Bournemouth University

Taught Unit Guide
Computer Animation Pathways

Engineering and Professional Doctorate in Digital Media

2010/2011

Introduction – IMPORTANT

As part of your Doctorate programme you have access to taught units from The University of Bath and Bournemouth University's Masters programmes.

This document contains the *Unit Descriptors* for taught units from Bournemouth's *Postgraduate Computer Animation Framework*.
This framework is comprised of 3 pathways
MA 3D Computer Animation
MA Digital Effects
MSc Computer Animation and Visual Effects.

These pathways share core units over the first terms and then specialise later on.

For ease of reference this document contains the unit descriptors only. If you do take one of these units you will be given the handbook for that pathway which contains additional information on structure, assessment criteria etc

Information on the courses is also available online at
http://onlineservices.bournemouth.ac.uk/Courses/Postgraduate.aspx?colID=161&colname=Animation&collection=pg

Online and Distance Learning Units

You also have access to units run by BU's Centre for Excellence in Media Practice (**CEMP**). These units are designed for media professionals to run alongside their day job and typically comprise a 2 day residential followed by 8 weeks of online support.

Overview is here
http://mixtape.bournemouth.ac.uk/index.html

Descriptors of available units are available by clicking on the short course name

Timetable is here
http://mixtape.bournemouth.ac.uk/Downloads/CSC-Delivery_May_2010_-_May_2011.pdf

Units available at the University of Bath

You have access to PG units in the *MSc Advanced Computer Systems* including from;
Software Systems, Internet Systems, Human Computer Interaction, Mobile and Pervasive Computing, Creativity and Collaborative Systems, Security, Agent Technology and Global Computing and Media Technology.

A full list of units is available from
http://www.bath.ac.uk/catalogues/2010-2011/cm/RSCM-AFD02.htm

And you can access unit descriptors and timetables from
http://www.bath.ac.uk/comp-sci/pgt/msc/msc-software-sys.html

Advice

Your academic and industrial supervisors will be able to help you decide which units will be appropriate to take. Your CDE Project Managers can also help with practical information and put you in touch with unit leaders if you need to ask further questions about content.

Contents

Note: This document is a compilation of other handbooks. The page numbers here refer to this PDF page number.

Independent Study 1

Level M:

Credit value: 20 credits (ECTS equivalent credit value 10)

PRE-REQUISITES AND CO-REQUISITES: None

AIMS

This unit aims to enable PGRs to investigate an issue or topic that supports their personal research interests and communicate their findings to students and staff.

Through pursuing independent study they will develop their ability to synthesise disparate elements of the technical and creative skills needed related to their chosen topic.

By undertaking this unit they will refine the research skills needed to be successful during the company based research phase of the programme.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. demonstrate mastery of independent learning and personal research enquiry and problem solving ability required for continuing professional development.
2. demonstrate a sound understanding of the background to their chosen research area and the ability to communicate this understanding.
3. demonstrate the ability to practically implement this knowledge in a subject appropriate production.
4. demonstrate planning and organisation to produce a programme of inquiry within a given timescale.

LEARNING AND TEACHING METHODS

This unit will employ a mixture of seminars, lectures and personal study negotiated with and supported by their research supervisor. To demonstrate the level of their knowledge and ability to communicate their findings the PGR will produce an appropriate piece or pieces of written and/or practical material.

ASSESMENT

This unit will be assessed by the production of material appropriate to the subject area negotiated with and approved by their supervisors. This will be equivalent to 5,000 words assessing all ILOs.

INDICATIVE CONTENT

PGRS will negotiate a programme of study including attendance at lectures, seminars and self-directed study with their supervisors and a method of assessment appropriate to their subject area. It is likely this will include a practical demonstration of technical and/or creative skills and contextualising written element.

The independent study will take place over a set number of weeks culminating in the production of the work to be assessed.

The study may be technically, theoretically, culturally or otherwise biased, depending on the PGRs chosen research area.

Lectures/ Workshops/Seminars

There are no set lectures or workshops but PGRs will have access to the Graduate School Research Skills and Methodology program to underpin their study.

Supervision

As part of their supervisory meetings PGRs will
-discuss initial proposal with reference to the Personal Development Plan.
-confirm proposed topic, methodology and programme of study
-confirm method of assessment

Further Reading

Phillips, E. and Pugh, G. (2005) *How to Get a PhD,* 4th ed, Oxford University Press

Independent Study 2

Level M:

Credit value: 40 credits (ECTS equivalent credit value 20)

PRE-REQUISITES AND CO-REQUISITES: None

AIMS

This unit aims to enable PGRs to investigate an issue or topic that supports their personal research interests and communicate their findings to students and staff.

Through pursuing independent study they will develop their ability to synthesise disparate elements of the technical and creative skills needed related to their chosen topic.

By undertaking this unit they will refine the research skills needed to be successful during the company based research phase of the programme.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

4. demonstrate mastery of independent learning and personal research enquiry and problem solving ability required for continuing professional development.
5. demonstrate a sound understanding of the background to their chosen research area and the ability to communicate this understanding.
6. demonstrate the ability to practically implement this knowledge in a subject appropriate production.
5. demonstrate planning and organisation to produce a programme of inquiry within a given timescale.

LEARNING AND TEACHING METHODS

This unit will employ a mixture of seminars, lectures and personal study negotiated with and supported by their research supervisor. To demonstrate the level of their knowledge and ability to communicate their findings the PGR will produce an appropriate piece or pieces of written and/or practical material.

ASSESMENT

This unit will be assessed by the production of material appropriate to the subject area negotiated with and approved by their supervisors. This will be equivalent to 10,000 words assessing all ILOs.

INDICATIVE CONTENT

PGRS will negotiate a programme of study including attendance at lectures, seminars and self-directed study with their supervisors and a method of assessment appropriate to their subject area. It is likely this will include a practical demonstration of technical and/or creative skills and contextualising written element.

The independent study will take place over a set number of weeks culminating in the production of the work to be assessed.

The study may be technically, theoretically, culturally or otherwise biased, depending on the PGRs chosen research area.

Lectures/ Workshops/Seminars

There are no set lectures or workshops but PGRs will have access to the Graduate School Research Skills and Methodology program to underpin their study.

Supervision

As part of their supervisory meetings PGRs will
-discuss initial proposal with reference to the Personal Development Plan.
-confirm proposed topic, methodology and programme of study
-confirm method of assessment

Further Reading

Phillips, E. and Pugh, G. (2005) *How to Get a PhD,* 4th ed, Oxford University Press

MOVING IMAGE THEORY

Level: M

Credit value: 20 (ECTS 10)

PRE-REQUISITES AND CO-REQUISITES: None

AIMS

This unit aims to enable students to understand and critically analyse forms of the moving image in order to develop a critical understanding of their position and involvement in current practice. In addition the unit aims to enable them to develop a critical awareness of the current issues in the specialist area addressed by their course and digital technology in general.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. display a comprehensive understanding of the languages used to discuss the moving image, art, science and technology.
2. demonstrate the ability to critically analyse work in the field of moving image.
3. substantiate skills in contextualization of personal practice critically, technically and historically
4. develop skills in the planning and production of critical written reports
5. display the ability to effectively communicate highly technical areas of the moving image with peers, supervisors and others.

LEARNING AND TEACHING METHODS

This unit will employ lectures, screenings and discussions. It is hoped that, resources permitting, intranet-based discussion will contribute to this unit.

A series of screenings of video, DVD and computer-based works will ensure that students are exposed to material covering a broad range of applications of the moving image. Sometimes the examples will relate to projects being undertaken by students, sometimes they will complement the student work.

By comparing and contrasting the sometimes contradictory messages of the visiting lecturers, students will be encouraged to develop their own critical positions relating to contemporary practice.

ASSESSMENT

Summative Assessment

The unit is assessed by 100% course work equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

Typically the students will be assessed in this unit by a number of assignments depending upon the pathway chosen. For all pathways there is one written 2500 word assignment worth 50% of the unit mark which assesses ILO's 1,3,5.

Essay

Students will negotiate the subjects and nature of presentation of their assignments based on a selection of suggested topics provided by the unit lecturers.
Students may choose to address any or all of the areas covered by the unit, reflecting their own practice and career aspirations.
Assessment of the unit will be based on students' ability to engage in critical discussion with an appropriate level of knowledge of the issues within their chosen area of practice. They will be assessed on their ability to demonstrate understanding of their chosen topic and their application of analytical, deductive and inductive skills to deal with contradictions and complexities in debates about issues in a dynamic and continually evolving area of theory and practice.

MA3D Pathway

Typically the MA3D pathway assess ILO's 2, 3 & 5 by the production of a storyboard, animatic or small animated sequence. This represents the other 50 % of the assessment equivalent to 2,500 words.

INDICATIVE CONTENT

Digital Cinematography/ Virtual Worlds

The language of the moving image will be investigated, focusing on the analysis of specific works and the methods of composition applied in moving image productions and interactive virtual environments, placed in a historical and contemporary context. Practical experience of critical analysis of works will assist the development of analytical and self-critical abilities. Digital Cinematography will concentrate on cinematographic aspects of the moving image, Virtual Worlds will address the characteristics of interactive works that may be composed in the realisation of interactive virtual environments including games.

- fundamental film structure - language, grammar and dialect
- evolution of the cut - influences and application
- shot length - basic composition and psychological underpinnings
- mobile framing
- transition devices
- editing - continuity and complexity
- camera positioning for subject interaction
- lighting
- student project centred case studies
- sound and music for the Moving Image
- the role of animation and effects in games
- characteristics of interaction
- non-linear narrative
- game design methods
- artificial intelligence in games
- case studies

Art, Science and Technology

Students will be introduced to the history and development of computer technology and its application in the arts, including an explanation of the basic workings of the computer and related technologies. The continuing debate about the relationship between art, science and technology will be addressed. The unit will encourage students to confront the intellectual inertia imposed by established norms in educational and wider social culture, enabling students from different backgrounds and with different career aspirations to orient themselves in this problematic area of cultural discussion.

- history of technology in the arts
- history of computer technology
- bitmaps, data and binary code
- computer hardware (the CPU)
- algorithms and programs
- the relationship between high-level languages and binary code
- types of high-level language
- the engineer in the development of computer arts
- methodologies of art and science
- the 'Renaissance team'
- scientific visualisation
- contemporary issues in technology and the arts

Screenings

By presenting a series of selected screenings and presentations it is intended to foster students' critical awareness of work of historical and contemporary significance. Sometimes the screenings will reflect the current projects being undertaken by the students, sometimes the screenings will compliment the work they are doing, addressing alternative areas of practice.

- technology represented in moving image productions
- historical examples of animation
- the title sequence;
- abstract cinema
- Japanese Animation and Anime culture
- the alternatives to Disney
- selected examples of Computer Animation, Effects and Games

Visiting Practitioners

This is series shared with the BA Computer Visualisation and Animation course. It will focus students' attention on contemporary issues in digital media, including computer animation, Games and effects. This will be achieved by a series of presentations by visiting practitioners from the digital media industry and arts together with lectures by University staff. Where appropriate, visitors will be asked to address business practice in their area of their industry. Past speakers have included:

Rick Leary - Head of Double Negative

Anders Langland - Senior R&D Programmer, The Moving Picture Company

Doug Lamour - Senior Compositor, The Moving Picture Company

Dr Karl Hilton, Free Radical
Jonathan Privett – Head of 3D, Rushes
Louise Hussey – 3D Production Manager, Rushes
Brandt Nicholas – Codemasters
Shelley Page – Dreamworks
Andy Lomas – Head of Computer Graphics, Framestore CFC
Dave Burgess – Supervising Animator, Dreamworks Animation

INDICATIVE KEY LEARNING RESOURCES

Online Lecture Notes

BU Leaning Support Materials

Digital Cinematography/ Virtual Worlds

Key Texts

Zettl H. (1990) Sight, *Sound, Motion – Applied Media Aesthetics*, 2nd Ed., Wadsworth Publishing Company.

Eisenstein S.(1943) *The Film Sense*. Faber & Faber.

Laurel B. (1993) *Computers as Theatre*. Addison-Wesley.

Wardrip-Fruin N. and Harrigan, P. (Eds) (1990) *First Person – New Media as Story, Performance, and Game*. The MIT Press.

Strongly Recommended

Katz S. Film (1991) Directing Shot by Shot – Visualising from Concept to Screen. Michael Wiese Productions.

Katz S. (1992) Film Directing Cinematic Motion – A Workshop for Staging Scenes. Michael Wiese Productions.

Millar G. and Reisz K. (1968) *The Technique of Film Editing*, 2nd Ed. Focal Press.

Millerson G. (1991) *Lighting for Television & Film*, 3rd Ed. Focal Press.

Fielding R. (1985) The Technique of Special Effects Cinematography, 4th Ed. Focal Press.

Perisic Z.(2000) *Visual Effects Cinematography*. Focal Press.

McKee R, (1999) Story; Substance, Sturcture, Style and the principles of Screenwriting. Methuen.

Other Texts

Wilkie B. (1996) Creating Special Effects for TV and Video, 3rd Ed. Focal Press.

Arijon D. (1976) *Grammar of the Film Language*, Silman-James Press.

Thompson R. (1998) *Grammar of the Shot*. Focal Press.

Thompson R. (1993) *Grammar of the Edit*. Focal Press.

Murch W. (1995) In the Blink of an Eye – A Perspective on Film Editing. Silman-James Press.

Samuelson D. (1998) 'Hands-On' Manual for Cinematographers, 2nd Ed. Focal
Krueger M (1991) *Artificial Reality II*. Addison-Wesley.
Marc Saltzman *(ed) (1999) Game Design: Secrets of the Sages*. Brady Press.
Poole S. (2000) *Trigger Happy*. Fourth Estate.

Journals

Leonardo. MIT Press

Web Sites

Links on the Digital Cinematography/ Virtual Worlds web page.

Art, Science and Technology

Key Texts

Brookshear, (2006). *Computer Science: An Overview*, 9th Ed. Addison Wesley
Darley, A., (2000). *Visual Digital Culture*, Routledge.
Russet and Starr, (1988). *Experimental Animation*, Da Capo Press.
Furniss, M., (1998). *Art in Motion; Animation Aethetics*, John Libbey & Co Ltd.

Other Texts

Wooley B. (1999). *The Bride of Science*. Macmillan.
Hodges, A. and Turing A. (1992) *The Enigma of Intelligence*. Vintage.
Brand S. (2000) *The Clock of the Long Now*. Phoenix.
Brand S. (1987) *The Media Lab*. Viking Penguin.
Negroponte N. (1996) *Being Digital*. Coronet.
Druckrey T. (1999) Ars Electronica: Facing the Future. MIT Press.
Prix Ars Electronica publications. Springer-Verlag.

Journals

Leonardo. MIT Press.
ACM SIGGRAPH. Art Show Publications.
ACM SIGGRAPH. Computer Animation journal.

Selected Filmography

The Cat came back Cordell Barker 1988
Gas Planet Pacific Data Images 1992
Train Spotter Neville Astley, Jeff Newitt 1997
Girls Night Out Joanna Quinn 1997
Deadsy David Anderson 1998
Iron Giant Brad Bird 1999
City of god Fernando Meirelles 2002

Play time Jack Tutti 1967
Mr Jessop Brian Wood 2004
Manipulation Daniel Greaves 1991
Tango Zbigniew Rybczynski 1982
Balance Wolfgang and Christoph Lauenstein 1989
Triangle Erica Russell 1994
Blindscape Stephen Palmer 1993
Repete Michaela Pavalatova 1995
Food Jan Svankmajer 1992
Gone Nutty Blue Sky Studios Carlos Saldanha and John C. Donkin 2003
Humdrum Peter Peake 1999
The Big Snit National Film Board of Canada Richard Condie and Michael Scott 1985
The Big Story Tim Watts and David Stoten 1994
Pinocchio Walt Disney 1940
The Jungle Book Walt Disney 1967
Monsters Inc Pete Docter 2001
Dog Suzie Templeton 2002
La Linea Osvaldo Cavandoli 1969
Pas De Deux MacClarens 1968
Hidalgo Joe Johnston. 2004
Oliver Carol Reed 1968
The wall Alan Parker 1982
Fallen Art Baginski 2006
Duck Amuck Chuck jones 1953
The Wild Steve 'Spaz' Williams 2006
Pocoyo David Cantolla, Guillermo García and Alfonso Rodriguez 2006
Chicken Little Mark Dindal 2005
Sugar Baby Love Aides 2007
Madagascar Eric Darnell Tom McGrath 2005

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

PERSONAL INQUIRY

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES AND CO-REQUISITES: None

AIMS

This unit aims to enable students to investigate an issue or topic that reflects their personal interests related to their chosen area of practice and communicate their findings to students and staff.

Through pursuing a personal inquiry they will develop further skills and knowledge, which will extend their learning experience during the course and enable them to deal more skilfully with changing theories and techniques in their continuing career.

By undertaking a personal inquiry project they will refine research and presentation skills and techniques that will equip them to continue to gain and communicate expertise after they have graduated.

By sharing the knowledge attained with fellow students and staff at a symposium they will enrich the learning environment.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to :

1. demonstrate mastery of personally motivated research, independent learning and problem solving ability required for continuing professional development.
2. display the ability to communicate with peers, supervisors and others.
3. be confident in the use of languages used to discuss the moving image and art, science and technology.
4. substantiate skills in contextualization of personal practice critically, technically and historically
5. demonstrate planning and organization to produce a project to a given time-scale.

LEARNING AND TEACHING METHODS

The unit will employ lectures, tutorials and a symposium.

The lectures will cover research and presentation methods.

Research supervisors will be assigned to each student to advise and support student progress.

To enable the students to demonstrate the level of their knowledge and ability to communicate their findings to their peers they are asked to present the results of their research at a symposium.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment.

All outcomes are assessed by staff attending the student presentations at the symposium. The assessments will focus on the depth of work produced and clarity of the presentation informed by observations by the student's supervisor.

INDICATIVE CONTENT

Students will be introduced to the types of research and research presentation techniques in a lecture and workshops, including a workshop in electronic research techniques.

Each student will propose a topic of inquiry, the topic to be agreed with the supervisory staff.

The inquiry will be carried out over a number of weeks, culminating in a symposium at which they will present the results of their inquiry to staff and their fellow students.

The inquiry may be technically, theoretically, culturally or otherwise biased, depending on the student's chosen area of practice.

Lectures/ Workshops

- Types of research (Exploratory/ Secondary/ Primary/ Qualitative/ Quantitative/ Visual)
- Reflection on personal practice
- Traditional and Internet Based Research Techniques

Tutorials

- Discuss initial proposal and methods to be adopted taking into account Personal Development Plan
- Confirm proposed topic and methodology
- Address work in progress
- Address presentation methods (talk/ poster/ web-site)

Symposium

- Talks
- Poster Sessions (including web based posters)

Indicative Key Learning Resources

Online lecture notes

BU Learning Support Materials

Further Reading

Phillips, E. and Pugh, G. (2005) *How to Get a PhD,* 4th ed, Oxford University Press

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

GROUP PROJECT

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

- **MSc Computer Animation and Visual Effects** :- Animation Software Development, CGI Tools
- **MA 3D Computer Animation** :- Computer Animation Principles, Computer Animation Techniques
- **MA Digital Effects** :- Digital Effects Nucleus, Digital Effects Tools

CO-REQUISITES

None.

AIMS

This unit builds on the experience gained in the specialist pathway units of the Animation Masters framework to allow the students to apply the skill developed in the tools based units to a larger production based piece of work.

Involvement in a group project enables students to take part in a more substantial project than they would be able to working alone. The emphasis of the project is the technical and creative aspects utilised in a production. Students focus on problem solving and the design and implementation of reusable tools and techniques. At the same time students are given the chance to develop the practical social and management skills needed when using digital media facilities within and between groups. Teamwork between all students on the Masters framework is encouraged.

The unit aims to enable students to engage in teamwork practices and to collaboratively design, produce and present a substantial piece of work with a technical / creative content.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to

- demonstrate abilities in concept development and engagement with the ideas, values and debates that inform practice in the field of animation.
- have a mastery of technical / creative abilities in the design and production of a computer animation sequence informed by the forefront of computer animation theory and practice.
- effectively plan and deliver a production to an agreed brief and timescale in a professional manner.
- work effectively as a member of a production team displaying initiative and personal responsibility.

LEARNING AND TEACHING METHODS

Projects provide students with the groundwork for learning and academic development together with the evolution of their skills in the creative and technical aspects of computer generated imagery (CGI). The initially all students present a project idea (which can also be suggested by industry) and groups are formed. From this point each group has a regular tutorial with the supervisory project tutors assigned. Tutorials are held primarily to support the development of project work, however they provide the opportunity for general feedback on the students' progression in the course. In general, the operation of a project conforms to the method described in the Indicative Content section.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

All outcomes are assessed by the project:

Outcomes 1 to 3 are assessed in a formal presentation at the conclusion of the project. The final critique looks at the originality, techniques used, problems solved, new skills developed and completeness of the piece of work produced, during the course project.

All Animation Masters students and project staff will be present. Each group project will screened, and each group member will have five to ten minutes to describe their contribution in terms of their own work and their group role. A further ten to fifteen minutes will be given for questions from the audience following each group presentation.

Outcome 4 is assessed on the degree to which a student has demonstrated the ability to co-operate in group practices, and the degree to which a student has successfully completed their project.
All outcomes are formatively appraised through staged tutorials with students, critiques and discussion among the staff and students involved. There is a mid-project critique with all staff and students present.

The group project will be assessed on the final outcome of the project, weighting 50%, and also the contribution each student makes to the professional functioning of the group, weighting 50%.

The assessment will be based on criteria agreed in each group's project proposal as well as the general criteria for project assessment, in relation to the intended learning outcomes.

The Group Project has a formative assessment in the form of mid-project group presentations. Each group will present work in progress at this intermediate critique for feedback from staff and fellow students.

Indicative Content

Students undertake the design and production of a piece of work. The specific content is originated by the students and developed by the student groups with tutorial consultation. Project staff, allowing for projects of diverse composition and intent, approve the final project proposal for each group and each student's assessment criteria. Teamwork between the courses and between MA and MSc students is encouraged. Collaboration with Video, Sound Design and / or Music for Television and Film students is supported. The proposed project may be a 'live' project with external clients, if the supervisory staff agree to the academic validity of the project.

A typical structure for the process of managing the group project is as follows :-

Project Introduction

The project is formally introduced to the students several weeks before the project commences. Students are asked to prepare work for an informal presentation at the beginning of the project unit. This work can take the form of a storyboard, concept sketches, a game concept, music to be animated to or an outline for a software technique.

Individual Presentations

When the project commences, each student gives a short presentation of the material they have prepared. This gives an idea to everyone of the kind of project each student might like to work on, and gives an insight into his or her interest.

Forming the Group and Developing a Project Proposal

The group the student joins, and the specific content of the project they get involved in, is the outcome of the series of presentations of ideas and discussions with tutors and fellow students. This culminates in the agreement of a 'Project Proposal' which outlines the expectations and responsibilities of the group and group members.

Agreeing a Project Proposal

Once groups have been formed in the third week of the project, they give formal presentations to the staff and students. Following this a project proposal is agreed between each group and the project tutors assigned to the project.

Mid-project Group Presentations

Each group presents work in progress at an intermediate critique for feedback from staff and fellow students.

Final Group Presentations

The final production of each group project is assessed in a formal presentation at the conclusion of the project. All students and project staff are present. On completion of the project students should have shown that they can work as a member of a team, communicating clearly with other members of the team in developing a project concept, placing the project in an historical context, and planning and completing it by an agreed date. Students should also have an understanding of the relevant software tools that they are utilising, and be more proficient in their use. Students

should have a better picture of the creative context they are working in and be more able to critically evaluate their achievements and potential.

Indicative Learning Resources

This unit is primarily studio based and access to modern computer animation software, tools and pipeline is provided. Technical support for specific problems is provided by Lecturing and demonstrator staff.

Student will also have access to filming equipment, blue / green screen for live action work.

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

COMPUTER ANIMATION AND EFFECTS MASTERS PROJECT

Level: M

Credit value : 60 (ECTS equivalent credit value 30)

PRE-REQUISITES

120 Credits of Pathway

CO-REQUISITES

None.

AIMS

This unit consists of a major project based upon the Pathway title.

This unit determines the award of the Masters degree. It is expected that the depth and scope of this project will reflect this fact.

Collaboration between students from different subject areas is encouraged. The Masters project may be a continuation of the Group Project or other project work undertaken in the first part of the framework. In such a case the Masters Project would be expected to expand the scope and extent of the previous project.

The unit aims to enable students to plan and execute a major project in a professional manner utilising relevant techniques and to undertake a critical analysis of their own work.

MA 3D Project

This unit consists of a single project and provides the students with an opportunity to produce a substantial and creative piece of work in the field of computer animation, which will consolidate the experience gained in the earlier parts of the framework. This unit determines the award of the Masters degree and should demonstrate an appropriate level of originality and mastery of the subject. Collaboration between students from different Masters courses will be encouraged. Students will normally focus on a visual, creative production.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. display abilities in concept development and engagement with the ideas, values and debates that inform practice in the field of animation.

2. have a mastery in the technical / creative abilities in the design and production of a substantial computer animation sequence; informed by the forefront of computer animation theory and practice.

3. Demonstrate the ability to plan and deliver a major production to an agreed brief and timescale in a professional manner.

4. exhibit proficiency and understanding in the application of computer animation systems informed by the forefront of computer animation practice.

5. critically analyse their own work and position themselves and their work critically in a historical and contemporary context.

Additionally if working in a group project :

6. demonstrate the ability to work effectively as a member of a production team displaying initiative and personal responsibility.

LEARNING AND TEACHING METHODS

The Masters Project is primarily student initiated and led. The Tutor's role becomes one of advisor and facilitator. Tutorial support commences from the onset of the project, as part of the process of finalising project proposals. From this point on each student or group of students has a planned series of tutorials with the project supervisors. Tutorials are held primarily to support the development of project work, however they provide the opportunity for general feedback on the students' progression in the programme. To supplement this, several critique sessions will be scheduled for the middle and end of the project, allowing group feedback from academic staff members and peers. In general, the operation of a project conforms to the method described in the Indicative Content section.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 15,000 words assessing all ILOs.

Indicative Assessment

All outcomes are assessed by the project:

Outcomes 1 to 4 are assessed on the work each student produces for the project. The final critique looks at the originality, ability of project design and planning, techniques used, problems solved, new skills developed and completeness of the piece of work produced during the course of the project.

Outcome 5 is assessed by the clarity and effectiveness of the report in conveying critical discussion with an appropriate level of knowledge of the issues within their chosen area of practice and explaining both the techniques covered and their appropriateness to the project work.

Outcome 6 is assessed on the degree to which a student has demonstrated the ability to co-operate in group practices, and the degree to which a student has successfully completed their project.

Project assessments are based on criteria agreed in the students project proposal in relation to the intended learning outcomes.

The hand-in media will be determined by the supervising staff team based on the nature of the project.

Formative Assessment

All outcomes are formatively appraised through staged tutorials with students, critiques and discussion among the staff and students involved.

INDICATIVE CONTENT

Students undertake the design and production of a substantial piece of work. The specific content is originated by each student, or group of students, and developed with tutorial consultation allowing for projects of diverse composition and intent. Project staff approve the final project proposal for each student, or group of students, and each student's assessment criteria.

Teamwork between the Masters Framework and between MA and MSc students is encouraged. Collaboration with Video, Sound Design and/ or Music for Television and Film students is supported. The proposed project may be a 'live' project with external clients if the supervisory staff agree to the academic validity of the project.

The agreed project proposal may be:

- The continuation of the PGDip stage *Group Project* *
- The continuation of a PGDip Project *

In these cases the project proposal should clearly indicate the nature and scope of the work, which was completed in the PGDip stage.

Project Introduction

The project is formally introduced to the students before the end of the PGDip stage. Students are asked to prepare work for their project proposal for discussion with project staff at the end of the PGDip.

Agreeing a Project Proposal

The project proposed by the student, or group of students, is the outcome of a series of discussions with tutors and fellow students. This culminates in the agreement of a 'Project Proposal' that outlines the content and assessment criteria of the proposed project. Project tutors are then assigned to the project.

Mid-Project Presentations

Each student/ group presents work in progress at an intermediate critique for feedback from staff and fellow students.

Final Presentations

The final production of each student/ group project is assessed in a formal presentation at the conclusion of the project. Project staff and the student/ group are present.

INDICATIVE KEY LEARNING RESOURCES

Required Reading

All software manuals, printed, CD, or online material from all the programme units.

COMPUTER ANIMATION PRINCIPLES

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITE

Computer Animation Techniques

CO-REQUISITE

Moving Image Theory

AIMS

This unit aims to enable students to develop skills and knowledge in computer animation principles and practice, which will extend their learning experience during the course and enable them to deal more skilfully with changing theories and techniques in their continuing careers. The intention is by learning about the underlying theories within Computer Graphics and Animation, in parallel to the development of practical skills in using systems that apply the theory in production tools (***Computer Animation Techniques***); students will enhance their transferable skills and knowledge and improve the quality of their productions in the project units. Students will become conversant in the language, concepts and techniques relating to the course.

Many of the Topics covered in this unit are common across all Postgraduate Pathways, therefore encouraging shared delivery of Lectures where possible.

All practical and theoretical subjects directly related to computer animation production are grouped in this unit giving flexibility in its content and delivery.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. display comprehensive understanding of the techniques and tools applicable to their own practice.

2. demonstrate a mastery of the underlying theory employed in computer animation techniques and Computer Graphics.

3. gain an understanding of animation principles and concept generation with an ability to engage with the concepts, values and debates that inform the practice in the field of animation.

4. act autonomously in the management, organisation and implementation of computer generated assets and tools within a production pipeline.

LEARNING AND TEACHING METHODS

In this unit students will be engaged in both workshop and lecture sessions. These sessions will relate the tools and software within CG to the theoretical and best practise aspects of computer animation, leading to the understanding and implementation of the underlying principles. All the sessions will feed directly to the students project work.

Lectures

A series of formal lectures will provide the main theory underlying animation principles, computer animation systems and programming concepts. These lectures will be designed in conjunction with the practical workshop sessions. The lectures will enable students to gain a deeper understanding of a number of techniques that relate to their personal practice.

Workshops

These will consist of lectures, demonstrations, exercises and case studies. These will expose the students a range of animation and computer animation tools and techniques, with the emphasis on best practise and transferable skills. The demonstrations will be used for practical sessions in conjunction with the use of lecture and case studies to convey the applications and theoretical underpinning. An academic staff member and a demonstrator will lead each session.

Students will undertake sessions covering an introduction to concept generation in computer animation. A series of practical lecture-workshops will provide a learning environment in which students can develop the creative skills necessary for generating and presenting ideas for computer animation projects. It is expected that students will be able to build on art and design skills that they have developed in their previous work and educational experiences. Field trips will be utilised to enhance these sessions, particularly those related to motion studies.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

All Intended Learning Outcomes are assessed by a series of set Animation projects which requires the student to use the tools and assets within a 3D software application in the creation of an animated sequence. This will contribute 100% to the Unit assessment. This projects aim to demonstrate the student proficiency in the software, as well as the implementation of animation techniques and principles.

INDICATIVE CONTENT

Lecture Sessions

Students will undertake a series of lectures and case studies developing their knowledge of computer animation software tools and techniques. These may be

presented as lectures, demonstrations or case studies illustrating specific techniques from both the practical and theoretical viewpoint.

The exact content and the order of the delivery may vary. The following sessions are proposed:

- Project Management
- Scene Management
- Exporting Data – Best Practise
- Managing and Exchanging assets between different software packages
- Traditional Lighting for theatre and film
- Lighting and Painting
- Compositing
- Cheating in Computer Animation
- Textures
- Computer Animation Techniques
- Photoreal Rendering
- Non-Photoreal Rendering
- Lip-Synching (2 sessions)
- Motion Capture and Crowd Systems
- Rendering Optimisation
- Introduction to Character Rigging
- Data conditional statements and control constructs
- Number systems
- Linear algebra
- Functions and graphs
- Trigonometry
- Vector algebra
- Matrices
- Co-ordinate systems
- Line and plane equations
- Geometric transformations
- The computer image: image synthesis, image processing
- Object representation
- Viewing: the synthetic camera
- Clipping and projection algorithms
- Hidden line and hidden surface removal algorithms
- Shading and illumination models

Animation

Students will undertake sessions covering an introduction to animation principles including practical sessions.

- Introduction to storyboarding
- Character design
- Generating ideas
- Keys, extremes, breakdowns, ease-in and ease-out
- Introduction to walks (performance)
- Weight and Mass (the properties of matter, the bouncing ball)
- Cause and Effect (anticipation and exaggeration)
- The dynamic line and arcs

- Follow-through and overlapping action
- Lip Synch
- Secondary action
- Acting in animation
- Criteria of a film and the audience.
- Case studies
- Drawing for animation
- Observation exercises and techniques
- What makes a good pose
- Introduction to production methods (Planning for animation)
- Introduction of filmic language of Treatments Synopsis
- Motion Studies Field Trip

Workshop Sessions

Students will undertake a series of workshop sessions developing their knowledge and practice of:

3D Computer Animation Software Tools and Techniques

- Pipeline 101
- Primitive Objects
- Forward and Inverse kinematics
- CG Lighting Principles
- CG Lighting Practice
- Character Rigging
- Modelling with deformations
- Generating Materials, Shaders and Texturing
- Non-Linear Animation Tools
- Photoreal Rendering
- Non-Photoreal Rendering

INDICATIVE KEY LEARNING RESOURCES

This unit is primarily studio-based and access to modern computer animation software, tools and pipeline is provided. Technical support for specific problems is provided by lecturing and demonstrator staff. Students will also have access to filming equipment for motion studies.

Texts

Birn J. (2006) Digital Lighting and Rendering New Riders
Brinkmann R. (1999) The Art and Science of Digital Compositing. Elsiever.
Brooker. D. (2002) Essential CG Lighting Techniques. Focal Press Visual Effects and Animation
Williams. R. (2002) The Animator's Survival Kit. Applied Arts
Thomas. F. Johnston O. (1995) The Illusion of Life: Disney Animation Disney Press.
Blair. P. (2003) Cartoon Animation Foster, Walter Publishing, Incorporated
Wade. D. & Snoswell. M. (2005) Digital Fine Art: 5 (Expose) Ballistic.
Petroc et-al d'artiste: Character Modeling 2 Ballistic.
Petroc et-al d'artiste: Character Modeling Ballistic.
Hull et-al. d'artiste: Concept Art Ballistic.
CGToolkit The Art of Rigging from http://cgtoolkit.com/

Web Based

www.edharriss.com
www.xsibase.com
www.cgchannel.com
www.conceptart.org
www.siggraph.com
http://community.softimage.com/
http://softimage.wiki.avid.com/index.php/Main_Page
www.digitaltutors.com

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

COMPUTER ANIMATION PRINCIPLES AND TECHNIQUES

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

Computer Animation Principles
Computer Animation Techniques

CO-REQUISITE

Moving Image Theory

AIMS

This unit aims to enable students to further develop skills and knowledge in computer animation principles and practice, which will extend their learning experience during the course and enable them to deal more skilfully with changing theories and techniques in their continuing careers. The intention is that Software Tools and Best Practise are underpinned by the theories introduced in the unit Computer Animation Principles, and further developed within the Moving Image Theory unit. Students will continue to be introduced to more complex techniques and principles, facilitating a higher understanding of Computer Animation techniques. This will again augment their transferable skills and knowledge; helping improve the quality of their productions in the project units. Students will become conversant in the language, concepts and techniques relating to the course.

This unit will take many of the topics delivered in Computer Animation Principles and Computer Animation Techniques and expose students to the tool and best practise available to them within a particular 3D animation Software Package.

All practical and theoretical subjects directly related to computer animation production are grouped in this unit giving flexibility in its content and delivery.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. display a comprehensive understanding of the techniques and tools applicable to their own practice

2. develop a mastery in the management, organisation and implementation of computer generated assets and tools within a production pipeline.

3. be critically aware of the design, production and technical quality of computer animation sequences informed by the forefront of computer animation praxis.

4. demonstrate a mastery of software and tools appropriate to their discipline and craft

LEARNING AND TEACHING METHODS

In this unit students will be engaged in both workshop and lecture sessions. These sessions will relate the practical hands on aspects to the understanding of the underlying principles. All the sessions will feed directly to the students project work.

Workshops

These will consist of lectures, demonstrations, exercises and case studies. These will expose the students a range of animation and computer animation tools and techniques. The demonstrations will be used for practical sessions in conjunction with the use of lecture and case studies to convey the applications and theoretical underpinning. An academic staff member and a demonstrator will lead each session.

Students will be introduced to practical scripting sessions in a 3D computer animation system. They will be exposed to various strategies for designing, implementing and testing scripts and be encouraged to develop a personal approach to scripting based upon application of industry praxis. Emphasis will be placed on enabling novice programmers to gain confidence whilst enabling those students who wish to pursue scripting further to explore more complex programming challenges.

Lectures

A series of formal lectures will provide the main theory underlying animation principles, computer animation systems and programming concepts. These lectures will be designed in conjunction with the practical workshop sessions. The lectures will enable students to gain a deeper understanding of a number of techniques that relate to their personal practice.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

All Intended Learning Outcomes might typically be assessed through a number of visual artefacts generated by the student in accordance to their brief, supported by a production diary (technical report, concept sketches, storyboards etc).
Indicative Content

Workshop Sessions

Students will undertake a series of workshop sessions developing their knowledge and practice of:

3D Computer Animation Software Tools and Techniques

- Advanced Rigging

- Lip-synching
- Particles
- Animation Tools 301 (MOCAP)
- Advanced Rendering
- Animation Mixer
- Soft and Rigid bodies
- Fluid dynamics
- Advanced Render Tree
- Volumetric Shaders

Compositing Software Tools and Techniques

- Integrating 3D depth
- Live action/ background plate
- Tracking
- Rotoscoping
- Greenscreen

Scripting in a 3D Computer Animation System

- Outputting data from XSI
- Logic
- Using custom parameters in scripting
- Scripted operators
- Scripting projects

Lecture Sessions

Students will undertake a series of lectures and case studies developing their knowledge of computer animation software tools and techniques. These may be presented as lectures, demonstrations or case studies illustrating specific techniques from both the practical and theoretical viewpoint.

The exact content and the order of the delivery may vary. The following sessions are proposed:

- Advanced Rigging
- Rigging for Motion Capture
- Games Animation
- Matte Painting

Animation

Students will undertake sessions focusing on developing animation principles including practical sessions.

- Body Mechanics 201
- Silhouette 201
- Acting 101
- Acting 201

INDICATIVE KEY LEARNING RESOURCES

This unit is primarily studio-based and access to modern computer animation software, tools and pipeline is provided. Technical support for specific problems is provided by lecturing and demonstrator staff. Students will also have access to filming equipment for motion studies.

Texts

Birn J. (2006) Digital Lighting and Rendering New Riders
Brinkmann R. (1999) The Art and Science of Digital Compositing. Elsiever.
Brooker. D. (2002) Essential CG Lighting Techniques. Focal Press Visual Effects and Animation
Williams. R. (2002) The Animator's Survival Kit. Applied Arts
Thomas. F. Johnston O. (1995) The Illusion of Life: Disney Animation Disney Press.
Blair. P. (2003) Cartoon Animation Foster, Walter Publishing, Incorporated
Wade. D. & Snoswell. M. (2005) Digital Fine Art: 5 (Expose) Ballistic.
Petroc et-al d'artiste: Character Modeling 2 Ballistic.
Petroc et-al d'artiste: Character Modeling Ballistic.
Hull et-al. d'artiste: Concept Art Ballistic.
CGToolkit The Art of Rigging from http://cgtoolkit.com/

Web Based

www.edharriss.com
www.xsibase.com
www.cgchannel.com
www.conceptart.org
www.siggraph.com
http://community.softimage.com/
http://softimage.wiki.avid.com/index.php/Main_Page
www.digitaltutors.com

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

COMPUTER ANIMATION TECHNIQUES

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITE

Computer Animation Principles

CO-REQUISITE

Moving Image Theory

AIMS

This unit aims to enable students to initially develop skills and knowledge in computer animation principles and practice. This will permit them to deal skilfully with changing theories and techniques in their continuing careers. The intention is that Software Tools and Best Practise are underpinned by the theories introduced in the parallel unit ***Computer Animation Principles***. Students will enhance their transferable skills and knowledge and improve the quality of their productions in the project units. Students will become conversant in the language, concepts and techniques relating to the course.

This unit will take many of the topics delivered in ***Computer Animation Principles*** and expose students to best practise and the tools available to them within a particular 3D animation Software Package.

All practical and theoretical subjects directly related to computer animation production are grouped in this unit giving flexibility in its content and delivery.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. demonstrate an advanced understanding of the techniques and tools applicable to their own practice.

2. demonstrate sound understanding of the management, organisation and implementation of computer generated assets and tools within a production pipeline.

3. be autonomous in the design and production of computer animation sequences of creative and technical quality, informed by the forefront of computer animation praxis.

4. effectively plan and produce a technical report displaying a sound knowledge of the techniques relevant to their own practice and craft.

LEARNING AND TEACHING METHODS

In this unit students will be engaged in both workshop and lecture sessions. These sessions will use practical hands on examples to help inform students of the tools and techniques at the artist disposal, leading to the understanding and implementation of the underlying principles. All the sessions will feed directly to the students project work.

Workshops

These will consist of lectures, demonstrations, exercises and case studies. These will expose the students a range of animation and computer animation tools and techniques. The demonstrations will be used for practical sessions in conjunction with the use of lecture and case studies to convey the applications and theoretical underpinning. An academic staff member and a demonstrator will lead each session.

Students will be introduced to practical scripting sessions in a 3D computer animation system. They will be exposed to various strategies for designing, implementing and testing scripts and be encouraged to develop a personal approach to scripting based upon current industry praxis. Emphasis will be placed on enabling novice programmers to gain confidence whilst enabling those students who wish to pursue scripting further to explore more complex programming challenges.

Lectures

A series of formal lectures will provide the main theory underlying animation principles, computer animation systems and programming concepts. These lectures will be designed in conjunction with the practical workshop sessions. The lectures will enable students to gain a deeper understanding of a number of techniques that relate to their personal practice.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words and assessing all ILOs.

Indicative Assessment

Outcomes 1, 2 and 4 are assessed by an Essay (2000 words, illustrated), carrying a weight of 40%. The report should demonstrate an appropriate level of command of the languages and techniques used in computer animation.

Outcomes 1, 2, 3 are assessed by a set Animation project carrying a total weight of 60% which requires the student to demonstrate a level of craftsmanship using the techniques and principles introduced to them in the earlier units equivalent to 3000 words.

INDICATIVE CONTENT

Workshop Sessions

Students will undertake a series of workshop sessions developing their knowledge and practice of:

3D Computer Animation Software Tools and Techniques

- Polygon Modelling
- Forward kinematics
- Inverse Kinematics and basic rigging
- Instances
- Lighting Principles
- Lighting Practice
- Seam free NURBS
- Character Rigging 101
- Modelling with deformations
- Materials, Shaders and Texturing
- Camera
- Animation Tools 101
- Animation Tools 201
- Rendering
- Volumetric Shaders

Compositing Software Tools and Techniques

- Introduction to the interface
- Compositing 101
- Simple mattes
- Shadows
- Depth of field
- Colour correction
- Creating passes

Scripting in a 3D Computer Animation System

- Object and command mode
- Particles –pre collision
- Accessing components
- Data conditional statements and control constructs
- Object orientated programming paradigm
- Program and script development processes

Lecture Sessions

Students will undertake a series of lectures and case studies developing their knowledge of computer animation software tools and techniques. These may be presented as lectures, demonstrations or case studies illustrating specific techniques from both the practical and theoretical viewpoint.
The exact content and the order of the delivery may vary. The following sessions are proposed:

- Project Management and Best Practise
- Image Based Lighting - HDRI
- Final Gathering and Global Illumination
- Rigging Approach
- Rigging Hands (Custom Parameters)
- Rigging Feet (Reverse IK)

Animation

Students will undertake sessions covering an introduction to animation principles including practical sessions.

- Spacing and Timing using a Ball
- Bouncing Balls
- Walk Cycles on the Spot
- Walks using Pose to Pose, straight ahead and Layered methods
- Body Mechanics 101
- Overlapping action
- Squash and Stretch
- Silhouette 101
- Line of action using a Biped Character
- Character Design
- Generating Ideas
- Storyboarding
- Breakdowns

INDICATIVE KEY LEARNING RESOURCES

This unit is primarily studio-based and access to modern computer animation software, tools and pipeline is provided. Technical support for specific problems is provided by lecturing and demonstrator staff. Students will also have access to filming equipment for motion studies.

Texts

Birn J. (2006) Digital Lighting and Rendering New Riders
Brinkmann R. (1999) The Art and Science of Digital Compositing. Elsiever.
Brooker. D. (2002) Essential CG Lighting Techniques. Focal Press Visual Effects and Animation
Williams. R. (2002) The Animator's Survival Kit. Applied Arts
Thomas. F. Johnston O. (1995) The Illusion of Life: Disney Animation Disney Press.
Blair. P. (2003) Cartoon Animation Foster, Walter Publishing, Incorporated
Wade. D. & Snoswell. M. (2005) Digital Fine Art: 5 (Expose) Ballistic.
Petroc et-al d'artiste: Character Modeling 2 Ballistic.
Petroc et-al d'artiste: Character Modeling Ballistic.
Hull et-al. d'artiste: Concept Art Ballistic.
CGToolkit The Art of Rigging from http://cgtoolkit.com/

Web Based

www.edharriss.com
www.xsibase.com
www.cgchannel.com
www.conceptart.org
www.siggraph.com
http://community.softimage.com/
http://softimage.wiki.avid.com/index.php/Main_Page
www.digitaltutors.com

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

DIGITAL EFFECTS TOOLS

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

None

CO-REQUISITES

Digital Effects Nucleus, Moving Image Theory

AIMS

This unit aims to provide a student with the technical foundation for their production-based work whilst on the Digital Effects Programme.

Its function is to communicate the craft of professional Digital Effects work at every stage of production. Each of the core Digital Effects subject areas will be examined through lectures and workshops exposing a student to the vast variety of tools that form the crux of current Digital Effects production.

The unit will enable a student to become conversant in the language, concepts and tools relating to production work; facilitate their usage within the **Digital Effects Nucleus** unit.

The skills learnt through applied tool usage, and through documenting visual artefacts will ground the student in a realm of practical and conceptual thoroughness, fundamental for their progress in the Digital Effects Pathway.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. demonstrate an advanced understanding of the techniques applicable to their own practice

2. demonstrate a mastery of the underlying theory employed in computer animation techniques and Computer Graphics.

3. substantiate skills in the underlying theory and practice utilised in Digital Effects production.

4. display contextual mediation of Digital Effects practice through written, spoken or visual artefacts.

5. effectively plan and produce critical written reports in the field of Digital Effects.

LEARNING AND TEACHING METHODS

This is a lecture and workshop led unit, requiring provision for demonstrator support and some off-campus location travel.

Subjects relating to Digital Effects Tools and Computer Graphics common fundamentals are taught in this unit (encouraging shared delivery of Lectures wherever possible). Block teaching will also be utilised where appropriate. Classes relating to the location-based acquisition of filmed elements will require off-campus location travel support.

The unit is delivered as a series of lectures and workshops. An academic staff member and a demonstrator lead each workshop. All taught sessions will be in support of the **Digital Effects Nucleus** unit.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% Coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

The production process of the Digital Effects Nucleus unit artefact will facilitate the two assignments for this unit enabling the student to generate and understand two higher level production tools. This is to reflect the growing requirement within Digital Effects Best Practice for mediating and documenting production work with precision and accuracy.

Intended Learning Outcomes 1, 2 & 4 will be assessed through a visual mediation of the **Digital Effects Nucleus** unit artefact. This mediation will be assessed upon visual clarity and effective communication of the production stages explored by the Digital Effects Nucleus Unit. Intended Learning Outcomes 3 & 5 will be assessed through a Production Record contextualising and documenting production based tool usage employed within the Digital Effects Nucleus Unit.

The visual mediation and a written Production Record are two contextualised higher level production tools supporting the Digital Effects Nucleus unit. Each assessment element equates to 50% of the total mark equivalent to 5000 words.

Indicative Content

Students will undertake a series of lectures and workshops developing their knowledge of Digital Effects core tools. While the exact content and order may vary, the following should be included:

Lectures

Tools Theory
Digital Effects Pipeline
Digital Effects Tools
Camera Match
Colour
Universes

Technical Management

Sequence Design
Critiquing
Aesthetics
Concepts
Cinematography
Pre-Vis & Animatics
Production Management
FX Breakdown

Common Fundamentals

Mathematical Tools
Co-ordinate systems
Number systems
Linear algebra
Vector algebra
Trigonometry
Shading and illumination models
Lighting
Storyboarding
Pipelines

Problem Solving

Workshops

3D Tools
Interface
Modelling
Animation
Lighting
Texturing
Rendering

2D Tools
Interface
Alpha Utilities
Colour Correction
Practical Effects & Lumakey
Render Passes & Roto
CG Integration & Grade

Acquisition Tools
Video Operations
Practical FX
Subject Lighting
Green Screen Video
Photography
Background Plates
Location Lighting
Slow Motion

Scripting Tools

Computer Operating Systems (OS)
OS Script Based Tools
Rendering Shader Languages

INDICATIVE KEY LEARNING RESOURCES

While the exact content of this list is subject to revision, the following (or their equivalents) should be included:

Sequence Design

Key Texts:

McKee R (1997) Story: Substance, Structure, Style, and the Principles of Screenwriting. Regan Books.

Katz S (2004) Film Directing: Cinematic Motion, 2nd Edition Michael Wiese Productions

Recommended Reading:

Perisic Z (2000) Visual Effects Cinematography. Focal Press
Ward P (2002) Picture Composition. Focal Press.
Hart J (1998) The Art of the Storyboard. Focal Press
Simon M (2000) Storyboards: Motion in Art. Focal Press.

Acquisition Tools Workshops

Key Texts:

Brown B (2002) Cinematography. Focal Press.

Recommended Reading:

Lowel R (2000) Matters of Light and Depth Lowel - Light Manufacturing.
Alton J. (1995) Painting with Light. University of California Press.
Malkiewicz K. (1986) Film Lighting Simon & Schuster Books
Malkiewicz K & Fletcher J (1989) Cinematography, 3rd Edition Simon & Schuster Books
Hunter F & Fuqua P (1997) Light Science and Magic, 2nd Edition - Focal Press.

3D, 2D & Scripting Tools Workshops

Key Texts:

Write S (2006) Digital Compositing for Film and Video 2nd Edition Focal Press
Birn J (2006) Digital Lighting and Rendering 2nd Edition New Riders
Demers O (2001) Digital Texturing and Painting. New Riders

Recommended Reading:

Santiago (2004) Creating 3D Effects for Film, TV and Games. Premier Press
Vince J ed (2003) Handbook of Computer Animation. Springer
Rickitt R (2000) Special Effects: The History and Technique. Virgin Books
Allen D (2006) Encyclopedia of Visual Effects. Peachpit Press

Periodicals

Key texts:
Cinefex
American Cinematographer
Recommended:
3D World
Computer Arts
Creative Review

Note: this list is indicative only- refer to Unit Guide for up to date list.

DIGITAL EFFECTS NUCLEUS

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

None

CO-REQUISITES

Moving Image Theory, Digital Effects Tools

AIMS

Students arrive on the Digital Effects Pathway with a variety of experiences and abilities. The Digital Effects Nucleus unit has evolved to anticipate, accommodate and equalise this phenomena through a strategic brief that students follow during the first part of the framework. The nature of the brief is such that it allows for a significant amount of creativity within fixed set of parameters. This has a twofold effect; firstly a student will apply taught techniques in a context creatively unique to their project, and secondly a student will actively communicate with others in order to research and understand techniques as a way to improve upon their own skill levels. As no two projects are the same, competition is bypassed in favour of communication.

This unit aims to provide a student with an overview of all the artistry required for Digital Effects production work, as well as revealing key areas that student could begin to specialise in. It also serves as a production methodology highlighter that students can revisit and reutilise when creating their own projects during the latter stages of the pathway.

Its academic function is however one of calibration and measurement. By adapting the student into a mindset appropriate for Digital Effects production they also adopt an open model of communication suitable for postgraduate study. The recording of a student's skill level by means of a visual artefact provides a useful diagnostic tool for gauging academic student directions.

The **Digital Effects Nucleus** unit will enable students to utilise, through a guided production, the languages, concepts and tools found within the units **Moving Image Theory** and **Digital Effects Tools**.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to

1. display advanced understanding of the fundamentals of Computer Graphics.

2. demonstrate mastery of the generation and implementation of computer generated tools and assets within a Digital Effects production pipeline.

3. originate a qualitative Digital Effects sequences informed by the forefront of Digital Effects praxis.

4. demonstrate knowledge of the underlying theory and practice utilised in all stages of Digital Effects Production.

5. effectively plan and deliver a production to an agreed brief and timescale in a professional manner.

LEARNING AND TEACHING METHODS

This is a production-orientated unit, requiring tutorial support and a field trip. Students will be issued the brief at the start of the unit. A field trip will take place shortly after the brief has been set. The field trip will reflect the importance of primary research for qualitative Digital Effects production. The location(s) of the field trip will mirror the themes outlined in the brief.
Students will then begin generating their projects based upon the skills outlined to them in the units Moving Image Theory and Digital Effects Tools. Over the duration of the project, students will continue to add elements into their project creating further detail and complexity.
Tutorials are held primarily to support the student's progression throughout the project's development. They will also offer constructive and relevant feedback to the student about their output, and monitor the integration of elements taught in the units **Moving Image Theory** and **Digital Effects Tools**.
The implementation of this unit should be one of high goals. Students should arrive into the unit wondering how to approach the problem facing them, and should leave the unit with a qualitative piece of work that has begun moulding them into the professionals they will soon become.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

All Intended Learning Outcomes will be assessed through the visual artefact generated by the student in accordance to the brief set. This element equates to 100% of the total mark.
Feedback provided from regular project tutorials will form a contextual underpinning for a formal tutorial based assessment at the end of the project. Students will be given the opportunity to articulate their thoughts about the project they have created, and receive formal critiquing and feedback and from the assessment panel.

INDICATIVE CONTENT

Students will be given a set brief to follow at the start of the unit. This brief will articulate a nucleus of current Digital Effects best practice and will allow for individual interpretation relevant to the student's own emerging practice.

The aim of the brief is to encourage and develop problem solving, elements integration, production stage awareness, and time-management skills. It also allows for the student to create elements for the final visual artefact from every core discipline currently identified within Digital Effects work. At present these areas include Digital Video Acquisition of background plates and practical effects, 3D Effects Animations Systems, 2D Effects Compositing Systems. A student's aim should be to demonstrate the same level of proficiency in all areas.

INDICATIVE KEY LEARNING RESOURCES

These will be determined by the content and nature of the brief.

DIGITAL EFFECTS TECHNIQUES

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

Moving Image Theory, Digital Effects Nucleus, Digital Effects Tools

CO-REQUISITES

Personal Inquiry, Group Project

AIMS

In preparation for the **Master's Project**, this unit aims to provide a student with the sufficient technical and conceptual proficiency for the mastery of the subject. Its function is to measure technical and conceptual precision by means of a discretionary brief formulated by the student, and by the application of taught Digital Effects Techniques.

When placed in context with **Personal Inquiry** and **Group Project**, **Digital Effects Techniques** will also enable a student to identify a career perspective.

Techniques specific to Digital Effects are taught to the students over the duration of this unit. These techniques can form the basis of a visual artefact whose primary aims are of preparatory study, technical correctness and observation based referencing. The artefact created can be considered as a Digital Effects orientated animated life study, and is intended to enhance other work produced in the units Personal Inquiry and Group Project. Its scope should reflect its contextual placement with these other units.

This unit aims to disclose to the students the power of artistry over and above the power of epic narratives. It is a strategic way to bypass the inherent desire to create visionary based work in favour of the simple articulation of visual precision. It also acts as a flexible buffer for other work produced during the first part of the framework.

INTENDED LEARNING OUTCOMES

Having completed this unit the students is expected to:

1. demonstrate a proficiency in the generation and implementation of computer generated tools and assets within a Digital Effects production pipeline.

2. display a mastery in the generation of qualitative Digital Effects sequence informed by the forefront of Digital Effects practice.

3. display precise knowledge of the underlying theory and practice utilised in Digital Effects production.

4. demonstrate the design and implementation of a project conceptually focused for Digital Effects work.

5. master production techniques echoing Digital Effects praxis

LEARNING AND TEACHING METHODS

This is a lecture, workshop and production orientated unit, requiring provision for demonstrator support, limited tutorial support, master-classes and some off-campus location travel support.

Subjects relating to Digital Effects Techniques and Computer Graphics common fundamentals are taught in this unit (encouraging shared delivery of Lectures wherever possible). Block teaching will also be utilised where appropriate.

The unit is delivered as a series of lectures and workshops. An academic staff member and a demonstrator lead each workshop. Limited tutorial guidance will be given in support of the visual artefact component of this unit.

Master-classes demonstrating specific Digital Effects techniques will be held in conjunction with the regular teaching. Wherever possible these master-classes will be led by Industry practitioners.

Classes relating to the location-based acquisition of filmed elements will require off-campus location travel support.

In conjunction with the taught elements of this unit, students will be asked to design and implement a visual artefact that eloquently demonstrates the Digital Effects Techniques specific to the student's own practice. The student will determine the nature of the project they generate.

Shortly after starting this unit, students will propose a visual artefact to generate. Upon agreement with unit tutors, students will generate a brief to follow for the remainder of the unit. This brief will articulate a demonstration of technically correct techniques taught to them by the unit itself, or will demonstrate other techniques sourced from elsewhere. Care and attention should be made to the scope of the artefacts expected. Students will be advised to attempt single shot pieces only. This is to allow for applied focus to the work undertaken.

Tutorials will be held on both individual and group basis, and will be designed to give minimal yet effective support to the artefact's development.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

All Intended Learning Outcomes will be assessed through a visual artefact generated by the student in accordance to their discretionary brief. This element equates to 100% of the total mark equivalent to 5,000 words.

The assessing panel will be present at the time of assessment and will determine a grade based upon the Learning Outcomes in relation to the student's visual

articulation of their brief. Emphasis will be placed on technical correctness, conceptual suitability and the level of parity between the proposed brief and the final outcome.

INDICATIVE CONTENT

At the commencement of this unit, students will be briefed with regard to the nature of the unit, and about the visual artefact they will generate. Upon submission of proposals and agreement from staff, the student may then begin generating their chosen artefact.

Students will also undertake a series of lectures, master-classes and workshops which will run throughout the course of the unit. This will develop their knowledge and understanding of core Digital Effects Techniques which may be included in the artefact design.

While the exact content and order may vary, the following should be included:

Lectures

Techniques Theory
Matte Painting
Light Match
Image Integration / Adv Keying
Image Analysis
Digital Film
Case Studies
Recognisable Patterns
Professional Development
Running an FX Business

Master-classes
Matte Painting
Advanced 3D Techniques
Advanced 2D Techniques

Workshops

3D Techniques
Expressions & Functions
Procedural Animation
Particles
Attributes
Deformers
Character Tools
Dynamics
Scripting

2D Techniques
Blue/Green Screen
2D Tracking & Stabilisation
3D Tracking
Light Matching
Camera Mapping
Procedural Animation

Scripting
Matte Painting

Acquisition Techniques
Green Screen Film
Track & Jib
Miniatures
Practical FX
Location BlueScreen
Location Survey
Pan & Tile
Motion Capture

Scripting Techniques
Shader Writing & Application

INDICATIVE KEY LEARNING RESOURCES

While the exact content of this list is subject to revision, the following (or their equivalents) should be included:

Acquisition Techniques

Key Texts:

Perisic Z. (2000) Visual Effects Cinematography. Focal Press
Wheeler P (2005) Practical Cinematography. Focal Press

Recommended Reading:

Lowell R (2000) Matters of Light and Depth. Lowel - Light Manufacturing
Alton J (1995) Painting with Light. University of California Press
Hunter F & Fuqua P. (1997) Light Science and Magic, 2nd Edition Focal Design.

3D, 2D & Scripting Workshops

Key Texts:

Brinkman R (2008) The Art and Science of Digital Compositing 2nd Edition Morgan Kaufman.
Birn J (2006) Digital Lighting and Rendering (2nd ed.) New Riders

Recommended Reading:

Santiago D (2004) Creating 3D Effects for Film, TV and Games. Premier Press
Vince J (ed) Handbook of Computer Animation. Springer
Stephenson I (2005) Essential Renderman Fast 2nd Edition Springer-Verlag UK, 2003
Mitchell M (2004) Visual Effects for Film and Television Focal Press
Allen D (2006) Encyclopedia of Visual Effects. Peachpit Press
Dobbert T (2005) Matchmoving. Sybex

Vaz M.C. Barron C. (2002) The Invisible Art: The Legends of Movie Matte Painting. Thames and Hudson

Periodicals

Key texts:

Cinefex
American Cinematographer
Recommended:
3D World
Computer Arts
Creative Review

Note: this list is indicative only- refer to Unit Guide for up to date list.

ANIMATION SOFTWARE DEVELOPMENT

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES AND CO-REQUISITES

None

AIMS

The purpose of the unit is to ensure that students are equipped with the technical computing skills necessary in the design and implementation of computer graphics tools.

The unit aims to equip the students with the knowledge to select the correct programming languages, application programming interfaces and techniques to solve computer generated imagery problems.

Further to this the application of standard software engineering techniques are encourage to enable the student to work as part of a development team solving complex technical issues in modern computer animation.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. demonstrate an ability to write complex programs using a high-level programming language and a computer graphics application programming interfaces (API).

2. demonstrate an ability to design, implement, test and document computer graphics tools and techniques using object-oriented and procedural programming informed by industry praxis.

3. display proficiency in applying modern software engineering techniques to computer generated image production.

LEARNING AND TEACHING METHODS

Initially this unit will be taught in block mode to teach the basic elements of graphics programming. This will include lectures supported by workshop sessions.

The workshop sessions are designed to follow the lectures step by step. The workshops both complement and mirror the corresponding lectures with practical programming examples and exercises. Students are exposed to various strategies for designing, implementing, testing and documenting programs. Students are also encouraged to develop a personal approach to solving computer graphics related problems based upon recognised practices of software engineering.

After the Initial Block teaching more focused workshops and Lectures will address issues in programming for graphics.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

All outcomes are assessed by a set project which determines 100% of the total mark of the unit equivalent to 5,000 words. The project is designed to measure the level of the student's ability to design and implement graphics techniques and tools using a computer programming language and selection of appropriate application programming interfaces.

INDICATIVE CONTENT

- Procedural programming and design (C, Python)
- Object Oriented Programming in C++ (including Standard Template Library)
- Real-time Graphics programming using a suitable API (OpenGL)
- Management of complex data for CGI production
- Algorithm design and implementation for computer graphics tools and techniques (Collision Detection, Virtual Cameras, Data Structures

INDICATIVE KEY LEARNING RESOURCES

Key Texts:

Hill F.S. (2005) Computer Graphics using OpenGL, 3rd Edition Addison-Wesley.

Woo, M., et al. (1999). *OpenGL Programming Guide The official Guide to Learning OpenGL*. Addison-Wesley, Version 1.2

Recommended Reading

Stroustrup, B., (1997). The C++ Programming Language, 3rd edition, Addison-Wesley

Parsons, D., (1997). Obect Oriented Programming with C++, 2cd edition, Letts Educational

Foley, J., van Dam, A., et al., (1996). *Computer Graphics: Principles and Practice*, Addison-Wesley, 2nd Edition in C

Watt, A., and Watt, M., (1992). Advanced Animation and Rendering Techniques. Addison-Wesley

Woo, M., et al., (1997). *OpenGL Programming Guide*. Addison-Wesley, Version 1.1.

Journals

'Communications of the ACM' monthly publication of Association of Computing Machinery

Websites

http://www.opengl.org/ (the OpenGL official site)

http://www.opengl.org/Documentation/Books.html (books on OpenGL)

http://www.acm.org/siggraph

http://www.research.att.com/~bs/C++.html (Bjarne Stroustrup C++)

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

COMPUTER GENERATED IMAGERY TOOLS

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

None

CO-REQUISITE

Animation Software Development

AIMS

The purpose of this unit is to equip students with an in depth understanding of computer graphics tools and their application to the CGI field.

The unit exposes students to the practical usage of CGI tools by application of current research in the CGI field.

The unit offers the opportunity to students to specialise in the use of a computer animation software tools through workshop sessions using the current state of the art animation tools and technical direction best practices.

The unit aims to provide students with a critical understanding of the theory involved in the construction and usage of CGI tools and techniques for computer animation thus enabling them to develop their problem solving and technique development skills.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. demonstrate a mastery of key computer graphics techniques employed in computer animation production and the use of computer animation tools.

2. demonstrate an advanced understanding of the techniques and tools applicable to their own practice.

3. demonstrate the ability to autonomously develop solutions to problems arising in computer animation productions.

LEARNING AND TEACHING METHODS

The unit is taught as a sequence of lectures and workshops delivered in parallel. An academic staff member and a demonstrator lead each workshop. Tutorials are held primarily to support the workshops. They also provide an opportunity for students to

give and receive general feedback on their progression and other aspects of the course.

The unit will expose the student to modern animation tools used in the CGI industry, however the emphasis will be on transferable skills and not specific packages.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words assessing all ILOs.

Indicative Assessment

Typically outcomes 1-3 are assessed by small set projects at the end of the unit, which determines 100% of the total mark equivalent to 5,000 words. The project is designed to assess the student's level of use of the software tools covered in the workshop sessions and the understanding of the techniques involved

INDICATIVE CONTENT

Students follow a series of lectures, which introduce a broad range of computer graphics techniques

- Introduction to Computer Animation Techniques
- Modelling Techniques, Object Representation, Curves and Surfaces
- Motion Theory and Techniques
- Articulated Structures
- Deformation Theory and Techniques
- Physically-Based Animation
- Rendering, Textures and Shadows
- Introduction to Effects Techniques
- Image Manipulation Techniques
- Image Compositing Techniques
- Integration Techniques, Lighting, Atmosphere, Shadows
- Particle Systems, Procedural Animation and Dynamics
- Behavioural Animation and AI techniques
- Procedural textures, Shader design and rendering pipeline

INDICATIVE KEY LEARNING RESOURCES

Key Texts:

Parent R. (2008). *Computer Animation Algorithms and Techniques 2nd Edition*, Academic Press. ISBN:1-55860-579-7

Stephenson I. (2004). Essential Renderman Fast 2nd Edition. Springer ISBN 1-85233-608-0

Recommended Reading

Apodaca, A. & Gritz, L. (1999) Advanced Renderman, Morgan Kaufmann. ISBN 1-55860-618-1

Foley, J. D., van Dam, A., Feiner, S. K., and Hughes, J. F., (1991). *Computer Graphics: Principles and Practice* 2nd Ed, Addison-Wesley

Vince, J. A., (1992). *3D Computer Animation*. Addison-Wesley

Watt, A., and Policarpo, F., (1998). *The Computer Image*. Addison-Wesley

Watt, A., (2000). *3D computer Graphics*. 3rd ed. Addison-Wesley

Journals

ACM-Computer Graphics

IEEE-Computer Graphics & Applications

Websites

http://www.education.siggraph.org/materials/C_and_I.htm
(SIGGRAPH computer graphics instructional material)

http://www.education.siggraph.org/materials/siggraph_conference_courses.htm
(SIGGRAPH Conference Courses)

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

COMPUTER GENERATED IMAGERY TECHNIQUES

Level: M

Credit value: 20 (ECTS equivalent credit value 10)

PRE-REQUISITES

Animation Software Development and Computer Generated Imagery Tools

CO-REQUISITES

None

AIMS

The purpose of this unit is to equip students with an in depth understanding of the algorithmic, and technical aspects of CGI production.

The unit builds on Animation Software Development and CGI Tools units to explore how modern animation tools are developed and current research may be integrated into an existing animation pipeline.

The unit aims to provide students with a critical understanding of the theory involved in the construction of tools and techniques for computer animation and to enable them to develop their problem solving and technique development skills.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to :

1. display an understanding of the CGI Pipeline and management of assets in CGI production.
2. demonstrate a critical understanding and ability to apply current research to CGI production.
3. demonstrate the ability to solve complex animation problems through the synthesis of current research and industry practise.

LEARNING AND TEACHING METHODS

The unit is taught as a sequence of lectures focusing on the underlying mathematical and algorithmic elements of computer graphics.

This theory is related to the use of modern animation tools in practical sessions.

ASSESSMENT

Summative Assessment

This unit is assessed by 100% coursework equivalent to 5,000 words and assessing all ILOs.

Indicative Assessment

Typically Outcomes 1-3 are assessed by a development project at the end of the unit. The project is designed to assess the student's level of critical understanding of the theory involved in the construction of tools and techniques and the student's skills and expertise in problem solving and technique development.

INDICATIVE CONTENT

Students follow a series of lectures, which introduce a broad range of computer graphics techniques

- Fundamental algorithms for computer graphics
- Mathematical foundations of computer graphics
- Curves and Surfaces.
- Articulated Structures
- Deformation Theory and Techniques
- Physically-Based Animation
- Rendering, Textures and Shadows
- Advanced rendering techniques. Sub Surface Scattering, Ambient Occlusion.
- Particle Systems, Procedural Animation and Dynamics
- Behavioural Animation and AI techniques
- Procedural textures, Shader design and rendering pipeline

INDICATIVE KEY LEARNING RESOURCES

Key Texts:

Parent R., (2008). *Computer Animation Algorithms and Techniques 2nd Edition*, Academic Press. ISBN:1-55860-579-7

Stephenson I., (2007). Essential Renderman Fast 2nd Ed. Springer

Recommended Reading

Stephenson I., (2005). Production Rendering : Design and Implementation Springer Apodaca, A. & Gritz, L. (1999) Advanced Renderman, Morgan Kaufmann. Foley, J. D., van Dam, A., Feiner, S. K., and Hughes, J. F., (1991). *Computer Graphics: Principles and Practice* 2nd Ed, Addison-Wesley

Watt, A., and Policarpo, F., (1998). *The Computer Image*. Addison-Wesley

Watt, A., (2000). *3D computer Graphics*. 3rd ed. Addison-Wesley

Journals

ACM-Computer Graphics
IEEE-Computer Graphics & Applications
The Visual Computer
Computer Graphics World
Cinefex

Websites

http://www.siggraph.org/
http://www.renderman.org/
http://portal.acm.org

Note: This list is indicative only – refer to Unit Guide for up-to-date list.

12 Generic Assessment Criteria

LEVEL M

Very weak fail (0 - 39%)

Assessment category	Performance criteria
Subject knowledge and understanding	Little or no evidence of factual and conceptual understanding of the subject, as appropriate to this level. There will be little or no evidence of extensive independent study and thinking, or of relevant reading/research. The student will be clearly unable to work at the forefront of theoretical understanding in their field of study.
Intellectual skills - including analysis, evaluation, and critical judgement	No evidence of appropriate analysis. An inability to independently critically analyse current research /knowledge. Unsubstantiated opinions reflecting a lack of familiarity with key concepts.
Subject-specific skills - including applications and problem solving	No evidence of ability to demonstrate the synthesis of ideas and place them within an appropriate context. No original ideas or insights evident.
Transferable skills - including communication and presentation	Unstructured and/or incoherent. Markedly poor English and /or inappropriate style. Other presentational aspects, including citations and bibliography may be incorrect or missing. May be seriously deficient in quantity.
Variations within this mark range will generally relate to the adequacy of the approach to the question, and the relative lack of understanding of the material, the paucity and weaknesses of the arguments used, and the factual and conceptual inadequacies. This is likely to be coupled with responses that are largely unrelated to the question and often limited in quantity.	

Fail (40 - 49%)

Assessment category	Performance criteria
Subject knowledge and understanding	Has been unable to develop in-depth knowledge, appropriate to this level, across specialised and applied areas. There will be insufficient evidence of extensive independent study and thinking. The student will be unable to work at the forefront of theoretical understanding in their field of study.
Intellectual skills - including analysis, evaluation, and critical judgement	Has not demonstrated an ability to deal with complexity, contradictions and incomplete data in the knowledge base. An inability to independently critically analyse current research /knowledge and argue alternative approaches. Unable to assess own and others' work with justification and judgement appropriate to postgraduate level.
Subject-specific skills - including applications and problem solving	Unable to independently synthesise information and ideas and seldom, if ever, offers new insights/original responses to problems that expand or redefine existing knowledge. Not able to develop new approaches to unpredictable situations.
Transferable skills -	Unable to communicate effectively. Presents poorly structured

including communication and presentation	and reasoned arguments that show a lack of maturity appropriate to postgraduate level.
Variations within this mark range will generally relate to the level of understanding, the approach to the question, the factual and conceptual inadequacies, and the relative levels of weakness of the arguments used.	

Pass (50 - 59%)

Assessment category	Performance criteria
Subject knowledge and understanding	Has developed in-depth knowledge across specialised and applied areas. There will be some evidence of extensive independent study and thinking. The student will, at times, be working at, or their work will be informed by, the forefront of theoretical understanding in their field of study.
Intellectual skills - including analysis, evaluation, and critical judgement	Has demonstrated an ability to deal with complexity, contradictions and incomplete data in the knowledge base. Can independently analyse current research /knowledge and present alternative approaches. Can independently assess own and others' work with justification and appropriate judgement.
Subject-specific skills - including applications and problem solving	Can independently synthesise information and ideas and occasionally offer new insights/original responses to problems and/or develop new approaches to unpredictable situations.
Transferable skills - including communication and presentation	Can effectively communicate their work to specialist and non-specialist audiences. Presents structured arguments that show a level of maturity appropriate to postgraduate level.

Merit (60 - 69%)

Assessment category	Performance criteria
Subject knowledge and understanding	Has developed a good in-depth knowledge across specialised and applied areas. There will be clear evidence of extensive independent study and thinking. The student will be working at, or their work will be informed by, the forefront of theoretical understanding in their field of study.
Intellectual skills - including analysis, evaluation, and critical judgement	Has demonstrated an ability to deal effectively with complexity, contradictions and incomplete data in the knowledge base. Can independently critically analyse current research /knowledge and argue alternative approaches. Able to reason effectively. Can independently assess own and others' work with clear justification and sound judgement.
Subject-specific skills - including applications and problem solving	Can independently synthesise information and ideas and offer new insights/original responses to problems and/or develop new approaches to unpredictable situations. Will be able to demonstrate an ability to undertake further specialist research.
Transferable skills -	Can effectively communicate their work clearly to specialist and

including communication and presentation	non-specialist audiences. Able to present tightly structured, rigorous arguments that show a high level of maturity appropriate to postgraduate level.

Distinction (70 - 79%)

Assessment category	Performance Criteria
Subject knowledge and understanding	Has developed very good in-depth knowledge across specialised and applied areas. There will be clear evidence of very extensive independent study and thinking. The student will generally be working at, or their work will be informed by, the forefront of theoretical understanding in their field of study.
Intellectual skills - including analysis, evaluation, and critical judgement	Has demonstrated an ability to deal very confidently and effectively with complexity, contradictions and incomplete data in the knowledge base. Can independently critically analyse current research /knowledge and cogently argue alternative approaches. Able to reason in a clear and effective manner. Can independently assess own and others' work with very clear justifications and sound judgement.
Subject-specific skills - including applications and problem solving	Can independently synthesise information and ideas and create a range of new insights/original responses to problems that may expand or redefine existing knowledge and/or develop new approaches to unpredictable situations. Will be able to demonstrate a clear ability to undertake further specialist research. Outstanding problem solving skills.
Transferable skills - including communication and presentation	Can effectively communicate their work clearly to specialist and non-specialist audiences. Able to present confident, tightly structured, stimulating, and rigorous arguments that show a high level of maturity appropriate to postgraduate level.

High Distinction (80% +)

Assessment category	Performance Criteria
Subject knowledge and understanding	Has developed an exceptional in-depth knowledge across specialised and applied areas. There will be clear evidence of very extensive independent study and thinking. The student will generally be working at, or their work will be demonstrably informed by, the forefront of theoretical understanding in their field of study. Shows considerable mastery of facts and concepts
Intellectual skills - including analysis, evaluation, and critical judgement	Has demonstrated an outstanding ability to deal with complexity, contradictions and incomplete data in the knowledge base. Can independently critically analyse current research /knowledge and cogently argue alternative approaches. Able to reason in an exemplary manner. Can assess independently and with confidence own and others' work with very clear justifications and sound judgement.
Subject-specific skills	Can independently synthesise information and ideas and create

- including applications and problem solving	a range of new insights/original responses to problems that may expand or redefine existing knowledge and/or develop new approaches to unpredictable situations. Will be able to demonstrate a clear ability to undertake further specialist research and make significant contributions to the subject. Outstanding problem solving skills.
Transferable skills - including communication and presentation	Can effectively communicate their work clearly to specialist and non-specialist audiences. Able to present exemplary, tightly structured, highly stimulating, and rigorous arguments that are likely to be at the limits of may be expected at this level.