

Computer Graphics and Design

LEVEL 3	15 TCE CREDIT POINTS
COURSE CODE	CGD315118
COURSE SPAN	2018 ONWARDS
COURSE STATUS	ONGOING
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	NO
COMPUTERS AND INTERNET STANDARD	YES

Computer Graphics and Design equips learners for working in the digital age through the development of design thinking and problem solving skills

In a future that will be characterised by rapid and continuing advances in digital technologies where visual solutions are central to the way people use, share, develop and process information, learners need to learn the skills to utilise such technologies to solve problems and visually communicate knowledge and ideas. Learners will work within the computer graphics context, applying their understanding of form and function to develop design solutions.

Rationale

Computer Graphics and Design equips learners for working in the digital age through the development of design thinking and problem solving skills. In a future that will be characterised by rapid and continuing advances in digital technologies where visual solutions are central to the way people use, share, develop and process information, learners need to learn the skills to utilise such technologies to solve problems and visually communicate knowledge and ideas. Learners will work within the computer graphics context, applying their understanding of form and function to develop design solutions.

Computer Graphics and Design Level 3, develops learners' capacity to solve complex problems and effectively use project management skills to collaborate and meet deadlines. Such skills are essential in existing and future work environments and are particularly relevant for learners seeking careers in design-based industries.

Computer Graphics and Design while associated with the Design and Technology strand of learning, also incorporates, and provides, rich learning opportunities to embed skills and knowledge from the fields of arts, maths and sciences. In doing so, Computer Graphics and Design provides potential for the engagement of integrated learning opportunities and the capacity to develop skills to effectively transfer knowledge and understanding across disciplines.

Aims

Computer Graphics and Design Level 3, aims to develop learners who are design literate. A learner who is design literate is able to:

- draw on knowledge and understanding of design thinking
- consider the implications of external influences
- develop design possibilities and communicate design solutions.

Learners will develop these skills through the creation, management and refinement of design briefs focusing on visual communication in the digital environment.

Learning Outcomes

On successful completion of this course, learners will be able to:

- apply research, analysis and evaluation skills through implementing a design process to undertake a range of design projects
- generate and communicate information, ideas, concepts and design solutions using a range of visual communication strategies and conventions
- provide active and constructive contributions during collaborative design challenges to creatively and innovatively solve problems
- apply design standards and conventions when using digital technologies
- analyse, select and apply appropriate contemporary digital technologies
- conduct formal and informal critique of others' design work, with a view to improvement
- manage design projects, both individually and collaboratively, by applying appropriate planning, time management and reflective thinking strategies
- analyse the impact of design in society and in relation to people and the environment, including historical, ethical, cultural and sustainability considerations.

Pathways

Learners entering this course should have an understanding of a design process and the application of this, including the elements and principles of design and the iterative process of design development. Learners who have successfully completed Computer Graphics and Design Foundation Level 2, Design and Production Level 2, Housing and Design Level 3, Technical Graphics Level 3 or Year 9/10 Australian Curriculum Technologies will have developed required knowledge and skills, although these are not pre-requisite courses.

On successful completion of this course, learners will have developed the knowledge and skills that will support them in further tertiary study and/or Vocational Education and Training pathways in the areas of engineering, architecture, computing, visual arts and design.

Resource Requirements

Providers of this course need to ensure learners have access to appropriate industry-standard graphics software applications and suitable hardware to enable the efficient operation of such applications.

Course Size And Complexity

This course has a complexity level of 3.

At Level 3 the learner is expected to acquire a combination of theoretical and/or technical and factual knowledge and skills and use judgment when varying procedures to deal with unusual or unexpected aspects that may arise. Some skills in organising self and others are expected. Level 3 is a standard suitable to prepare learners for further study at tertiary level. VET competencies at this level are often those characteristic of an AQF Certificate III.

This course has a size value of 15.

Course Description

Design principles and processes must underpin the development of digitally created outcomes and solutions. These must be arrived at using a range of expressive techniques including written, drawn and digital. Learners develop the ability to use, manage, assess and understand the implications and applications and consequences of digital design technologies on individuals, society and the environment. Project management skills are an important part of this course, fostering learners as creative, critical and reflective thinkers. Learners develop insights in to how design is culturally, socially and ethically constructed with an environmentally sustainable approach.

Connections will be made with contemporary designers working in a diverse range of contexts. This may take the form of case studies, guest speakers and/or excursions.

Relationship To Other TASC Accredited And Recognised Senior Secondary Course

Computer Graphics and Design – Foundation Level 2 includes an introduction to design thinking and computer graphics skills and knowledge which provides a required foundation for learners who wish to study Computer Graphics and Design Level 3.

Computer Graphics and Design Level 3 is underpinned by design thinking which appears in other TASC Design and Technology courses. While learners who are studying more than one Design and Technology course (either sequentially or concurrently) may have some advantages in dealing with familiar terms and integrating broad concepts, the depth, contextualisation of content and application all vary significantly between courses.

Course Requirements

Work submitted for assessment must be:

- produced over the duration of one calendar year
- be unique to this course and;
- not be work submitted for assessment in any other course.

Learners must complete the work requirements as listed in the Course Content section of this document.

Course Content

Unit 1, Design Extension will be covered first and the processes and practices for this will be applied in Unit 2. All learners will study the one compulsory Design Studio from Unit 2, (Digital Imaging and 3D Modelling), and two elective Design Studios. All learners will complete the extended project in Unit 3.

Note: The nature of Computer Graphics and Design Projects have been outlined in the appendices to this course document.

Unit 1 - Design Extension (30 hours)	
UNIT OUTLINE	<p>Design underpins all computer graphics applications. This Unit builds on learners' understanding of the design process and the implementation of the design process to create solutions to meet the requirements of a brief. Learners will develop skills to research and develop their own design briefs from authentic scenarios.</p> <p>Learners will gain an understanding of a broad range of factors which impact on design from a local, national and global perspective. Learners develop insights into how design is culturally, socially and ethically constructed with an environmentally sustainable approach. Consideration is given to influences by social and cultural factors, and past and contemporary practices when proposing design solutions.</p> <p>Learners will analyse and select communication strategies to undertake the design process and communicate their ideas and understandings through the process of design development, analysis of iterations and the presentation of a final product. Project management techniques and processes will be analysed and applied to manage design projects.</p>
KEY KNOWLEDGE AND SKILLS	<ul style="list-style-type: none"> practices, techniques and processes used by designers in establishing briefs and in the designing and producing of solutions to meet clients' requirements selection and application a range of design elements, design principles, manual and digital methods, materials, conventions and media appropriate to different purposes, audiences and contexts influences on design, including environmental, ethical, social and historical creative, critical and reflective design thinking strategies expression in design incorporating sketching, model making/prototyping and graphic communication, including perspective, isometric and orthographic drawing collaborative and individualised project management techniques, including the ability to provide and receive critique from peers contemporary designers within digital technologies
WORK REQUIREMENTS	<p>One introductory design brief to apply the key knowledge and skills delivered in this Unit, with a focus on working collaboratively to fulfill a design brief and applying project management techniques. Students are to work in teams to propose a collective solution to a brief. Each student is to reflect on and document their role in the team and the collaboration and project management techniques they implemented. Team brief solution 750-1200 words, including background research graphics, design sketching and evidence of production process. Individual reflection 500 words. The learning from this unit is embedded and assessed in the projects produced using the skills developed and work requirements specified in Unit 2.</p>

Unit 2 - Design Studios (70 hours)	
UNIT OUTLINE	<p>This Unit is the content basis for working within a field of design.</p> <p>Learners must study the core design design studio and at least two of the elective design studios. One, or a combination of these studio areas studied, must from the basis of the extended project in Unit 3.</p>
KEY KNOWLEDGE AND SKILLS	<p>Core design studio (20 hours)</p> <p>3D Modeling</p> <p>This content area builds on the foundation processes and systems of polygon, splibne and digital sculpting 3D modelling methods to enable learners to produce complex models across a range of design contexts.</p>

For example, the ability to take a base object and develop complex geometry using polygon editing methods such as:

- o extrusion
- o bevelling,
- o edge loops,
- o inseting,
- o edge and vertex editing.

It also incorporates the use of digital imaging systems to:

- o create custom texture surfaces on 3D models
- o enhance rendered 3D images through post processing in digital imaging applications
- o present visual design solutions for a diversity of presentation mediums.

This requires the use of both 2D pixel and vector image based editors and 3D graphics applications.

Elective design studios (25 hours each, select two)

1. Interactive Design

This elective studio involves learning the processes and systems of interactive design solutions including virtual and augmented reality. It incorporates understanding of how systems impact on the creation of functional design solutions such as:

- o image optimisation
- o usability
- o interface layout
- o information architecture
- o interaction behaviour.

This will also include the exploration of the current and future roles of artificial intelligence.

2. Solid Modelling and 3D Digital Fabrication

This elective studio involves developing an understanding of systems involved in digital manufacturing and the process from brief, concept design through to product.

Learners will compare different digital fabrication methods and analyse these methods to determine the best fit for purpose tools for particular design solutions.

Efficiencies of design will be considered, including material properties and concepts such as nesting and finite element analysis.

3. Video and Motion Graphics

This elective studio incorporates understanding of how post production editing techniques can be applied in the design of functional visual communication solutions. Learners will focus on the application of:

- o special effects
- o particle systems
- o the capture of 3D based objects.

4. Animation

This elective studio involves building an understanding of 3D animation to develop design solutions. It incorporates understanding of different animation systems, such as pose to pose and straight ahead, and the diverse range of methods that may be used in developing design solutions. For example;

- o cel shading
- o motion capture
- o rotoscoping
- o inverse and forward kinematics
- o stop motion
- o morphing
- o camera walkthrough
- o rigging and bones.

5. Asset development, game design and production

This elective studio involves learning the processes and systems of game design and production to develop design solutions in either 2D or 3D contexts. It incorporates understanding of how computer graphic assets can be designed and created for embedding in-game systems to ensure effective functionality. Learners will use systems that allow for optimization, normal mapping, and texture baking as they design and develop visual content.

WORK REQUIREMENTS	<p>At least three design projects will be undertaken, one from the core studio and one each from the elective studios selected. While maintaining focus on software skill development, the knowledge of the design process and the application of design elements and principles appropriate to the design context underpin the learning activity.</p> <p>Each project must address the impact of social and sustainability considerations. Project size – 1500-2500 words, including background research graphics, design sketching and annotated screen shots of production process.</p>
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Unit 3 - Extended Project (50 hours)	
UNIT OUTLINE	Using computer generated graphics, or digital content, in the field of design, each learner will undertake an extended design project.
KEY KNOWLEDGE AND SKILLS	<p>Within the Extended Design Project, learners must:</p> <ul style="list-style-type: none"> * construct a clear, concise design brief * follow a structured iterative design process as evident in a commercial setting * implement project management techniques to fulfill the project requirements within the allocated time frame * prepare a presentation and written analysis for external assessment * use contemporary digital design methods in the presentation of the project.
WORK REQUIREMENTS	<p>This Unit of study culminates in the project management of an extended design project which is externally assessed. See TASC's External Assessment Guidelines for this course.</p>

Work Requirements

Unit 1 Design Extension			Introductory collaborative design project
Unit 2 Design Studios - Core	Core Design Studio	Digital Imaging and 3D Modelling	One Design Project
Unit 2 Design Studios - Elective	Elective Design Studio	<ul style="list-style-type: none"> • Interactive Design • Animation • Special Effects • 3D Prototyping & Solid Modelling • Asset development, game design and production 	Two design projects, one from each of the two elective studios studied
Unit 3 Extended Project			Externally assessed extended design project details available on the TASC website

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate end-point of study. Although assessment – as part of the learning program – is continuous, much of it is formative, and is done to help learners identify what they need to do to attain the maximum benefit from their study of the course. Therefore, assessment for summative reporting to TASC will focus on what both teacher and learner understand to reflect end-point achievement.

The standard of achievement each learner attains on each criterion is recorded as a rating 'A', 'B', or 'C', according to the outcomes specified in the standards section of the course.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating.

A 'z' notation is to be used where a learner provides no evidence of achievement at all.

Providers offering this course must participate in quality assurance processes specified by TASC to ensure provider validity and comparability of standards across all awards. For further information, see TASC's [quality assurance](#) and [assessment](#) processes.

Internal assessment of all criteria will be made by the provider. Providers will report the learner's rating for each criterion to TASC.

TASC will supervise the external assessment of designated criteria which will be indicated by an asterisk (*). The ratings obtained from the external assessments will be used in addition to internal ratings from the provider to determine the final award.

Quality Assurance Process

The following processes will be facilitated by TASC to ensure there is:

- a match between the standards of achievement specified in the course and the skills and knowledge demonstrated by learners
- community confidence in the integrity and meaning of the qualification

TASC gives course providers feedback about any systematic differences in the relationships of their internal and external assessments and, where appropriate, seeks further evidence through audit and required corrective action in the future.

External Assessment Requirements

The external assessment for this course will comprise:

- a two hour written examination assessing criteria: 6 & 7
- the presentation of an Extended Project assessing criteria: 2, 5, 8

For further information see the current external assessment specifications and guidelines for this course available on the TASC website.

Criteria

The assessment for Computer Graphics and Design, Level 3, will be based on the degree to which the learner can:

1. collect, organise and analyse information
2. apply a design process to generate solutions *
3. implement self-management strategies to complete individual and team activities
4. generate and communicate ideas using a range of graphic techniques
5. analyse and apply elements and principles of design*
6. analyse the impact of design in society*
7. describe and apply key features, applications and influences on contemporary computer graphics systems*
8. apply digital technologies to create designed solutions.*

Note: * denotes criteria that are both internally and externally assessed

Standards

Criterion 1: collect, organise and analyse information

The learner:

Rating A	Rating B	Rating C
evaluates a broad range of computer graphic and design ideas and issues	analyses computer graphic and design ideas and issues	identifies and discusses a range of computer graphic and design ideas and issues
accurately classifies and organises computer graphic and design information from a broad range of sources into logical patterns or points of view	classifies and organises computer graphic and design information from a range of sources into logical patterns or points of view	organises computer graphic and design information from a limited range of sources into logical patterns or points of view
revises and reflects upon computer graphic and design information to check for clarity, detail, accuracy and effectiveness, and makes relevant adjustments.	revises and reflects upon computer graphic and design information to check for clarity and effectiveness, and makes adjustments.	checks computer graphic and design information for clarity, detail, accuracy and effectiveness, and makes adjustments based on feedback.

Explanation of Criterion 1

This criterion is used to assess work samples within the course whether they are research/theory based assignments or practical computer graphic tasks. For example: the action of interpreting a brief or task; undertaking research; refining the information or concepts; producing an outcome; and evaluating the outcomes. This evaluation may be done by self, by teacher and/or peers. A learner's understanding can be demonstrated through the preparation and production of essays, talks/discussions, the solving of design briefs and other assignment based tasks. Learner work will demonstrate academic rigour and integrity.

Criterion 2: apply a design process to generate solutions

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
identifies and evaluates existing problems and issues in computer graphics and design situations	identifies and analyses existing problems in computer graphics and design situations	identifies existing problems in computer graphics and design situations
identifies and analyses potential problems in computer graphics and design situations and proposes realistic strategies to address them	identifies a range of potential problems in computer graphics and design situations and suggests possible strategies to address them	identifies limited potential problems in computer graphics and design situations
follows the design process using appropriate resources in an effective manner to produce resolved solutions	follows the design process using appropriate resources in an effective manner	follows a design process using a limited range of available resources
selects appropriate methods and initiates actions to effectively and efficiently solve problems	selects appropriate methods and uses them to effectively solve problems	identifies and selects methods to solve problems
sequences and presents graphics and annotations to clearly show problem solving processes and pivotal points in design decisions.	sequences and clearly presents graphics and annotations to clearly show problem solving processes and pivotal points in design decisions.	sequences and presents graphics and annotations to clearly show problem solving processes.

Explanation of Criterion 2

This criterion is used to assess the performance a learner displays in problem solving using a design process through computer graphics and associated digital technologies. Problems may be directly related to the development of the design solution or may arise as a consequence of working through the design solution.

For example, problems can be in relation to understanding hardware/software routines, difficult phases within the designing process or in the interpretation of limitations imposed by a design brief.

A learner can provide evidence via teacher-observation, personal reflection documents and folios which include personal and teacher evaluations.

Criterion 3: implement self-management strategies to complete individual and team activities

The learner:

Rating A	Rating B	Rating C
efficiently and effectively communicates within teams, collaboratively formulates team goals and clearly articulates own role in achieving these goals	effectively communicates within teams, contributes to the formulation of team goals and clearly articulates own role in achieving these goals	communicates within teams, identifies team goals and articulates own role in achieving these goals
evaluates progress towards team goals, identifying a range of individual and team actions that may be applied to meet goals, and implements an appropriate strategy derived from these actions	monitors and reviews progress towards team goals, identifying individual and team actions that may be applied to meet goals	monitors and reviews progress towards team goals
uses a range of planning and self-management strategies that enables the effective completion of tasks within agreed time frames	uses a wide range of planning and self-management strategies that consistently enables the effective completion of tasks within agreed time frames	uses planning and self-management strategies to facilitate successful completion of key elements of tasks within agreed time frames
reflects, orally and in writing, upon planning timelines and makes effective and efficient modifications	reflects, orally and in writing, upon planning timelines and makes appropriate modifications	reflects, orally and in writing, upon planning timelines and makes modifications
utilises appropriate resources and effectively addresses barriers to achieve individual and team goals	utilises appropriate resources to address barriers to achieve individual and team goals	utilises appropriate resources to address key barriers to achieve individual and team goals
identifies and addresses issues that affect achievement of team goals, and in leadership roles provides direction and support of others.	identifies and addresses issues that affect achievement of team goals, and provides direction in leadership roles.	identifies and addresses issues that affect achievement of team goals.

Explanation of Criterion 3

This criterion is used to assess the degree to which a learner can plan, manage and meet realistic project time frames. Emphasis is placed on meeting deadlines as an outcome of strategic task planning. There are a number of key planning targets that need to be met to ensure that a project is complete by the deadline. Project targets are designed by the learner, in consultation with the teacher. This criterion must be assessed using both individual design projects and collaborative design projects.

For example, the project planning for the extended project must include completion and performance targets for the stages design brief, concept development, production and evaluation to provide evidence that each stage of the design project has been appropriately project managed.

Criterion 4: generate and communicate ideas using a range of graphic techniques

The learner:

Rating A	Rating B	Rating C
analyses roles of audience in relation to graphic communications	identifies and explains roles of audience in relation to graphic communications	describes roles of audience in relation to graphic communications
selects and effectively uses a range of appropriate techniques and styles to communicate ideas visually	selects and uses appropriate techniques and styles to communicate ideas visually	selects and uses appropriate techniques to communicate ideas visually
generates, effectively communicates and evaluates design concepts, using justification to clearly show problem solving process and all pivotal points in design decisions	generates and appropriately communicates design concepts, justifying key design decisions	generates and communicates design concepts identifying key design decisions
evaluates and provides feedback, orally and in writing, when reflecting on own and others' designs	analyses and provides feedback, orally and in writing, when reflecting on own and others' designs	provides limited feedback, orally and in writing, when reflecting on own and others' designs

provides clear evidence within the design process that the design has been consistently and effectively refined to address issues identified via feedback from others and own ongoing reflective thinking.	provides clear evidence within the design process that the design has been refined to address issues identified via feedback from others and own ongoing reflective thinking.	provides evidence within the design process that the design has included refinements based on feedback from others and own reflective thinking.
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Explanation of Criterion 4

This criterion is used to assess the degree to which a learner can communicate design based ideas using a range of methods and technologies. Significant emphasis must be placed on a range of drawing techniques including orthographic, isometric and perspective drawing. The ability to evolve a design concept on paper prior to using a range of computer based technologies is an important skill set. Communication of design concepts using a range of 2D and 3D drawing, modelling, animating and rapid prototyping software and hardware options must be used where appropriate as specified in the course content.

Criterion 5: analyse and apply elements and principles of design

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
identifies and evaluates a broad range of design principles and elements	identifies and analyses a range of design principles and elements	identifies, describes and discusses a range of design principles and elements
evaluates the use of elements and principles of design in computer graphics, including the interrelationships between elements and principles of design	analyses the use of elements and principles of design in computer graphics	describes key elements and principles of design used in computer graphics
selectively uses an appropriate range of design principles and elements to create a specified visual impact when using computer graphics	uses a range of design principles and elements to create specific visual impacts when using computer graphics	uses limited design principles and elements to create computer graphics
clearly differentiates the information, images, ideas and words of others from the learner's own	clearly differentiates the information, images, ideas and words of others from the learner's own	differentiates the information, images, ideas and words of others from the learner's own
referencing conventions and methodologies are followed with a high degree of accuracy	referencing conventions and methodologies are followed correctly	referencing conventions and methodologies are generally followed correctly
creates appropriate, well structured reference lists/bibliographies.	creates appropriate, structured reference lists/bibliographies.	creates appropriate reference lists/bibliographies.

Explanation of Criterion 5

This criterion is used to assess the degree to which a learner can employ the elements and principles of design when solving design problems in a range of contexts. The knowledge of elements and principles appropriate to the design context are an important consideration. For example, a scenario may be to design a consumer product. The solution to such a problem may be found by applying the appropriate rules of form, function and aesthetics.

A learner's understanding may be demonstrated by various means, including: the manipulation of design principles and elements in the production of design solution; and verbal or written discussions. Standard elements relating to academic integrity are included here to ensure that there is an internal and externally assessed focus on academic integrity.

Criterion 6: analyse the impact of design in society

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
evaluates environmental and sustainability	analyses environmental and sustainability	identifies and describes key

factors that impact on design	factors that impact on design	environmental and sustainability factors that impact on design
evaluates a range of factors related to the social and historical evolution of design	analyses a range of factors related to the social and historical evolution of design	identifies and describes key factors related to the social and historical evolution of design
evaluates competing sustainability, environmental and social factors, and addresses these in own design	analyses competing sustainability, environmental and social factors, and addresses these in own design	identifies competing sustainability, environmental and social factors relative to the learner's own design
evaluates inter-relationships between a broad range of factors influencing design	analyses inter-relationships between a range of factors influencing design	identifies key inter-relationships between factors influencing design
evaluates how factors influencing design impact on own design, and discusses a range of effective ways of resolving competing factors.	analyses how factors influencing design impact on own design, and discusses a limited range of ways of resolving competing factors.	describes and discusses how factors influencing design impact on own design, and identifies competing factors.

Explanation of Criterion 6:

This criterion focuses on the assessment of learners' development of the understanding of the historical context of design and how this has impacted on the social, economic and environmental fabric of design within contemporary society. A learner's understanding may be demonstrated by various means including: addressing the factors during the production of design solutions; and verbal or written discussions.

Criterion 7: describe and apply key features, applications and influences on contemporary computer graphics systems

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
recognises and accurately describes a wide range of features of a computer graphic system, and applies and adapts this knowledge to a range of design problems	identifies and describes a wide range of features of a computer graphic system, and applies this knowledge to design problems	identifies a range of features of a computer graphic system, and applies this knowledge to design problems
analyses a diverse range of historical developments in computer graphic technologies, and makes logical predictions about possible future developments	explains relative significance of a diverse range of historical developments in computer graphic technologies and makes logical predictions about possible future developments	identifies and describes a range of key historical developments in computer graphic technologies
identifies and describes, orally and in writing, components of a graphic workstation and how these may be customised and optimised to improve productivity in creation of complex design solutions	identifies and describes, orally and in writing, components of a graphic workstation and how these may be customised to improve productivity in creation of design solutions	identifies and describes, orally and in writing, core components of a graphic workstation used to create design solutions
evaluates the specific function and customisation of tools and routines. Selects and uses tools and routines effectively when working with graphics applications to produce complex design solutions	compares specific functions of tools and routines. Selects and uses tools and routines appropriately when working with graphics applications to produce design solutions	applies the functions of basic tools and routines when working with graphics applications to produce design solutions
analyses and identifies the correct function of a range of files types and data management systems to effectively produce design outcomes.	identifies and describes the function of a range of files types and data management systems to produce design outcomes.	identifies and describes a limited range of files types and data management systems in the production of design outcomes.

Explanation of Criterion 7

This criterion is used to assess the degree to which a learner can apply knowledge and understanding of contemporary computer graphics systems across a range of design contexts in order to produce effective design solutions. It also provides scope for learners to develop understanding of the historical context of computer graphics systems and how systems may develop into the future to assist in the development of design based solutions.

Criterion 8: apply digital technologies to create designed solutions.

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
identifies a wide range of technologies and techniques and selects appropriately to express and develop own design ideas	identifies a range of technologies and techniques, and selects appropriately to express and develop own design ideas	identifies and selects appropriately from a range of technologies to express and develop own ideas
competently achieves subtle and complex intentions – with refinement of technique, materials and technologies – in the application of computing technology in specific design tasks	competently uses a variety of techniques in the application of computing technology in specific design tasks	uses a variety of techniques in the application of computer graphics technology to design tasks
effectively applies specific and appropriate standards and conventions in the completion of design tasks	applies appropriate standards and conventions in the completion of design tasks	applies basic standards and conventions in the completion of design tasks
uses and maintains technologies in accordance with established safety procedures.	uses and maintains technologies in accordance with established safety procedures.	uses and maintains technologies in accordance with established safety procedures.

Explanation of Criterion 8:

This criterion is used to assess the degree to which a learner can express their design ideas using a range of techniques and software applications. It enables the learner to comply with standards and conventions across a range of design contexts that are teacher directed or within their chosen area of specialisation. This could be as simple as knowing and applying appropriate screen resolution and frame rate settings to an animation.

A learner's understanding may be demonstrated by the completion of teacher-directed design tasks and through the completion of the externally assessed folio.

Qualifications Available

Computer Graphics and Design Level 3 (with the award of):

EXCEPTIONAL ACHIEVEMENT
HIGH ACHIEVEMENT
COMMENDABLE ACHIEVEMENT
SATISFACTORY ACHIEVEMENT
PRELIMINARY ACHIEVEMENT

Award Requirements

The final award will be determined by the Office of Tasmanian Assessment, Standards and Certification from 13 ratings (8 from the internal assessment, 5 from external assessment).

The minimum requirements for an award in Computer Graphics and Design Level 3, are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)

10 'A', 3 'B' ratings (4 'A', 1 'B' from external assessment).

HIGH ACHIEVEMENT (HA)

5 'A', 5 'B', 3 'C' ratings (2 'A', 2 'B', 1 'C' from external assessment).

COMMENDABLE ACHIEVEMENT (CA)

7 'B', 5 'C' ratings (2 'B', 2 'C' from external assessment).

SATISFACTORY ACHIEVEMENT (SA)

11 'C' ratings (3 'C' from external assessment).

PRELIMINARY ACHIEVEMENT (PA)

6 'C' ratings.

A learner who otherwise achieves the ratings for a CA (Commendable Achievement) or SA (Satisfactory Achievement) award but who fails to show any evidence of achievement in one or more criteria ('z' notation) will be issued with a PA (Preliminary Achievement) award.

Course Evaluation

The Department of Education's Curriculum Services will develop and regularly revise the curriculum. This evaluation will be informed by the experience of the course's implementation, delivery and assessment. In addition, stakeholders may request Curriculum Services to review a particular aspect of an accredited course.

Requests for amendments to an accredited course will be forward by Curriculum Services to the Office of TASC for formal consideration.

Such requests for amendment will be considered in terms of the likely improvements to the outcomes for learners, possible consequences for delivery and assessment of the course, and alignment with Australian Curriculum materials.

A course is formally analysed prior to the expiry of its accreditation as part of the process to develop specifications to guide the development of any replacement course.

Course Developer

The Department of Education acknowledges the significant leadership of Michael Dowling, Philip Goss and Melinda Williams in the development of this course.

Expectations Defined By National Standards

There are no statements of national standards relevant to this course.

Accreditation

The accreditation period for this course is from 1 January 2018 with a decision regarding renewal of accreditation to be made within twelve (12) months and contingent on the outcomes of the Years 9-12 Review Process.

Version History

Version 1 – Accredited on 19 May 2017 for use from 1 January 2018. This course replaces Computer Graphics and Design (CGD315113) that expired on 31 December 2017.

Appendix 1

APPLYING A DESIGN PROCESS WITHIN COMPUTER GRAPHICS AND DESIGN

Learners will respond to design scenarios by applying a design process. This process is an iterative process which uses a design brief, is informed by research and impacting factors and documents the development and presentation of a computer graphics solution.

The application of the design process within a Computer Graphics and Design project is expressed below. Depending on the particular project, the design process often requires further refinement and circulating between the ideations, investigations and challenges. Evaluation occurs along the way, especially during refinement and final evaluation of the project.

Diagram derived from Design Thinking: a non-linear process, Teo Yu Siang and Interaction Design Foundation used under CC BY NC SA 3.0

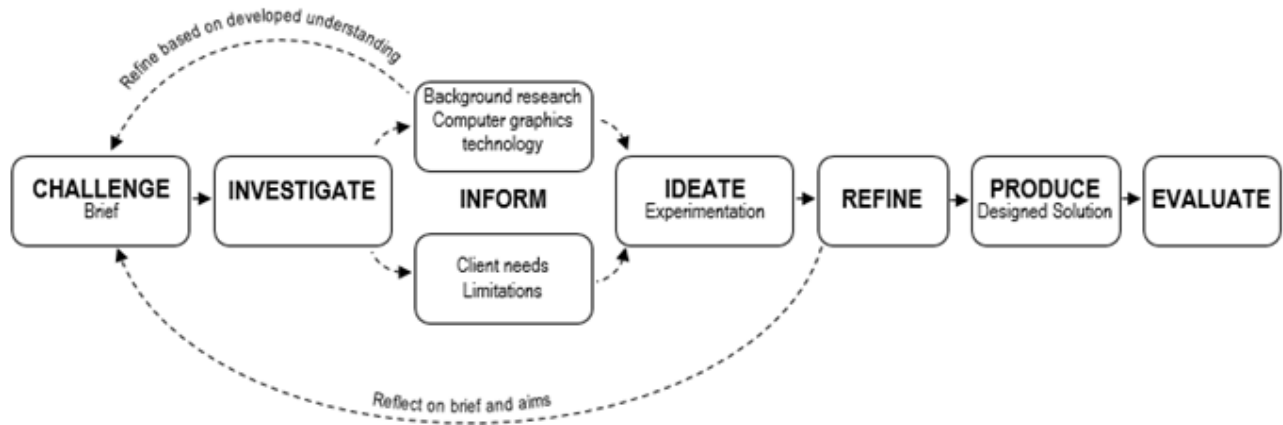


Diagram derived from Design Thinking: a non-linear process, Teo Yu Siang and Interaction Design Foundation used under CC BY NC SA 3.0

A DESIGN PROJECT RESPONSE IN COMPUTER GRAPHICS AND DESIGN

Students coming in to Computer Graphics and Design Level 3 are required to have an understanding of a design process and the application of this process, including the elements and principles of design and the iterative process of design development. It is common for design brief responses to follow the following structure. The structure below reflects the structure learners will be required to follow for their externally assessed major design project. Learners further develop their skills in responding to a design brief throughout this course, alongside project management and collaborative design skills.

DESIGN BRIEF

The brief is usually the starting point of a design, and is a statement of the project's purpose. This details the requirements of the project or can be an explanation of a design problem to generate a brief from. This will include any information about a client or audience the design is intended for. It is also the place to include any limitations or constraints such as the size or technology to be used to fulfil the brief. The context of the brief needs to be identified and considered in the design response. The brief forms part of the criteria by which the final design solution is evaluated. Learners may begin by having a design brief given to them to work from, but should be developing the skills to construct their own design brief early on in this course.

RESEARCH

Research involves the collection of information, including data and background information to assist in the understanding of the brief and development of the design solution. This research need to be collected, organized and analysed effectively to inform the design response. This can include research to:

- * further understand the intended design scenario or target audience
- * consider existing similar products, problems or solutions
- * identify current trends, including data to support these trends
- * understand historical factors which may influence design
- * identify and understand social and environmental factors which may impact, or be impacted upon by the solution
- * identify appropriate computer graphics systems, processes & technology for the design development

GENERATION, DEVELOPMENT AND REFINEMENT OF IDEAS

This includes preliminary sketch designs and concept designs drawn as sketches with annotations which relate back to the brief and aims. Following on from sketches this can also include screen shots of exploratory computer graphic work. This documents the learner's design progression, reflection and refinement of ideas. This is part of the iterative approach which can cycle back through further research to inform concept development, and testing of product development which may then go back to the development stage to further refine concepts. The preliminary design work for all projects must illustrate contemporary trends and conventions used in the related industry. For example, an animation-based project would be the result of a written script and comprehensive storyboard.

PRODUCTION

This shows the development of the designed solution. There needs to be evidence of critical and analytical decision making which justify final design decisions. This section should be thorough and include well annotated screenshots of the development of the final solution.

EVALUATION

An evaluation reflecting on how well the brief and aims have been met by the final design, discussing and justifying any aims which have not been fully resolved.

REFERENCES

Learners must reference all images information, ideas and words which they use that are not their own creation. Images include, but are not limited to, pictures, tables, graphs, charts and graphics. When using computer graphic programs to present work, reference should be made to the program used and, if assets have been used which are not part of the program but have been created by others, these need to be referenced individually e.g. furniture. Particular care needs to be taken to ensure in-text and reference lists are completed accurately. Learners must follow the TASC Authenticity and Academic Integrity Guide : http://www.tqa.tas.gov.au/4DCGI/_WWW_doc/047444/RND01/Academic_Integrity_Guide.pdf

REFERENCE

Teo Yu Siang, R D, 2016, What is Design Thinking and Why is it so Popular, Interaction Design Foundation, accessed 25 October 2016 < <https://www.interaction-design.org/literature/article/what-is-design-thinking-and-why-is-it-so-popular?>>

Appendix 2

GLOSSARY

Term	Explanation
2D	two dimensional
2D modelling	a geometric model of an object as a two-dimensional figure
3D	three dimensional
3D modelling	is the process of developing a mathematical representation of any three-dimensional surface of an object
aesthetic	refers to those principles governing the nature and appreciation of beauty in design
aims	the objectives or goals
analyse	identify components and the relationship between them; draw out and relate implications
animation	moving images created from drawings or models that are photographed or created by computer
annotate	to add brief notes to sketch or design giving explanation or comment
anthropometry	the measurement of the human individual, these measurements are used to inform standard measurements in design
applications (apps)	An application program is a computer program designed to perform a group of coordinated functions, tasks
appraise	assess the value or quality of
appreciate	make a judgement about the value of
apply	use or employ knowledge and skills in a particular situation
architecture	the art or practice of designing buildings
assess	make a judgement about, to rate, weigh up, to form an opinion
asymmetry	a way of organizing the parts of a design so that one side differs from the other without destroying the overall balance and harmony; also called informal balance
augmented reality (AR)	a technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view
balance	an even distribution of visual weight
basic	essential or elementary
binary format	a binary format is a format in which file information is stored in the form of ones and zeros
bones	elements within a skeleton or rig used to add animation to a character
cel shading	a type of non-photorealistic rendering designed to make 3-D computer graphics appear to be flat
clear	easy to understand, fully intelligible, without ambiguity; explicit
client	a person, or group of people, for whom a design is being developed
coherent	orderly, logical and internally consistent relation of parts
collaborative	to work with another person or group in order to achieve or do something
communicate	convey information about, clearly reveal or make known
compare	estimate, measure or note how things are similar or dissimilar

Computer Aided Design (CAD)	the use of computer systems to aid in the creation, modification, analysis, or optimisation of a design
Computer Aided Manufacturing(CAM)	an application technology that uses computer software and machinery to facilitate and automate manufacturing processes
concept	an abstract idea, the start of a design
concept sketch	freehand drawings that are used by designers as a quick and simple way of exploring initial ideas for designs
conflict resolution	a way for two or more people to find a constructive solution to a difference of opinion
consider	formed after careful thought
contrast	the arrangement of opposite elements (e.g. light vs. dark colours, rough vs. smooth textures, large vs. small shapes) in a design so as to create visual interest
critically	add a degree or level of accuracy, depth, knowledge and understanding, logic, questioning, reflection and quality to analysis/evaluation
describe	recount, comment on, and provide an account of characteristics or features
design	a solution, the process of creating a solution
design brief	a written document for a design project specifying parameters
design thinking	a process-based approach which uses an iterative approach to solve problems
detailed	meticulous, specific, precise
develop	construct, elaborate or expand on an opinion or idea
digital asset	a digital asset is any text or media that is formatted into a binary source and includes the right to use it
digital imaging	digital imaging is a broad term applied to the recording of images electronically, conversion of those images into a set of numbers, storage of those numbers in a computer, and manipulation with computer programs
digital fabrication	a type of manufacturing process where the machine used is controlled by a computer. The most common forms of digital fabrication are 3D printing, laser cutting and CNC machining
direction	an element of design, all lines have direction - Horizontal, Vertical or Oblique
discuss	talk or write about a topic, taking into account different issues and ideas
document	to create a record of (something) through writing or record keeping
elements and principles of design	components that comprise a design, such as line, colour, shape, texture, form and space
emphasis	a principle of design that refers to a way of combining elements to stress the differences between those elements
enterprise	a project or undertaking
evaluate	appraise, measure, examine and judge the merit, significance or value of something
exemplary	an outstanding example of practice
explain	provide additional information that demonstrates understanding and reasoning; present a meaning with clarity, precision, completeness, and with due regard to the order of statements in the explanation
form	the visible shape or configuration of something
function	the purpose for which something is designed or exists
graphic	a drawing or picture used to illustrate

graphic organisers	tools to help to help people to organize ideas and communicate more effectively
hardware	computer hardware is the physical parts or components of a computer, such as monitor, keyboard, computer data storage
harmony	harmony is the combination or adaptation of parts, elements or related things, so as to form a consistent and orderly whole
hierarchy	a principle of design which refers to the order in which the elements within a composition are viewed by the eye
identify	name, list and establish or indicate who or what something is
integrate	combine one thing with another to form a whole
interpret	explain the meaning of information or actions
innovative	introducing new ideas or being original and creative in thinking
investigate	carry out an inquiry to discover and examine facts
isometric	isometric projection is a method for visually representing three-dimensional objects in two dimensions
iteration	the process of repeating a design to improve it
justify	support a conclusion or design decision
keyframing	this is the simplest method of animation. It works by showing the "key" frames that describe the transformation of an object
kinematics	describes the motion of points, bodies, and systems
line	an element of design referring to linear marks which draw they eye along
mass	the visual weight or actual weight of an object
mind map	a diagram used to visually organise information
morphing	change smoothly from one image to another by small gradual steps using computer animation techniques
motion capture	it refers to recording actions of human actors or figures, and using that information to animate digital character models in 2D or 3D computer animation
motion graphics	pieces of digital footage or animation which create the illusion of motion or rotation
negotiation	communication between two or more people which is intended to reach a beneficial outcome
organise	systematically order and arrange
orthographic	an orthographic drawing is a method that allows someone to represent a three-dimensional object on a two-dimensional piece of paper. By drawing the object for a various angles, the artist is able to show how the object looks in the real world
outline	give the main features or aspects of
pattern	a repeated decorative design
perspective	perspective drawing is a drawing technique used to illustrate dimension through a flat surface. There are many forms including one perspective, two-point perspective, three-point perspective
pixel	is the basic unit of programmable colour on a computer display or in a computer image
polygon	is a plane shape with straight sides, the basis for many computer graphics images
problem	a question proposed for solution
proportion	the relationship between a part in comparative relation to a whole

prototyping	an early model of a design or product built to test a concept
range	a number of different things of the same general type; breadth
rapid prototyping	rapid prototyping is a group of techniques used to quickly fabricate a scale model of a physical part using three-dimensional computer aided design (CAD) data
raster	an image made of pixels
rationale	a set of reasons or a logical basis for an action
relevant	applicable and pertinent
repetition	repeating something e.g. part of a design in a pattern
research	investigation into and study of materials and sources
resolved	completed with a level of refinement and clarity of purpose/vision
rhythm	rhythm in design is created by the repetition of a design element
rigging	the process of creating bones and joints for the 3D models which allows the animators to manipulate and pose them
rotoscoping	the rotated projection of a sequence of usually photographed action image frames so that the artist can trace from the frame or create an image to superimpose on it
scale	reducing or enlarging an object whilst maintain proportion and relationship of objects
scale sketch	sketching whilst maintaining a representative scale. Scale sketches are often used in situations where relative size important but a full blown technical drawing is not required
select	choose in preference to another or others
software	software is a collection of instructions that enable the user to interact with a computer, its hardware, or perform tasks
solid modelling	solid modelling is a consistent set of principles for mathematical and computer modelling of three-dimensional solids
solution	the means of solving a problem, a design solution is a proposed solution to a design brief
space	the extent of area in two or three dimensions
special effects (SFX)	illusions or visual tricks used in the film, television, theatre, video game, and simulator industries to simulate the imagined events in a story or virtual world
spline	a spline is a curve that connects two or more specific points, or that is defined by two or more points
stop motion	an animation technique that physically manipulates an object so that it appears to move on its own
summarise	express, concisely, the relevant details
sustainable design	the philosophy of designing to comply with the principles of social, economic, and ecological sustainability
symmetry	the quality of being made up of exactly similar parts facing each other or around an axis
synthesise	to combine so as to form a new, complex product
technological	relating to or using technology
texture	element of design that refers to the perceived surface quality or “feel” of an object—its roughness, smoothness, softness, etc. this can refer to the actual physical texture of a surface or the illusion of texture



time management	management and organisation of available time and tasks to be completed
tone	the lightness or darkness of a colour (value)
tweening	the process of generating intermediate frames between two images to give the appearance that the first image evolves smoothly into the second image
vector	a type of graphical representation which uses math to draw shapes using points, lines and curves
virtual reality (VR)	the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment
visual communication	the communication of ideas and information in forms that can be read or looked upon
visual effects (VFX)	the processes by which imagery is created and/or manipulated outside the context of a live action shot

Appendix 3

LINE OF SIGHT - Computer Graphics and Design Level 3

Learning Outcomes	Criteria and Elements	Content	Work Requirements
<ul style="list-style-type: none"> apply research, analysis and evaluation skills through implementing the design process to undertake a range of design projects 	C1, E1 2 3, C2 E1 2 3 4 5, C5 E4 5 6,	Unit 1	U1 WR 1, U2 WR 1 2 3, U3 WR 1
<ul style="list-style-type: none"> generate and communicate information, ideas, concepts and design solutions using a range of visual communication strategies and conventions 	C1 E1 2 3, C2 E1 2 3 4 5, C4 E1 2 3 4 5, C5 E1 2 3	Unit 1, Unit 2	U1 WR 1, U2 WR 1 2 3, U3 WR 1
<ul style="list-style-type: none"> provide active and constructive contributions during collaborative design challenges to creatively and innovatively solve problems 	C3 E1 2 3 4 5	Unit 1	U1 WR1
<ul style="list-style-type: none"> apply design standards and conventions when using digital technologies 	C8 E1 2 3 4 5	Unit 2	U2 WR 1 2 3, U3 WR 1
<ul style="list-style-type: none"> analyse, select and apply appropriate appropriate contemporary digital technologies 	C2 E4, C7 E1 2 3 4 5, C8 E1 2 3 4	Unit 2	U2 WR 1 2 3, U3 WR1
<ul style="list-style-type: none"> conduct formal formal and informal critique of others design work, with a view to improvement 	C4, E4 5	Unit 1	U1 WR 1
<ul style="list-style-type: none"> manage design projects, both individually and collaboratively, by applying appropriate planning, time management and reflective thinking strategies 	C3, E1 2 3 4 5	Unit 1 Unit 2 Unit 3	U1 WR 1, U2 WR 1 2 3, U3 WR 1

Supporting documents including external assessment material

-  [CGD315113 Exam Paper 2013.pdf](#) (2018-02-06 02:59pm AEDT)
-  [CGD315113 Exam Paper 2015.pdf](#) (2018-02-06 03:00pm AEDT)
-  [CGD315113 Exam Paper 2016.pdf](#) (2018-02-06 03:01pm AEDT)
-  [CGD315113 Exam Paper 2016.pdf](#) (2018-02-06 03:01pm AEDT)
-  [CGD315113 Exam Paper 2017.pdf](#) (2018-02-06 03:01pm AEDT)
-  [CGD315113 Exam Paper 2014.pdf](#) (2018-02-06 03:03pm AEDT)
-  [CGD315113 Assessment Report 2015.pdf](#) (2018-02-06 03:03pm AEDT)
-  [CGD315113 Assessment Report 2016.pdf](#) (2018-02-06 03:04pm AEDT)
-  [CGD315118 External Assessment Specifications.pdf](#) (2018-02-27 08:48am AEDT)
-  [CGD315113 Assessment Report 2017.pdf](#) (2018-02-28 03:42pm AEDT)