique in the applications it runs, and the relevance of the applications to its business. Therefore, it is essential that a well implemented cloud DR strategy to ensure the organisation business and reputation is not affected.
Level	4
Credit	3
Competency	Performance Requirements 1. Knowledge for implementing cloud disaster recovery strategy - Possess good project management - Possess good coordination and communication skills, ranging from writing basic instructions to handle vendors and senior managements - Possess in-depth skills in implementation of DR projects - Possess good knowledge of information security and business continuity - Possess in-depth knowledge of traditional DR and cloud DR technologies - Possess good knowledge of DR implementation and monitoring tools 2. Implement cloud disaster recovery strategy: - Comprehend the organisation's DR strategies and identify the DR protection requirement by developing a "DR mapping" of critical systems/application/contents with list of actions, including: - Component (system/application/contents) - Threads/Risks - Response steps - RTO (Recovery Time Objectives) and Recovery Point Objectives (RPO) - Recovery strategy - Recovery steps - Identify suitable cloud DR services providers and formulate RFP (Request for Proposal) for the provisioning of Cloud DR services with no loss of contents - Develop service provider evaluation/selection criteria template. Such as: - Security mechanism - How it can ensure data durability, reliability and availability - Supportability - How easy to exit (transfer data out on terminating service) - Performance - Synchronisation/load balancing function on Multi-DR vendor strategy - Cost - Summarise the returned RFP and make recommendation during the DR services provider selection process - Develop Internet bandwidth management plan to minimise cloud service provider charges but ensuring sufficient network data bandwidth to meet business needs of general operational and DR use - Work with services provider to provision the DR service and develop testing and verification tools that determines status after a DR is performed - Develop procedures and guidelines to handle different recovery scenarios. For example:

Functional Area - Content Security

	o Server or component loss
	    o Multisystem loss
	    o One whole cloud infrastructure loss
	• Schedule training sessions and DR drills with the result that can contribute to enhancement of the DR plan
	
	3. Exhibit professionalism
	
	• Committed to ensure the organisation's business continuity is not compromised by system failures or contents lost
	• Apply industry best practices when implementing cloud DR strategy

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Develop a comprehensive DR mapping of all the critical systems recovery requirements and identify the most suitable vendor to commission the required service • Coordinate all parties to implement the DR services and demonstrate that in emergencies various cloud components (systems, applications, contents) or whole cloud infrastructure can be recovered within the RTO/RPO requirements with no security risks or affecting the business • Develop procedures and guidelines that enable all stakeholders, involved with DR process, understand precisely their roles and actions to take during a real emergency or drill
Remark	

Specification of Competency Standards
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Functional Area - Content Security

Title	Maintain content security
Code	108066L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners involved with implementation of content security. To most organisation, content security is all about rights and Intellectual Property (IP) protection. This is correct. But there are many other security aspects, in-addition to Digital Rights Management (DRM), needed to be considered and be validated to maintain content security. Content security is a part of information security. Hence, this UoC will not distinguish "Pure Content" or "Pure information" security; but covers only security elements associated with protecting an organisation's digital media contents.
Level	3
Credit	3
Competency	Performance Requirements 1. Knowledge for maintaining content security - Possess good project management and technical writing skills - Possess in-depth knowledge of planning and implementing content security - Possess good knowledge of different types of content security and information security technology - Possess good knowledge of content security implementation methodologies - Possess good knowledge of networking and infrastructure security - Possess good knowledge of content security and IP laws of Hong Kong - Possess good knowledge of the organisation security policies 2. Maintain content security: - Evaluate the organisation's current content protect plan/design and determine areas which have or may have security exposures. Areas include but not limited to the following: - Firewall protection rules - Physical storage systems (Servers, Storage Area Network (SAN), etc.) - Network security including Virtual Private Network (VPN), transport layer security, etc. - Cyber-attack protections - Review user's credential/authentication and registration system on website and web applications to ensure all the required authentication elements are properly implemented and functioning as stipulated by the security policy. Examples of elements include: - Username, password - Personal identifiable information - Answers to security questions/challenges - CAPTCHA (**C**ompletely **A**utomated **P**ublic **T**uring test to tell **C**omputers and **H**umans **A**part) - Server scripting cannot be compromised by Structured Query Language (SQL) injection - Review on contents protection mechanisms which are being applied during the production stage, such as: - Watermarking - Encryption - Rights/geo-location access have been set - Review the organisation's hybrid cloud security when storing contents in the cloud and ensure the following:

Functional Area - Content Security

	o Sensitive contents/documents held on mobile devices are encrypted
	   o Contents on cloud store are encrypted
	   o Contents transmitted across networks are encrypted. For example: delivery systems
	• Review the DRM/Digital Asset Management (DAM) system, certificate systems, delivery systems to ensure they are properly configured and all contents are handled encrypted, and are delivered to the correct stakeholder (user, customer, staff, etc.)
	• Review backup and recovery mechanisms and procedures; ensuring they are in place and well setup. Staff are well rehearsed and prepared for emergencies
	• Review security monitoring, ensuring that it can alert/highlight any security abnormalities. e.g. web page
	• Review security escalation, handling and other contents security procedures to determine if they are current and effective
	• Document the findings and areas for probable enhancement. If necessary, present to management. Also schedule future reviews
	
	3. Exhibit professionalism
	
	• Apply industry best practices to protect the organisation's digital contents either on premise or at the cloud. Example of best practices: ISO 27000 standards family

Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Identify and review security components that are associated with protecting digital contents • Perform review of the content security to ensure it is systematically and methodically in layered or onion manner • Perform a complete review of all the organisation's content security and able to deliver a complete report of any security exposures that needed to be reinforced
Remark	

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

Functional Area - Content Security

Title	Develop content security practices and procedures
Code	108067L3
Description	This unit of competency applies to all Digital Media Technology (DMT) practitioners involved with implementation of content security. Content can be captured/created in multiple ways and published via multiple avenues. It can be dynamically repurposed, tailored to individual consumers/users. Good content management practices that can balance access and risk are needed to ensure digital contents are well controlled and protected.
Level	3
Credit	3

Competency	Performance Requirements
	1. Knowledge for developing content security practices and procedures
	
	• Possess good project management and technical writing skills
	• Possess in-depth knowledge of developing security and operating procedures
	• Possess in-depth knowledge of different types of content protection systems, such as:
	    o DRM (Digital Rights Management)
	    o DAM (Digital Asset Management)
	    o Encrypted Media Extension
	    o Content Distribution Systems
	• Possess good knowledge of content management methodologies
	• Possess good knowledge of content security and Intellectual Property (IP) laws of Hong Kong
	• Possess good knowledge of the organisation documentation standards
	
	2. Develop content security practices and procedures
	
	• Comprehend the organisation's content protecting and security strategy to form a protection mapping of different categories of contents
	• Review the content protection systems and technologies that currently operating in the organisation, including but not limited to the following:
	    o DRM and DAM systems
	    o SSL (Secure Socket Layer), SHA (Secure Hash Algorithms), TLS (Transport Layer Security) security
	    o Watermarking
	    o Dynamic adaptive streaming over HTTP (DASH)
	• Define the scope/objectives of the procedure and target reader, for example:
	    o Defining access control
	    o Defining basic encryption protection
	    o Configuring content security management systems
	    o Handling infringements
	• Define actions for the procedure. For Example:
	    o Defining video access control
	        • Allow viewing by tokens generated by certain defined players
	        • Accept tokens from defined geographical area
	        • Deny access, even with valid token, where IP address is anonymised
	• Define registration and enrollment requirements, setting and configurations for security systems, such as:
	    o User ID - minimal length
	    o Password - minimal length, validation characters

Functional Area - Content Security

	o Double validate - Use of CAPTCHA check (**C**ompletely **A**utomated **P**ublic **T**uring test to tell **C**omputers and **H**umans **A**part) o Email address - to confirm registration • Define actions to take when security system flags illegal content access or infringements/security breaches are detected. Also, define escalation structure with roles and responsibilities • Organise briefing sessions to introduce and test the procedure with stakeholders and receive comments to enhance procedure, if appropriate 3. Exhibit professionalism • Committed to develop procedure that can provide precise instructions to reader at the correct level without any miscommunication
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to: • Develop a procedure at the correct level that can give precise and concise details and required actions to stakeholders to protect the organisation's contents • Develop the procedure that reflects the scope of the procedure and achieve its objective • Develop the procedure that complied with the organisation's format and documentation standards
Remark	

Appendices

Appendix 1   Visit Summary

The following are companies / organisations that have been visited and consulted during the SCS development:

	Date	Organisation / Company	Location
1	16/09/2014	Firedog Creative Company Limited	Firedog's office (San Po Kong)
2	14/10/2014	Ms. Anna Kan, Digital Magic	Digital Magic's office (Causeway Bay)
3	29/10/2014	Mr. Philip Lau, Outblaze	Outblaze's office (CyberPort)
4	17/12/2014	IVE – Trainers on Digital Media	IVE (Lee Wai Lee)
5	21/1/2015	Eddie Hui (Technological and Higher Education Institute of Hong Kong)	Hong Kong Design Institute
6	5/3/2015	RTHK (Animation Expert)	IVE (Lee Wai Lee)
7	11/3/2015	Dickens Mak (Industry Expert in Game Development)	PEAK/VTC
8	10/5/2016	Mr. Kenneth Lee (Four Directions)	Four Directions' Office (Kwun Tong)
9	6/6/2016	Mr. Eric Chan (Hutchison)	Hutchison's office (Tsing Yi)
10	6/7/2016	Mr. Lento Ip (Convener)	VTC Tower
11	13/10/2016	Mr. Philip Lau, Out Blaze	Outblaze's office (CyberPort)
12	3/11/2016	Mr. Benny Leung and colleagues, Green Tomato	Green Tomato's office (Kwun Tong)
13	9/11/2016	Mr. Keith Li (Innopage)	Hong Kong Science and Technology Park
14	4/5/2017	Department of IT	IVE (Lee Wai Lee)

Appendix 2　Generic Level Descriptors under the Qualification Framework

Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
7	• Demonstrate and work with a critical overview of a subject or discipline, including an evaluative understanding of principal theories and concepts, and of its broad relationships with other disciplines • Identify, conceptualise and offer original and creative insights into new, complex and abstract ideas and information • Deal with very complex and/or new issues and make informed judgements in the absence of complete or consistent data/information • Make a significant and original contribution to a specialised field of inquiry, or to broader interdisciplinary relationships.	• Demonstrate command of research and methodological issues and engage in critical dialogue • Develop creative and original responses to problems and issues in the context of new circumstances.	• Apply knowledge and skills in a broad range of complex and professional work activities, including new and unforeseen circumstances • Demonstrate leadership and originality in tackling and solving problems • Accept accountability in related decision making • High degree of autonomy, with full responsibility for own work, and significant responsibility for others • Deal with complex ethical and professional issues.	• Strategically use communication skills, adapting context and purpose to a range of audiences • Communicate at the standard of published academic work and/or critical dialogue • Monitor, review and reflect on own work and skill development, and change and adapt in the light of new demands • Use a range of software and specify software requirements to enhance work, anticipating future requirements • Critically evaluate numerical and graphical data, and employ such data extensively.

Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
6	• Critically review, consolidate, and extend a systematic, coherent body of knowledge • Utilise highly specialised technical research or scholastic skills across an area of study • Critically evaluate new information, concepts and evidence from a range of sources and develop creative responses • Critically review, consolidate and extend knowledge, skills practices and thinking in a subject/discipline • Deal with complex issues and make informed judgements in the absence of complete or consistent data/information.	• Transfer and apply diagnostic and creative skills in a range of situations • Exercise appropriate judgement in complex planning, design, technical and/or management functions related to products, services, operations or processes, including resourcing and evaluation • Conduct research, and/or advanced technical or professional activity • Design and apply appropriate research methodologies.	• Apply knowledge and skills in a broad range of professional work activities • Practice significant autonomy in determining and achieving personal and/or group outcomes • Accept accountability in related decision making including use of supervision • Demonstrate leadership and /or make an identifiable contribution to change and development.	• Communicate, using appropriate methods, to a range of audiences including peers, senior colleagues, specialists • Use a wide range of software to support and enhance work; identify refinements to existing software to increase effectiveness or specify new software • Undertake critical evaluations of a wide range of numerical and graphical data, and use calculations at various stages of the work.

Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
5	• Generate ideas through the analysis of abstract information and concepts • Command wide ranging, specialised technical, creative and/or conceptual skills • Identify and analyse both routine and abstract professional problems and issues, and formulate evidence-based responses • Analyse, reformat and evaluate a wide range of information • Critically analyse, evaluate and/or synthesise ideas, concepts, information and issues • Draw on a range of sources in making judgments.	• Utilise diagnostic and creative skills in a range of technical, professional or management functions • Exercise appropriate judgement in planning, design, technical and/or supervisory functions related to products, services, operations or processes.	• Perform tasks involving planning, design, and technical skills, and involving some management functions • Accept responsibility and accountability within broad parameters for determining and achieving personal and/or group outcomes • Work under the mentoring of senior qualified practitioners • Deal with ethical issues, seeking guidance of others where appropriate.	• Use a range of routine skills and some advanced and specialized skills in support of established practices in a subject/discipline, for example: • Make formal and informal presentations on standard/mainstream topics in the subject/discipline to a range of audiences • Participate in group discussions about complex subjects; create opportunities for others to contribute • Use a range of IT applications to support and enhance work • Interpret, use and evaluate numerical and graphical data to achieve goals/targets.

Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
4	• Develop a rigorous approach to the acquisition of a broad knowledge base, with some specialist knowledge in selected areas • Present and evaluate information, using it to plan and develop investigative strategies • Deal with well defined issues within largely familiar contexts, but extend this to some unfamiliar problems • Employ a range of specialised skills and approaches to generate a range of responses.	• Operate in a range of varied and specific contexts involving some creative and non-routine activities • Exercise appropriate judgement in planning, selecting or presenting information, methods or resources • Carry out routine lines of enquiry, development of investigation into professional level issues and problems.	• The ability to perform skilled tasks requiring some discretion and judgement, and undertake a supervisory role • Undertake self-directed and a some directive activity • Operate within broad general guidelines or functions • Take responsibility for the nature and quantity of own outputs • Meet specified quality standards • Accept some responsibility for the quantity and quality of the output of others.	• Use a wide range of routine skills and some advanced skills associated with the subject/discipline — for example: • Present using a range of techniques to engage the audience in both familiar and some new contexts • Read and synthesis extended information from subject documents; organise information coherently, convey complex ideas in well-structured form • Use a range of IT applications to support and enhance work • Plan approaches to obtaining and using information, choose appropriate methods and data to justify results & choices • Carry out multi-stage calculations.

| Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	**Processes**	**Application, Autonomy & Accountability**	**Communications, IT & Numeracy**
3	• Apply knowledge and skills in a range of activities, demonstrating comprehension of relevant theories • Access, organise and evaluate information independently and make reasoned judgements in relation to a subject or discipline • Employ a range of responses to well defined, but sometimes unfamiliar or unpredictable, problems • Make generalisations and predictions in familiar contexts.	• Operate in a variety of familiar and some unfamiliar contexts, using a known range of technical or learning skills • Select from a considerable choice of predetermined procedures • Give presentations to an audience	• The ability to perform tasks in a broad range of predictable and structured contexts which may also involve some non-routine activities requiring a degree of individual responsibility • Engage in self-directed activity with guidance/evaluation • Accept responsibility for quantity and quality of output • Accept well defined but limited responsibility for the quantity and quality of the output of others	• Use a wide range of largely routine and well practiced skills — for example: • Produce and respond to detailed and complex written and oral communication in familiar contexts, and use a suitable structure and style when writing extended documents. • Select and use standard applications to obtain, process and combine information • Use a wide range of numerical and graphical data in routine contexts, which may have some non-routine elements.

Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
2	• Apply knowledge based on an underpinning comprehension in a selected number of areas • Make comparisons with some evaluation and interpret available information • Apply basic tools and materials and use rehearsed stages for solving problems. • Operate in familiar, personal and/or everyday contexts • Take account the identified consequences of actions.	• Choose from a range of procedures performed in a number of contexts, a few of which may be non-routine • Co-ordinate with others to achieve common goals.	• The ability to perform a range of tasks in predictable and structured contexts • Undertake directed activity with a degree of autonomy • Achieve outcomes within time constraints • Accept defined responsibility for quantity and quality of output subject to external quality checking.	• Use skills with some assistance — for example: • Take active part in discussions about identified subjects • Identify the main points and ideas from documents and reproduce them in other contexts • Produce and respond to a specified range of written and oral communications, in familiar/routine contexts • Carry out a defined range of tasks to process data and access information • Use a limited range of familiar numerical and graphical data in everyday contexts • Carry out calculations, using percentages and graphical data to given levels of accuracy.

| Level	Generic Level Descriptors			
	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
1	• Employ recall and demonstrate elementary comprehension in a narrow range of areas with dependency on ideas of others • Exercise basic skills • Receive and pass on information • Use, under supervision or prompting, basic tools and materials. • Apply learnt responses to solve problems • Operate in familiar, personal and/or everyday contexts • Take some account, with prompting, of identified consequences of actions.	• Operate mainly in closely defined and highly structured contexts • Carry out processes that are repetitive and predictable • Undertake the performance of clearly defined tasks • Assume a strictly limited range of roles.	• The ability to perform tasks of routine and repetitive nature given clear direction • Carry out directed activity under close supervision • Rely entirely on external monitoring of output and quality	• Use very simple skills with assistance — for example: • Take some part in discussions about straightforward subjects • Read and identify the main points and ideas from documents about straightforward subjects • Produce and respond to a limited range of simple, written and oral communications, in familiar/routine contexts • Carry out a limited range of simple tasks to process data and access information • Use a limited range of very simple and familiar numerical and pictorial data • Carry out calculations, using whole numbers and simple decimals to given levels of accuracy.

Appendix 3   References

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13. Definitive Guide to Marketing Metrics and Analytics – by Marketo, Inc.

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Appendix 4 Relationship diagram for UoCs under "Marketing Management"
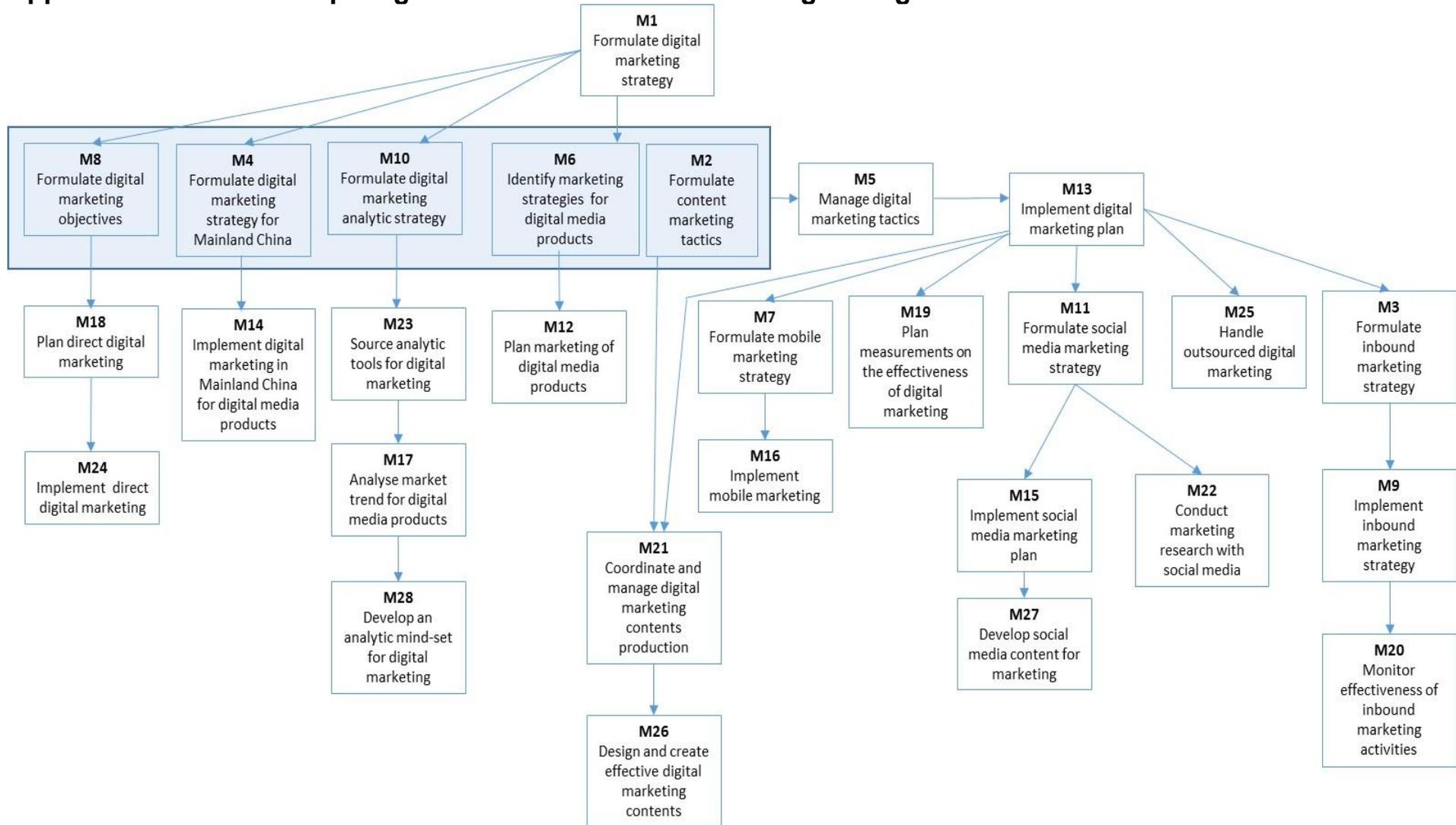
Appendix 5   Pictorial Representation of "DMT Architecture"
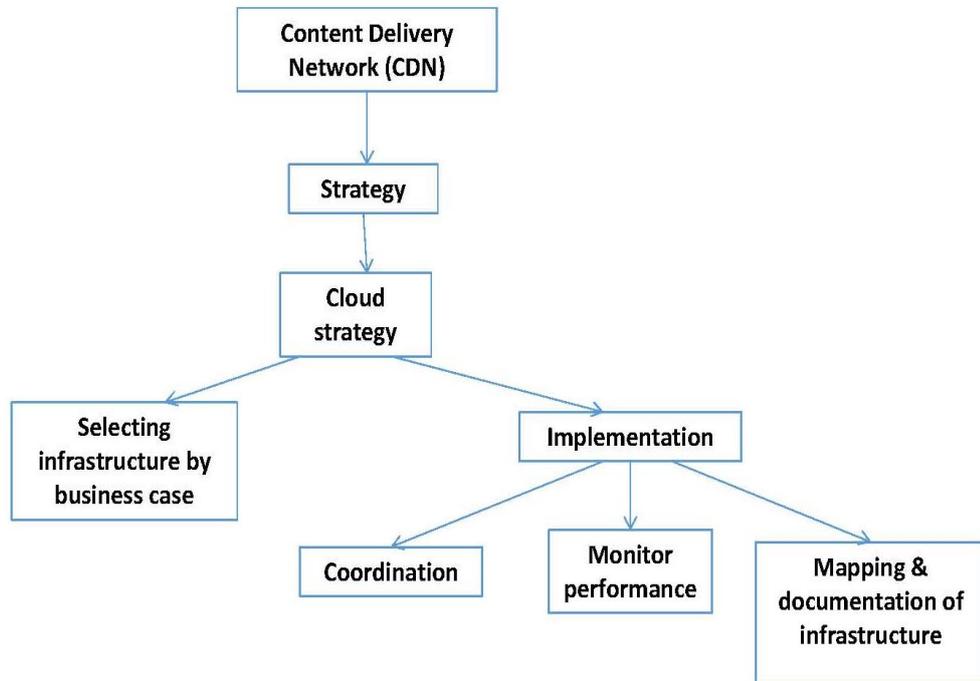
Appendix 6　　Examples of UoCs for DMT Generic Competencies

(a) Generic DMT Skills

UoC Code	UoC Title	QF Level	SCS**
107903L3	Perform basic system administration	3	SCS (O&S)
107904L3	Provide support to mobile device users	3	SCS (O&S)
107897L2	Restore system or files from backups	2	SCS (O&S)
107892L1	Maintain inventories of equipment/software	1	SCS (O&S)
107887L3	Administer basic network security	3	SCS (O&S)
107888L3	Administer system security	3	SCS (O&S)
107886L3	Configure user access control on server	2	SCS (O&S)
108016L6	Formulate uptake of disruptive technologies	6	SCS (DMT)
108012L2	Observe digital rights management	2	SCS (DMT)
108013L2	Observe information security	2	SCS (DMT)
108013L2	Conduct technical support for marketing	4	SCS (DMT)
107923L4	Perform HCI design	4	SCS (DMT)
107921L4	Prepare asset list	4	SCS (DMT)
107918L5	Perform technical feasibility study	5	SCS (DMT)

(b) Generic Soft Skills

UoC Code	UoC Title	QF Level	SCS**
ITOSCS201A	Keep user/client informed of status of work	2	SCS (O&S)
ITOSCS101A	Perform next level escalation	1	SCS (O&S)
ITOSCS104A	Understand the principle of data security	1	SCS (O&S)
ITOSCS106A	Understand professional ethics and conduct	1	SCS (O&S)
ITSWGS604A	Lead and motivate a team	6	SCS (SW)
ITSWGS605A	Apply analytical methods and techniques in problem solving	6	SCS (SW)
ITSWGS609A	Manage changes	6	SCS (SW)
ITSWGS519A	Manage procurement	5	SCS (SW)
ITSWGS516A	Interpersonal and people networking skills	5	SCS (SW)
ITSWGS402A	Communicate (oral and written) information with team members and clients	4	SCS (SW)
108011L2	Observe intellectual property rights	2	SCS (DMT)
107940L4	Create user documentation	4	SCS (DMT)
107942L3	Develop promotion materials	3	SCS (DMT)

Note**:
SCS (O&S) – SCS Operation and Support
SCS (SW) – SCS Software Products and Software Services
SCS (DMT) – SCS Digital Media Technology