

PROGRAMME STANDARDS: CREATIVE MULTIMEDIA STANDARD PROGRAM: MULTIMEDIA KREATIF

This set of Programme Standards has been prepared to enhance the development of educational programmes in creative multimedia and to maintain the quality of graduates. It is hoped that with this document, higher education providers will be able to provide quality education in creative multimedia and its related fields.

Standard Program ini disediakan untuk membantu pembangunan program pendidikan dalam bidang multimedia kreatif dan menjaga kualiti graduan. Semoga dokumen ini dapat membantu Pemberi Pendidikan Tinggi (PPT) menyediakan pendidikan yang berkualiti dalam bidang multimedia kreatif dan bidang yang berkaitan.

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FOREWORD

In its effort to ensure the quality of programmes in institutions of higher learning in Malaysia, Malaysian Qualifications Agency (MQA) has published various documents such as Malaysian Qualifications Framework (MQF), Code of Practice for Programme Accreditation (COPPA), Code of Practice for Institutional Audit (COPIA), Guidelines to Good Practices (GGP) and Programme Standards (PS). It is important that these quality assurance documents be read together with this document in developing and delivering higher education programmes in Malaysia.

The Programme Standards document outlines sets of characteristics that describe and represent guidelines on the minimum levels of acceptable practices that cover all the nine Malaysian quality assurance areas: programme aims and learning outcomes, curriculum design and delivery, assessment of students, student selection, academic staff, educational resources, programme monitoring and review, leadership, governance and administration, and continual quality improvement. The Programme Standards for Creative Multimedia cover all the education levels: from certificate to doctoral.

This Programme Standards document has been developed by a panel of experts in consultation with various public and private Higher Education Providers (HEPs), relevant government and statutory agencies, professional bodies, related Creative Multimedia industry and students.

This standards do not attempt to give specific characteristics for the programmes, especially for those related to the framing of the curricula and provision of educational resources. This Programme Standards document encourages diversity and allows programme providers to be innovative and to be able to customise their programmes in order to create their own niches, while ensuring they produce graduates that meet the current needs of the profession and ensuring they fulfil their obligations to society. Some examples given in this Programme Standards document, such as the statements of programme aims and learning outcomes, are intended to give clarity to the document; they are not intended to be adopted in a verbatim manner.

I would like to express my appreciation to all the panel members, the various stakeholders who have given their input, and all the officers from MQA who have

contributed to the development of this Programme Standards: Creative Multimedia document.

Thank you.

Tan Sri Dato' Dr. Mohamed Salleh Mohamed Yasin

Council Chairman

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2011

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With our sincere appreciation and gratitude,

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ABBREVIATIONS

CGPA	Cumulative Grade Point Average
COPIA	Code of Practice for Institutional Audit
COPPA	Code of Practice for Programme Accreditation
CPD	Continuous Professional Development
GGP	Guidelines to Good Practices
HEP	Higher Education Provider
MQA	Malaysian Qualifications Agency
MQF	Malaysian Qualifications Framework

GLOSSARY

Compulsory Module	Module that is taken to fulfill university and national requirements.
Common Core	Modules that are deemed common to all disciplines of Computing by this Programme Standards.
Concentration / Specialisation / Specialism	Modules taken to fulfill the requirements within an identified / specific discipline of Computing.
Formative Assessment	A process of monitoring the achievement of the learning outcomes. It involves evaluating student learning that aids understanding and development of knowledge, skills and abilities without passing any final judgement (via recorded grade) on the level of learning.
Summative Assessment	A process of evaluating and grading the learning of students at a point in time.
Graduate	A student who has successfully completed any level of qualification within this Programme Standards.
Industrial Attachment / Industrial Training	A period of time within the programme where students are required to be placed in the industry to gain industrial experience and enhance soft skills.
Module	A unit of learning and teaching also described as subject or course or unit in a programme.
Programme	A structured and sequenced set of modules leading to an academic award / qualification.
Elective Module	A module which is selected by a student from a group of identified modules which form part of the Minimum Graduating Credits for the programme. These may either be as free electives or field electives.
Specialised Area	Selected area of study within the larger field of Creative Multimedia.

1. INTRODUCTION

This set of Programme Standards has been prepared to enhance the development of educational programmes in creative multimedia and to maintain the quality of graduates. It is hoped that with this document, higher education providers will be able to provide quality education in creative multimedia and its related fields. For this purpose, 'Creative Multimedia' is defined as a field that utilize digital technologies to create, process, publish, aggregate, package, archive and / or broadcast sound, text, computer graphics and images as fundamental components for diverse content creation for multimedia platforms and applications.

This set of Programme Standards may be utilized in any creative multimedia programme of study, from certificate up to Doctoral Degree levels. It is not possible to list down all possible subfields in Creative Multimedia. However, a few examples are given below and institutions are encouraged to develop their respective fields with this document as a guide. The subfields of Creative Multimedia defined below are to be used as guidelines and are prepared with the knowledge that Creative Multimedia cannot be limited to specific fields given the diversity and intensity of growth. HEPs offering programmes in Creative Multimedia are required to best fit the programme according to international guidelines (where available) and domestic manpower needs. The following are some examples of the subfields of creative multimedia:

- i. Advertising
- ii. Animation and Visual Effects
- iii. Digital Art and Design
- iv. Games Development
- v. Interactive Media
- vi. Sound Design
- vii. Video and Film
- viii. Virtual Reality

1. Creative Multimedia: Advertising

Advertising provides the understanding of and skills in creative concepts, art direction, and the execution and production of advertisement and creative multimedia content. The programme encourages students to utilise new media and equips them with a strong comprehension of a product / brand, the consumer and the marketplace. At the end of the programme, the students learn the theory and practice

of advertising, creativity and innovation, basic marketing and branding, the media, and indirectly, research skills as well as business acumen.

Possible Designations

- i. Art Director
- ii. Advertising Consultant
- iii. Brand and Account Management
- iv. Copywriter
- v. Web Designer
- vi. Multimedia Designer
- vii. Graphic Designer
- viii. Strategic Planner
- ix. Event Manager

2. Creative Multimedia: Animation and Visual Effects

Animation

The act of animating or “giving life” is a process of giving the illusion of movement to drawings, models, or inanimate objects. ‘Animation’ is a broad-based term used to describe the visual techniques that provide the illusion of motion by displaying or capturing a collection of images in time-based sequence.

Visual Effects

‘Visual Effects’ comprise practices, methods and technologies relating to the creation and manipulation of elements within moving images that enable storytellers to guide an audience’s conception of time, space and / or reality. Commonly used in connection with live action productions or sequences a ‘visual effect’ refers to a special effect which is usually inserted into the production after filming to create a visual impression which would be impossible, impractical or unsafe to achieve during shooting using physical effects.

The effect may be created by digitally augmenting and manipulating visual imagery originating on film, tape and / or 2D. It may also be created 3D digital by compositing the modified or digitally-created imagery (back) into film or tape.

For the purpose of the Malaysian Higher Education training sector, ‘Visual Effects’ is a subset of Animation. The term ‘Animation’ is used to describe arts, processes, techniques, theories and practices involved in giving apparent movement and life to

inanimate objects by means of cinematography and/or the creation of fully digital, digitally- assisted or analogue content for entertainment, education and/or training. Animation Production is subdivided into three major categories namely, Classical Animation, Digital Animation and Computer Generated Imagery (CGI) Animation.

Students of Animation and Visual Effects will begin by studying traditional arts as well as computer animation. Traditional subjects provide students with the soft skills needed to work within the 3D computer animation environment and include life drawing, concept drawing, composition, character design and 2D animation. Alongside traditional subjects, students will also begin with courses in computer animation including the operating environment, Photoshop, 3D modeling, animation and texturing. They will become strong in Fine Arts and Creative writing and will gain skills in Pre Production. They will also be able to visualize how to generate “Original Ideas” concepts and will learn to put their thoughts into a story and develop their ideas into projects.

In their final term, students will gain skills in 3D Graphics i.e Background, Texture and Environment creation for their Film and Audio techniques i.e editing, composing and creating an original piece of audio for their film.

Possible Designations

- i. Character Modeller
- ii. Background Modeller
- iii. Animator
- iv. Texture Artist
- v. Render Artist
- vi. Storyboard Artist
- vii. Game Designer
- viii. VFX Artist / Compositor
- ix. 3D Designer (Architectural Visualization, Medical Visualization, Automotive Visualization)
- x. Animation Director

3. Creative Multimedia: Digital Art and Design

‘Digital Art and Design’ is an umbrella term for a range of artistic works and practices that utilize digital technology. The impact of digital technology has transformed traditional activities such as painting, drawing and sculpture, while new forms, such

as net art, digital installation art, and virtual reality, have become recognised artistic practices.

Graduates of Digital Art and Design will be able to develop web design, interactive design, print design, usability and interface design, motion graphics, digital typography and font design, digital video, imaging, digital photography, vector illustration and audio design.

With these comprehensive, multi-disciplinary design skills, the Digital Art and Design graduates are likely to have employment opportunities in Media, Film, Television, Graphics, Computer Games Design and Publishing. Graduates of this specialized visually-creative degree will attract employers in the creative industries.

Possible Designations

- i. Web Designer
- ii. Cartoon Film Production Designer
- iii. Digital Photographer
- iv. Multimedia Producer
- v. Film Production Manager
- vi. Animation Designer
- vii. Internet Designer
- viii. Programme Director
- ix. Art Director
- x. Desktop Publisher
- xi. Games Art Designer

4. Creative Multimedia: Games Development

The term '*Games Development*' is used to describe the processes, techniques, theories and practices related to the creation of digital interactive multimedia applications that incorporates the element of entertainment or in simpler terms, digital games. Games Development is a process that involves an interdisciplinary cooperation of technical disciplines, like software engineering, and creative disciplines, like art and music, to implement a game design in a playable real-world format. This involves a fusion of three major disciplines, namely Games Technology, Games Art and Games Design.

In the Malaysian context, the term ‘*Games Development*’ is used to describe the holistic approach to a full development and technological process of creating digital games within the industry or under academic institutions as Research and Development Initiatives.

For the purpose of the Malaysian Higher Education training sector, ‘*Games Development*’ is categorised into three (3) major disciplines namely, Games Art, Games Design and Games Technology as shown in Table 1. Games Programming while similar in nature to Games Technology; falls under the umbrella of the Programme Standards for Computing. Games Programming covers the area which focuses on the real-time 3D rendering, architecture and development for ground-up games engine while Games Technology focuses on the manipulation of game engine architecture through scripting and programming.¹

Table 1: Major Disciplines in Games Development²

GAMES DEVELOPMENT	Games Art
	<ul style="list-style-type: none"> • Concept Art • 2D Sprites • 3D Models and Environment (Modelling and Texturing) • Game Art Assets Production • 3D Rigging and Animation • Interface
	Games Design
	<ul style="list-style-type: none"> • Game Mechanics • Game Testing and QA • Level Design • Game Narratives • Game World Creation
	Games Technology
	<ul style="list-style-type: none"> • Tools Construction (Game Editor) • Casual Game Development • Procedural Content Generation • Game Logic • Programming for 3D Engines

¹ Amendments as in MQA Circular Letter No. 2/2015 with reference number MQA.100-1/7/1 (7) dated March 11, 2015 effective on 1st September 2015 for new programme.

² *Ibid*

The explanation of the individual terms are as below;

- **Games Art.** Graduates of this discipline are called Gamers or Digital Artists (or Animator/Modeler, depending on specialisation) whose main task is to design, create and analyse the visual components of games. Graduates are expected to be well-versed in visual design fundamentals, production in traditional art media such as painting, drawing and sculpture, communication fields like illustration, typography and graphic design, as a foundation for digital or non-digital output within the Games Development Pipeline. Time-based media like animation and visual effects and the use of 2D and 3D graphics applications for the purpose of games asset creation is also a major requirement for a Games Arts Graduate.
- **Games Design** is the processes of crafting a system of play in which players' actions have meaning in the context of the game environment. Graduates of this discipline are called *Games Designers* and should display a wide-range of skills and knowledge in the following areas: gameplay, storytelling and basic interactive design, including interface design, information design and world interaction. Perhaps what is most important for game design is a detailed study of how games function to construct experiences, including rule design, play mechanics, game balancing, social game interaction, and the integration of visual, audio, tactile and textual elements into the total game experience. More practical aspects of game design, such as game design documentation and playtesting are also covered.
- **Games Technology** focuses on the technical aspects of Games in general involving core topics such as game physics, mathematics, programming and scripting techniques, algorithm design, game-specific programming and the technical aspects of game testing. Much of the material in this area could be taught under the auspices of a traditional computer science or software engineering curriculum. Within the Games Development Industry however, games do present a very specific set of programming challenges, such as optimization of mainstream algorithms such as path-finding and sorting, programming for 3D engines, including graphic libraries, collision detection and collision response, console hardware specific workflow, real-time scene

optimization techniques, editors and toolsets for game production and the modification of an existing game engine. Games Technology graduates are called Games Developers.³

Possible Designations

- i. Concept Artists
- ii. 2D Game Artists
- iii. 3D Game Artists
- iv. Level Designers
- v. Games Designer
- vi. Game Testers
- vii. ⁴Technical Artist
- viii. Games Engine Programmer
- ix. Tools Programmer
- x. Gameplay Programmer

5. Creative Multimedia: Interactive Media

Normally, the term 'Interactive Media' refers to products and services on digital, computer-based systems which respond to the user's actions by presenting contents such as text, graphics, animation, video and audio.

'Interactive Media' is related to the concepts interaction design, new media, interactivity, human computer interaction, cyber culture, digital culture and includes specific cases, for example, interactive television, narrative and advertising, algorithmic art, videogames, social media, ambient intelligence, virtual reality and augmented reality.

Graduates of Interactive Media will learn to produce interactive and rich media content for online, web design and development, mobile, social networks, hybrid media, games, e-learning and interactive installations. Interactive Digital Media emphasises technical competence, diversity of thought, exploration and an interdisciplinary approach, creating a culture of risk-taking, problem solving and team building.

³ *Ibid*, p. 5

⁴ *Ibid*

Possible Designations

- i. Web Designer
- ii. Web Developer
- iii. Graphic Designer
- iv. Game Designer
- v. Interactive Software Designer
- vi. Interactive Media Developer

6. Creative Multimedia: Sound Design

In the professional field, sound designers, composers and mix engineers develop soundtracks for all types of media. Sound designers work specifically with dialog, sound effects and Foley. Composers, music editors and music supervisors develop legal scores. Mix engineers prepare all three stems (dialog, SFX and music) for a variety of release formats.

Graduates of Sound Design will develop specific knowledge and obtain a broad-based foundation in sound design technologies. They will explore the use of existing computer-aided sound design techniques in a creative way and will be able to analyse and critically think about sound and its role in a wider creative arts environment. Graduates of this programme will have the skills to engage in cross-disciplinary collaboration in the context of audiovisual practice and discover new creative uses of advanced technologies.

Possible Designations

- i. Foley Recording Engineer or Mixer
- ii. Boom Operator
- iii. Dialog Editor
- iv. Game Audio Designer
- v. Location Sound Specialist for Films
- vi. Music Editor
- vii. Music Supervisor
- viii. Production Mixer
- ix. Sound Effects Editor
- x. Sound Designer

7. Creative Multimedia: Video and Film

Film and Video Studies is an interdisciplinary Arts programme with a curriculum drawn from a variety of areas. This programme employs a scholarly, creative and professional approach to the study of both film and television and seeks to help each student discover his or her own vision as an independent critic, artist, and communicator. The programme provides an education in the history and theory of film, television and digital media art forms and basic learning experiences in film and video production, weaving together the scholarly, artistic and professional aspects of the wide range of fields within the context of communication and a liberal arts education.

Possible Designations

- i. Producer / Executive Producer
- ii. Director / Assistant Director
- iii. Script Writer
- iv. Production Manager
- v. Production Designer
- vi. Art Director
- vii. Art Department Team (make up, costume, set design, props, graphic)
- viii. Director of Photography
- ix. Cinematographer
- x. Camera Operator
- xi. Editor (Post Production)
- xii. Production Sound Mixer / Recorder / Foley / Boom Operator
- xiii. Sound Editor / Sound Post / Sound Design
- xiv. Lighting / Grip

8. Creative Multimedia: Virtual Reality

'Virtual Reality (VR)' refers to computer simulation that creates an image of a world that appears to our senses in much the same way we perceive the real world, or "physical" reality. In order to convince the brain that the synthetic world is authentic, the computer simulation monitors the movements of the participant and adjusts the sensory display or displays in a manner that gives the feeling of being immersed or being present in the simulation, thus leaving participants physically engaged in the simulated environment that is distinct from their physical reality.

It is also a high-end user-computer interface that involves real-time simulation and interactions through multiple sensorial channels which are visual, auditory, tactile, smell and taste. Through presence and natural interaction, VR is used in education, training, entertainment and many other application areas.

Graduates will be able to combine design with the latest virtual and immersive technologies to build the next generation of entertainment, educational and business applications that transform the way people live and work around the globe. They can also create an augmented reality with animated visualization in which physical and virtual objects coexist and can be interacted within a shared space and environment.

Graduates of this programme will have the creativity and technical abilities within the broad disciplines of design, media, technology and artistic creation. From computer games creation and films to forensic analysis and architectural designs, the career options are endless for Virtual Reality graduates.

Possible Designations

- i. Virtual Reality Specialist
- ii. Virtual Reality Designers
- iii. Virtual Reality and Immersive Technology Modellers
- iv. Virtual Reality and Immersive Technology Visualizers
- v. Simulation Specialist
- vi. Simulation Designers
- vii. Special Effects Designers
- viii. 3D Artists
- ix. 3D Illustrators
- x. 3D Animators
- xi. Interface Designers
- xii. Motion Graphic Designers
- xiii. World Builder

2. PROGRAMME STANDARDS

The development and implementation of this set of Programme Standards is to ensure that the graduates meet the professional requirements and expectations in their respective fields. Higher education providers must take cognisance of the rapidly evolving subject matter and introduce effective and sustainable programme improvement. In doing so, the providers should also ensure that the graduates obtain the necessary skills to function effectively.

This Programme Standards document is subdivided into the following areas:

- i. Programme Aims
- ii. Learning Outcomes
- iii. Curriculum Design and Delivery
- iv. Student Selection
- v. Student Assessment
- vi. Academic Staff
- vii. Educational Resources
- viii. Programme Monitoring and Review
- ix. Leadership, Governance and Administration
- x. Continual Quality Improvement (CQI)
- xi. Appendices

Recognition of Prior Learning will be in accordance to the 'Code of Practice for Quality Assurance of the Open Entry Admission System' and open entry policies. Qualifications supporting lifelong learning, Advanced Diploma, Graduate Certificate and Diploma, and Postgraduate Certificate and Diploma should reflect the achievement in part of the learning outcomes for the respective levels. For example, a Graduate Certificate is placed at Level 6 of the MQF (Bachelor's). Therefore, the learning outcomes should in part fulfil the learning outcomes at Bachelor's level.

As the purpose of this Programme Standards document is to provide guidelines in relation to the development and conduct of programmes in the identified fields, it is of paramount importance that this document be read with other quality assurance documents and policies by the Malaysian Qualifications Agency and related agencies.

These include but are not limited to:

- i. The Malaysian Qualifications Framework (MQF)
- ii. The Code of Practice for Programme Accreditation (COPPA)
- iii. The Code of Practice for Institutional Audit (COPIA)
- iv. Relevant Guidelines to Good Practices (GGPs).

3. PROGRAMME AIMS

“A programme’s stated aims reflect what it wants the learner to achieve. It is crucial for these aims to be expressed explicitly and be made known to learners and other stakeholders alike” (COPPA, 2008, pp.10).

Certificate

The programme aims to provide graduates with fundamental knowledge and basic required creative skills to effectively perform in their specific areas.

Advanced Diploma

“Advanced Diploma is a specific qualification which identifies an individual who has knowledge, practical skills, managerial abilities and more complex and higher responsibilities than those expected at the diploma level” (MQF, pp. 11).

The programme aims to provide graduates with a fundamental and broad-based knowledge to support their existing skills to function effectively within the organisation’s creative processes and/or production workflow.

Bachelor’s Degree

The programme aims to provide graduates with sufficient knowledge, practices and skills with a higher degree of autonomy and adaptability to contribute to an organisation’s creative processes and/or production workflow.

Postgraduate Certificate and Postgraduate Diploma

These are qualifications which contain competencies that bridge bachelors and masters qualifications. Collectively these aim to provide graduates with advanced knowledge and skills in selected areas to deal with the demands of the new developments in the field of creative industries and a masters qualification.

Master’s Degree

The programme aims to provide graduates with the advanced knowledge and skills in selected areas to deal with the demands of the new developments in the field of creative industries.

Doctoral Degree

As a Terminal Degree in Creative Multimedia, the programme aims to provide graduates with the ability to carry out scholarly research at the forefront of their fields and become experts who facilitate and contribute to the advancement of new knowledge.

4. LEARNING OUTCOMES

"The quality of programme is ultimately assessed by the ability of the learner to carry out their expected roles and responsibilities in society. This requires the programme to have a clear statement of the learning outcomes to be achieved by the learner" (COPPA, 2008, pp.11).

These learning outcomes should cumulatively reflect the eight domains of learning outcomes, which are significant for Malaysia (MQF, 2007, Para 15, pp. 4).

Certificate

At the end of the programme, graduates will be able to:

- i. interpret and use basic knowledge and skills in their area of concentration;
- ii. use basic tools and techniques to solve problems related to the area of concentration;
- iii. perform a range of support tasks related to an area of concentration within an organisation;
- iv. follow instructions with guidance;
- v. apply skills and principles of lifelong learning in academic and career development;
- vi. communicate effectively with peers, clients, superiors and society at large;
- vii. exhibit teamwork, interpersonal and social skills; and
- viii. practice professionalism in accordance with social, ethical and legal principles.

Diploma

At the end of the programme, graduates will be able to:

- i. use broad-based knowledge and skills in the specialised area;
- ii. demonstrate the ability to articulate and document work-flow and processes;
- iii. possess problem-solving skills with moderate autonomy;
- iv. perform a broad range of tasks related to an area of concentration;
- v. execute instructions with minimum supervision;
- vi. apply skills and principles of lifelong learning in academic and career development;
- vii. communicate effectively with peers, clients, superiors and society at large;
- viii. exhibit teamwork, interpersonal, entrepreneurial and social skills; and

- ix. demonstrate professionalism in accordance with social, ethical and legal principles.

Advanced Diploma

At the end of the programme, graduates will be able to:

- i. demonstrate the ability to articulate and document work-flow and processes;
- ii. perform a broad range of tasks related to an area of concentration;
- iii. apply skills and principles of lifelong learning in academic and career development;
- iv. communicate effectively with peers, clients, superiors and society at large;
- v. demonstrate professionalism in accordance with social, ethical and legal principles; and
- vi. demonstrate awareness and understanding of management, business practices and entrepreneurship.

Bachelor's Degree

At the end of the programme, graduates will be able to:

- i. apply in-depth knowledge and understanding, both innovatively and effectively, in the creative industries;
- ii. combine technical skills with creativity and research to produce an innovative portfolio of relevant and contemporary work;
- iii. practice social, cultural, global and ethical responsibility in creative content design;
- iv. integrate professionalism, commitment and a positive attitude while working collaboratively;
- v. possess a positive leadership attitude and be able to communicate effectively with peers, clients, superiors and society at large, utilizing the correct industry-specific terminologies;
- vi. use analytical and critical thinking skills in problem-solving;
- vii. use lifelong learning principles and skills to effectively respond and adapt to industry needs and emerging trends;
- viii. show an awareness and understanding of management, business practices and entrepreneurship; and
- ix. carry out supervised research in the related field by seeking and applying knowledge and information analytically.

Postgraduate Certificate and Postgraduate Diploma

At the end of the programme, graduates will be able to:

- i. demonstrate continuing and advanced knowledge;
- ii. integrate knowledge and skills in new situations or multi-disciplinary contexts;
- iii. apply advanced skills in the documentation, description, appraisal and analysis of evidence and problems;
- iv. formulate solutions through the application of appropriate tools and techniques to report findings to diverse audiences; and
- v. create and promote works with an awareness of socio-cultural and legal implications.

Master's Degree

At the end of the programme, graduates will be able to:

- i. demonstrate continuing and advanced knowledge;
- ii. integrate knowledge and skills in new situations or in multi-disciplinary contexts;
- iii. apply advanced skills in the documentation, description, appraisal and analysis of evidence and problems;
- iv. formulate solutions through the application of appropriate tools and techniques to report findings to diverse audiences;
- v. create works that are at the forefront of their specialization and undertake initiatives for continuing professional development;
- vi. supervise undergraduate projects;
- vii. conduct research under supervision;
- viii. create and promote works with an awareness of socio-cultural and legal implications; and
- ix. practice relevant cultural and aesthetic trends, both historical and contemporary.

Doctoral Degree

At the end of the programme, graduates will be able to:

- i. show advanced scholarship in their area of research;
- ii. contribute to original research that broadens the boundary of knowledge through an in-depth thesis;

- iii. present research findings in accordance with international publication standards;
- iv. make critical analysis, evaluation and synthesis of new and complex ideas;
- v. propose solutions through the application of appropriate tools and techniques and report findings to specific audiences;
- vi. perform research professionally and ethically;
- vii. promote technological, social and cultural progress in both academic and professional contexts; and
- viii. initiate continuing professional development.

5. CURRICULUM DESIGN AND DELIVERY

This section provides some general guidelines to Curriculum Design and Delivery as it is not possible to list down all possible subfields in Creative Multimedia. However, the general requirements for a programme within the Creative Multimedia field of study for the various MQF levels are indicated below. A few examples of a full curriculum are given in Appendix 1 of this document. Higher Education Providers (HEPs) are encouraged to develop their respective fields, with guidance from this document and the stated Appendix. For programmes that come under the purview of this Programme Standards document, it is proposed that the common core at each level be listed as necessary.

Certificate (Based on minimum of 60 graduation credits)

Components	Proposed Credits	
	Min	Max
Compulsory Subjects	9	12
Common Core	12	18
Specialism	29	36
Industrial Training	0	4

Common Core for Certificate

Subject Areas	Proposed Credits
Introduction to computing	2
Basic Art and Design	3
Visual Communication	2
Basic Drawing (Relevant to the area of specialism)	3
Professional Ethics	2

Diploma (Based on minimum of 90 graduating credits)

Components	Proposed Credits	
	Min	Max
Compulsory Subjects	9	16
Common Core	18	25
Concentration / Specialism	44	48
Option / Electives	0	8
Industrial Training	4	8

Common Core for Diploma

Subject Areas	Proposed Credits
Introduction to Computing	2
Basic Art and Design	3
History of Art	2
Basic Drawing (Relevant to the area of specialism)	3
Creative Thinking	2
Visual Study	2
Production Visualization	2
Professional Practice	2
Law for Creative Industry	2

Advanced Diploma (Based on minimum of 40 graduating credits)

Components	Proposed Credits	
	Min	Max
Compulsory Subjects	2	7
Common Core	9	12
Concentration / Specialism	20	22
Option / Electives	2	6

Common Core for Advanced Diploma

Subject Areas	Proposed Credits
History of Art	3
Principles of Art and Design	3
History of Media	3

Bachelor's Degree (Based on minimum of 120 graduating credits)

Components	Proposed Credits	
	Min	Max
Compulsory Subjects	9	20
Common Core	26	30
Concentration/Specialism	56	60
Option/Electives	5	13
Industrial Training	6	12

Common Core for Bachelor's Degree

Subject Areas	Proposed Credits
Design Principles	3
History of Art	2
Drawing	3
Creative Studies	3
Perception Studies	3
Production Visualization	2
Media History, Culture and Appreciation	2
Multimedia Technologies	3
Professional Practice	2
Law for Creative Industry	3

Postgraduate Certificate (Based on minimum of 20 graduating credits)

Components	Proposed Credits	
	Min	Max
Common Core	9	12
Concentration / Specialism	8	11

Common Core for Postgraduate Certificate

Subject Areas	Proposed Credits
Research Methodology	3
Technique of Writing Creative Multimedia	3
Production Technique	3

Postgraduate Diploma (Based on minimum of 30 graduating credits)

Components	Proposed Credits	
	Min	Max
Common Core	9	12
Concentration / Specialism	18	21

Common Core for Postgraduate Diploma

Subject Areas	Proposed Credits
Management Skills	3
Marketing and Distribution Study	3
Advanced Principles of Media	3

Master's Degree by Coursework (Based on minimum of 40 graduating credits)

Components	Proposed Credits	
	Min	Max
Common Core	18	20
Concentration/Specialism	18	22
Industrial Training	0	2

Common Core (Masters Degree by Coursework)

Subject Areas	Proposed Credits
Research Methodology	3
Technique of Writing Creative Multimedia	3
Advanced Principles of Media	3

Master's Degree by Mixed Mode (Based on minimum of 40 graduating credits)

Components	Proposed Credits	
	Min	Max
Common Core	6	7
Concentration / Specialism	5	14
Project Paper	18	28
Industrial Training	0	2

Common Core (Masters Degree by Mixed Mode)

Subject Areas	Proposed Credits
Research Methodology	3
Writing for Creative Multimedia	3

Master's Degree by Research and Doctoral

- Minimum Graduating Credits - No MQF credit value
- Research Methodology or Relevant Prerequisite modules as required

*For Concentration / Specialism, samples of modules are as in Appendix 1

6. ASSESSMENT OF STUDENTS

“Student assessment is a crucial aspect of quality assurance because it drives student learning. It is one of the most important measures to show the achievement of learning outcomes. The result of assessment is also the basis in awarding qualifications. Hence, methods of student assessment have to be clear, consistent, effective, reliable and in line with current practices and must clearly support the achievement of learning outcomes” (COPPA, 2008, pp.15).

Specific methods of assessment will depend on the specific requirement of each module. However, as a general guide, the following must be considered:

- i. Summative and formative assessments;
- ii. Knowledge and understanding (the cognitive domain) should be tested through written, oral or other suitable means but practical skills should be tested by practical evaluation such as lab tests;
- iii. In modules requiring practical skills, a pass in practical evaluation is compulsory (A pass implies that the examiner is satisfied that the candidate has met the learning outcomes of the particular subject);
- iv. The types of assessments indicated below are merely examples. Higher Education Providers (HEPs) are encouraged to use a variety of methods and tools appropriate for the learning outcomes and competencies; and
- v. Candidates are required to attempt both continuous and final evaluations (A pass implies that the examiner is satisfied that the candidate has met the learning outcomes of the particular subject).

Generally, students will be evaluated, where appropriate, through:

- i. Examination
 - Closed / Open book, Viva Voce, Mid Term, Final;
- ii. Coursework
 - Assignments, Quiz, Laboratory Report;
- iii. Projects
 - Individual / Group, Short / Long Presentation; and
- iv. Others
 - Class Participation, Group Activities.

A suggested breakdown for each level of award from Certificate to Doctoral Degree is given below:

Qualifications	CONTINUOUS EVALUATION (%)	FINAL EVALUATION (%)	SUGGESTED EVALUATION
Certificate	50-70	30-50	<ul style="list-style-type: none"> • Practical Assessment • Examinations
Diploma	30-50	50-70	<ul style="list-style-type: none"> • Case Studies • Industrial Reports • Project • Practical Assessment • Presentation • Examinations
Advanced Diploma	50-70	30-50	<ul style="list-style-type: none"> • Case Studies • Project • Practical Assessment • Presentation • Examinations
Bachelor's Degree	40-70	30-60	<ul style="list-style-type: none"> • Case Studies • Final Year Project • Industrial Reports • Presentation • Practical Assessment • Examinations
Postgraduate Certificate / Postgraduate Diploma	40-70	30-60	<ul style="list-style-type: none"> • Case Studies • Reports • Presentation • Project Paper • Examinations
Master's Degree by	*	*	<ul style="list-style-type: none"> • Presentation • Project Paper • Examinations

Qualifications	CONTINUOUS EVALUATION (%)	FINAL EVALUATION (%)	SUGGESTED EVALUATION
Coursework			
Master's Degree by Mixed mode	*	*	<ul style="list-style-type: none"> • Dissertation • Presentation • Project Paper • Examinations
Master's Degree by Research	-	-	<ul style="list-style-type: none"> • Presentation • Thesis • Viva Voce
Doctoral Degree	-	-	<ul style="list-style-type: none"> • Thesis • Viva Voce • Presentation according to international standards

*To be determined according to individual programmes

7. STUDENT SELECTION

This section of the Programme Standards document concerns the recruitments of students into the individual programme of study. In general, admission policies of the programme need to comply with the prevailing policies of the Ministry of Higher Education (MoHE). “There are varying views on the best method of student selection. Whatever the method used, the Higher Education Provider (HEP) must be able to defend its consistency. The number of students to be admitted to the programme is determined by the capacity of the HEP and the number of qualified applicants. HEP admission and retention policies must not be compromised for the sole purpose of maintaining a desired enrolment. If an HEP operates geographically separated campuses or if the programme is a collaborative one, the selection and assignment of all students must be consistent with national policies” (COPPA, 2008, pp.17).

The benchmarked standards for recruitment of students into Creative Multimedia programmes are provided below. The standards are created, keeping in mind the generic national higher education policies pertaining to minimum student entry requirement. HEPs must take cognizance of any specific policies that may apply to their individual institution.

Certificate

- i. **Pass Sijil Pelajaran Malaysia (SPM)** with one (1) credit or equivalent.
(Whilst there are no requirements to pass Mathematics and Arts at SPM level, HEPs are encouraged to include a Mathematics and Basic Arts syllabus in the Certificate)

Diploma

- i. **Pass Sijil Pelajaran Malaysia (SPM)** or equivalent with at least three (3) credits;
OR
- ii. **Recognised Creative Multimedia Certificate** or equivalent;
OR
- iii. **Recognised related Technical and Vocational Certificate** or equivalent with one (1) year relevant work experience or one (1) semester bridging programme.
OR

- iv. **Sijil Kemahiran Malaysia (SKM) Level 3 and Sijil Pelajaran Malaysia (SPM)** with at least 1 credit.

Advanced Diploma

- i. **Recognised Creative Multimedia Diploma** or equivalent.

Bachelor's Degree

- i. **Recognised Matriculation or Foundation** with CGPA 2.0;
OR
Pass Sijil Tinggi Persekolahan Malaysia (STPM) with 2 full passes or equivalent with minimum CGPA of 2.0;
OR
- ii. **Recognised Creative Multimedia Diploma** or equivalent with a minimum CGPA of 2.5. (Candidates with CGPA between 2.00 and 2.50 may be admitted, subject to an internal assessment process);

Master's Degree by Coursework or Mixed Mode

- i. **Recognised Bachelor's Degree in Creative Multimedia OR related field**, with CGPA of 2.50*.
Where candidates without a Creative Multimedia Degree are admitted, prerequisite modules in Creative Multimedia must be offered to adequately prepare them for their advanced study.
- ii. Candidates from non-related fields but with 5 years of relevant industry experience may be considered, subject to a rigorous internal process. These candidates may be required to take and pass prerequisite modules in Creative Multimedia to adequately prepare them for their advanced study.

*Candidates with CGPA between 2.00 and 2.50 may be admitted, subject to a rigorous internal assessment process.

In addition to the requirements stated above for the Diploma and Bachelors levels, it would be beneficial for students to have a pass in Mathematics at SPM or equivalent for programmes in Animation And Visual Effects, Games Development, Media Innovation, Sound Design, Video and Film and Virtual Reality.

The HEPs may consider students through an internal assessment process such as an interview, an assessment of a portfolio or other tests to ensure effective learning and teaching.

Postgraduate Certificate and Postgraduate Diploma

- i. **Recognised Bachelor's Degree in Creative Multimedia**
OR
- ii. **Recognised Bachelor's Degree in any other related field**

Doctoral Degree

- i. **Recognised Master's Degree** or equivalent **AND** candidates must have completed at least one (1) of the earlier degrees (**Masters or Bachelors**) in **Creative Multimedia**

8. ACADEMIC STAFF

“The quality of the academic staff is one of the most important components in assuring the quality of higher education and thus every effort must be made to establish proper and effective recruitment, service, development and appraisal policies that are conducive to staff productivity” (COPPA, 2008, pp.21).

The following sections provide benchmarked requirements for the various levels of the creative multimedia qualifications.

Certificate

- i. Bachelors Degree in a relevant field
OR
- ii. Diploma with two (2) years of relevant industrial experience or professional certification in the relevant area. The programme should not employ more than 30% of the staff from this category.
- iii. Overall Staff-Student ratio – 1:20
- iv. Full-time and Part-time faculty – at least 50% full-time of which 30% are with relevant industry experience
- v. Continuous Professional Development (CPD) for full-time staff according to the specialisation needs with at least 40 hours of relevant training per year
- vi. Lab staff (technicians and instructors) to lab ratio –1:2

Diploma

- i. Bachelor’s Degree in a relevant field
OR
- ii. Diploma with five (5) years of relevant industrial experience and professional certification in the relevant area. The programme should not employ more than 30% of the staff from this category
- iii. Overall Staff-Student ratio – 1:20
- iv. Full-time and Part-time faculty – at least 60% full-time of which 30% are with relevant industry experience
- v. Continuous Professional Development (CPD) for full-time staff according to the specialization needs with at least 40 hours of relevant training per year.
- vi. Lab Staff (Technicians and Instructors) to Lab ratio – 1:2

Advanced Diploma

- i. Bachelor's Degree in a relevant field with five (5) years of industry experience

Bachelors Degree

- i. Master's Degree in a related field (30% of the staff from this category with minimum two (2) years of relevant industrial/work experience)
- ii. Bachelors Degree with five (5) years related work experience in the subject taught. The programme should not employ more than 20% of the staff from this category. For programmes where there are limited or no available staff with masters, the HEP may employ not more than 50% of the staff from this category
- iii. Overall Staff-Student ratio – 1:15
- iv. Full-time and Part-time teaching faculty – At least 60% full-time
- v. Continuous Professional Development (CPD) for full-time staff according to the specialization needs with at least 40 hours of relevant training per year
- vi. Lab Staff (Technicians and Instructors) to Lab ratio – 1:2

Postgraduate Certificate and Postgraduate Diploma

- i. Doctoral Degree
OR
- ii. Master's Degree with five (5) years of relevant work experience (academic/industry).

Masters Degree**Masters Degree by Research**

- i. Doctoral in a related field
OR
- ii. Master's Degree with ten (10) years of academic experience

Masters Degree by Mixed Mode and Coursework

- i. Doctoral in a relevant field
OR
- ii. Master's Degree with seven (7) years of relevant work experience (academic/industry) (The programme should not employ more than 40% of the staff from this category)

- iii. Overall Staff-Student ratio – 1:10
- iv. Overall Supervisor-Student ratio – 1:7
- v. Full-time and Part-time teaching faculty – At least 60% full-time
- vi. Continuous Professional Development (CPD) for full-time staff according to the specialisation needs with 40 hours of relevant training per year.

Doctoral Degree

- i. Doctoral Degree or equivalent in a relevant field.
- ii. Overall Supervisor-Student ratio – 1:7
- iii. The main Supervisor must be a full-time staff of the faculty
- iv. Continuous Professional Development (CPD) for full-time staff according to the specialization needs with 40 hours of relevant training per year.

****This is only proposed by the panel experts. It would be the HEP that determines who is the most suitable to fill in the position.***

9. EDUCATIONAL RESOURCES

“Adequate educational resources are necessary to support the teaching-learning activities of the programme. These resources include finance, expertise, physical infrastructure, information and communication technology, and research facilities. The physical facilities of a programme are largely guided by the needs of the specific field of study” (COPPA, 2008, pp.23).

For creative multimedia programmes, Higher Education Providers (HEPs) are required to provide sufficient resources to support teaching and learning in the field and these according to the various levels are as listed below:

Certificate, Diploma and Advanced Diploma

- i. Computer labs
- ii. Tutorial rooms
- iii. Specialized labs, studios and production facilities according to the programme needs
- iv. Lecture rooms (with sufficient audio visual facilities)
- v. Library (including on-line and audio visual resources)
- vi. Internet Access (including wireless)
- vii. Sufficient access to relevant software and hardware according to the needs of the programmes and students

Bachelor's Degree

- i. Computer labs
- ii. Research / Project Lab for final year students and postgraduates
- iii. Specialized Labs, studios and production facilities according to the programme needs
- iv. Tutorial Rooms
- v. Lecture Rooms (with sufficient Audio Visual facilities)
- vi. Library (including on-line and audio visual resources)
- vii. Internet Access (including wireless)
- viii. Sufficient access to relevant software and hardware according to the needs of the programmes and students

Master's Degree and Doctoral Degree

- i. Computer Labs
- ii. Research / Project Lab for final year students and postgraduates
- iii. Specialized Lab according to the programme needs
- iv. Tutorial Rooms
- v. Workstations for Graduate Students to carry out Research
- vi. Lecture Rooms (with sufficient Audio Visual facilities)
- vii. Library (including on-line, audio visual resources and up-to-date resources)
- viii. Internet Access (including wireless)
- ix. Relevant specialized software and hardware according to the needs of the programmes and students.

10. PROGRAMME MONITORING AND REVIEW

“Quality enhancement calls for programmes to be regularly monitored, reviewed and evaluated. This includes the monitoring, reviewing and evaluating of institutional structures and processes (administrative structure, leadership and governance, planning and review mechanisms), curriculum components (syllabi, teaching methodologies, learning outcomes) as well as student progress, employability and performance.

Feedback from multiple sources-students, alumni, academic staff, employers, professional bodies, parents - assist in enhancing the quality of the programme. Feedback can also be obtained from an analysis of student performance and from longitudinal studies.

Measures of student performance would include the average study duration, assessment scores, passing rate at examinations, success and dropout rates, students’ and alumni’s reports about their learning experience, as well as time spent by students in areas of special interest. Evaluation of student performance in examinations can reveal very useful information. If student selection has been correctly done, a high failure rate in a programme indicates something amiss in the curriculum content, teaching-learning activities or assessment system. The programme committees need to monitor the performance rate in each course and investigate if the rate is too high or too low.

Student feedback, for example, through questionnaires and representation in programme committees, is useful for identifying specific problems and for continual improvement of the programme.

One method to evaluate programme effectiveness is a longitudinal study of the graduates. The department should have mechanisms for monitoring the performance of its graduates and for obtaining the perceptions of society and employers on the strengths and weaknesses of the graduates and there-upon to respond appropriately (COPPA, 2008, pp.27).

11. LEADERSHIP, GOVERNANCE AND ADMINISTRATION

“There are many ways of administering an educational institution and the methods of management differ between HEPs. Nevertheless, governance that reflects the leadership of an academic organisation must emphasise excellence and scholarship. At the departmental level, it is crucial that the leadership provides clear guidelines and direction, builds relationships amongst the different constituents based on collegiality and transparency, manages finances and other resources with accountability, forge partnerships with significant stakeholders in educational delivery, research and consultancy and dedicates itself to academic and scholarly endeavours. Whilst formalised arrangements can protect these relationships, they are best developed by a culture of reciprocity, mutuality and open communication” (COPPA, 2008, pp.28).

Specific to the level offered at the HEPs, the programme leadership (e.g., Coordinator, Head or Dean) must have the following qualification and experience.

Diploma and below

- i. A Bachelors Degree in Creative Multimedia or a related area
- OR**
- ii. A Diploma with ten (10) years of relevant experience in Creative Multimedia or a related area

Bachelor’s Degree and below

- i. A Masters Degree with at least one qualification in Creative Multimedia or a related area.

Master’s Degree and below

- i. A Doctoral, with at least one qualification in Creative Multimedia or a related area;
- OR**
- ii. A Masters Degree with ten (10) years of relevant experience, with at least one qualification in Creative Multimedia or a related area.

Doctoral Degree

- i. A Doctoral with three (3) years experience in a related area, with at least one qualification in Creative Multimedia;
- OR**
- ii. A Masters Degree with 15 years of relevant experience and an active research publications background.

12. CONTINUAL QUALITY IMPROVEMENT

“Increasingly, society demands greater accountability from HEPs. Needs are constantly changing because of the advancements in science and technology, and the explosive growth in global knowledge, which are rapidly and widely disseminated. In facing these challenges, HEPs have little choice but to become dynamic learning organisations that need to continually and systematically review and monitor the various issues so as to meet the demands of the constantly changing environment” (COPPA, 2008, pp.30-31).

The Higher Education Providers (HEPs) are expected to provide evidence of the ability to keep pace with changes in the field and the requirements of stakeholders.

These may be demonstrated by, but not limited to:

- i. an annual module review;
- ii. a programme curriculum review, conducted at least once every 2-3 years;
- iii. the appointment of an external reviewer/industrial adviser for quality assessment processes;
- iv. linkages with industry;
- v. a continuous review of industrial attachment practices and records;
- vi. dialogue sessions with stakeholders;
- vii. an active participation of academic staff at relevant conferences, seminars, workshops and short courses;
- viii. presentations by invited speakers(local or international); and
- ix. the organisation of conferences, seminars and workshops.

Proposed Modules: Creative Multimedia Concentration / Specialisation

The following are **suggested modules** in Creative Multimedia that are normally incorporated into a programme of study in the respective fields. These are kept generic to enable institutions to develop according to the specialism, national manpower and student needs and strength of the HEPs. As such these should be considered as broad guidelines and will include theory and practice in Creative Multimedia. The modules should also be further divided into introduction, intermediate and advanced (or any equivalent terminologies) to reflect the content of the modules. However, an intermediate or advanced level module cannot be delivered without first offering the introductory module.

Creative Multimedia: Advertising

- Computer Modeling
- Scripting Language and Multimedia Authoring
- Visual Culture
- Video Post-Production
- Interaction Studies
- Semiotics
- Internet Application
- Media Aesthetics
- Sound Design
- Media Appreciation
- Professional Practice
- Media Innovation Design
- Online Advertising
- Environmental Media
- Copywriting
- Audio Visual in Advertising
- e-Marketing
- Integrated Brand Promotion

Creative Multimedia: Animation and Visual Effects

- Art
- Model Creation
- Shading and Lighting
- Design
- Character Design and Creation
- Physics
- Animation
- Compositing
- Scripting
- Character Rigging
- Character Animation
- Performance Capture
- Software and Technologies
- Visual Effects
- Production Process
- Stereoscopy

Creative Multimedia: Digital Art and Design

- Design
- Drawing and Illustration
- Storytelling
- 2D and 3D Design
- Colour Concepts
- Painting and Mixed Media
- History
- Animation
- Digital Image Processing
- Web Development
- Visual Concepts for Graphic Designers
- Critical Studies
- Photography
- Audio Design
- Video
- Multimedia Authoring

- Visual Communication

Creative Multimedia: Games Development

a) Games Art

- Critical Game Studies
- Design Principles (Graphic Design)
- 3D Modeling (Low Polygon)
- 3D Animation
- 2D Animation
- Principles of Art
- Fundamentals of Animation
- Character Animation
- Character Rigging
- Level Design
- Shading and Effects for Games
- Concept Art and Drawing
- Digital Imaging
- Animation Principles
- Casual Games Development / Interactive Media
- Game Production Process Proses Produksi Permainan
- Games *Modding* (Modification)
- Motion Capture

b) Games Design

- History
- Design
- Storytelling
- Physics
- Statistics
- Design and Development Analysis Analisis Reka bentuk dan Pembangunan
- Design Project Projek Reka bentuk
- Programming Pengaturcaraan
- Mechanics Mekanik

- Design Tools Alatan Reka bentuk
- Level Design Tahap Reka bentuk
- Aesthetics and Immersion
- Testing and Play Balancing
- Research and Marketing

c) Games Technology⁵

- Fundamentals of Programming
- Object Oriented Programming
- Game Logic and Scripting
- Mathematics and Physics for Games
- Data Structures and Algorithms
- Mobile/Console Game Development
- 2D Game Development
- 3D Game Development
- Game System Architecture
- Graphics System and API
- Procedural content generation
- Game Editors and Tools Construction
- Game Analytics and Monetization Integration
- Multiplayer Networking

Creative Multimedia: Interactive Media

- Art and Design Practice
- 2D and 3D Animation
- Video Narrative
- Concept and Structured Development
- Web Delivery Systems
- Interactive Scripting
- Interaction Design
- Experimental Design and Reflection
- Platform Development Environments
- 3D Modeling

⁵ *Ibid*, p. 5

- Audio Design
- Motion Graphics
- Compositing and Post Production
- Novel Interactions
- Design Solutions
- Content Management
- Production Process

Creative Multimedia: Sound Design

- Media Art
- Music Theory
- Sound Synthesis
- Desktop audio
- Production Systems
- Audio File Management and Documentation
- Sound Design
- Digital Audio Theory
- History
- Sound in Media
- MIDI Technologies
- Sound Effects and Foley
- Location Sound
- Surround Sound
- Postproduction

Creative Multimedia: Video and Film

- Art and Design Studies
- Film Studies and History
- Photography
- Video Production
- Script Writing
- Storytelling
- Storyboarding
- Creative Design

- Technology
- Cinematography
- Directing
- Art Direction
- Production Design
- Film Production Process
- Motion Graphics
- Sound
- Editing and Compositing
- Broadcasting and Distribution
- Graphic Design

Creative Multimedia: Virtual Reality

- Principles
- Virtual Reality Art and Design
- Visual Communication
- Human Factors and Experiential Studies
- Design Process for Virtual Reality
- Interaction and Design
- Digital Landscapes
- 3D Animation and Kinetic Media
- Simulation, Modelling and Scripting
- Sound and Space
- Augmented Reality
- 3D Modelling
- 3D Materials
- Character Figure Drawing
- Character Rigging
- Character Animation
- Motion Capture
- Information and Embedded Visualization
- Video Production