



**MONASH** University  
Information Technology

**FIT1033**  
**Foundations of 3D**

**Unit Guide**

**Semester 2, 2015**

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*Last updated: 21 Jul 2015*

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# **FIT1033 Foundations of 3D - Semester 2, 2015**

This unit is an introduction to the techniques, frameworks and processes comprising 3D modelling and 3D imaging. Foundations of 3D aims to give students an understanding of 3D modelling by developing skills in 3D model creation for a variety of contexts, including 3D prototyping, 3D visualisation and 3D modelling for games and animation. Students will communicate their knowledge of 3D theory through the production of designs that demonstrate geometrical modelling, texture mapping, virtual lighting techniques, camera positioning, and rendering procedures.

## **Mode of Delivery**

Caulfield (Day)

## **Workload Requirements**

Minimum total expected workload equals 12 hours per week comprising:

(a.) Contact hours for on-campus students:

- One hour of lectures
- One 3-hour studio

(b.) Additional requirements (all students):

- A minimum of 8 hours of personal study per week for completing lab and project work, private study and revision.

See also Unit timetable information

## **Unit Relationships**

### **Prohibitions**

FIT2015, DIS1911

### **Chief Examiner**

Dr Tom Chandler

### **Campus Lecturer**

### **Caulfield**

Tom Chandler

## **Tutors**

### **Caulfield**

**Tom Chandler**

**David Lewis**

**Phil Owen**

**Michael Lim**

**Warwick Laird**

## **Your feedback to Us**

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through the Student Evaluation of Teaching and Units (SETU) survey. The University's student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash's educational strategy, see:

[www.monash.edu.au/about/monash-directions/](http://www.monash.edu.au/about/monash-directions/) and on student evaluations, see:  
[www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html](http://www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html)

## **Previous Student Evaluations of this Unit**

Generally student feedback about this unit has been very positive. Unit materials, tutorials and exercises continue to be updated each year.

If you wish to view how previous students rated this unit, please go to  
<https://emuapps.monash.edu.au/unitevaluations/index.jsp>

# Academic Overview

## Learning Outcomes

At successful completion of this unit students should be able to:

- deploy 3D design applications over a range of digital media;
- navigate the simulated spatial environment and taxonomy of the 3D discipline;
- interpret issues involved in the 3D development process;
- use 3D modelling and 3D imaging as a medium of digital graphic creation;
- design, create and detail 3D models and scenes for various outputs;
- evaluate and assess techniques used in the 3D creation process;
- manage and implement efficient 3D modelling production workflows.

## Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Introduction to Unit. 3D Theory and Maya Interface	
2	Introduction to Polygon Modelling	Bring 'found' object to tutorial for checking
3	Polygon Modelling Techniques	
4	Basic 3D Lighting and Rendering	
5	3D Character Design	Assignment 1 due Monday Week 5 / Test 1 (3D Modelling) in Tutorial Week 5
6	Introduction to 3D Character Modelling	Students to check assignment 2 concept with tutor
7	3D Character Modelling Techniques	
8	Character UV Texturing	
9	Introduction to 3D Scene Modelling	Assignment 2 due Monday Week 9 / Test 2 (Basic 3D Character Creation) in Tutorial Week 9
10	Architectural and Environmental Texturing Techniques	Students to check assignment 3 concept with tutor
11	Advanced 3D Lighting Techniques	
12	Advanced Rendering Techniques	Test 3 (3D Scene Texturing) in Tutorial Week 12
	SWOT VAC	No formal assessment is undertaken in SWOT VAC. Assignment 3 due Week 14
	Examination period	LINK to Assessment Policy: <a href="http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html">http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html</a>

\*Unit Schedule details will be maintained and communicated to you via your learning system.

## Teaching Approach

### Lecture and tutorials or problem classes

This teaching and learning approach provides facilitated learning, practical exploration and peer learning.

### Assessment Summary

In-semester assessment: 100% (includes 30% in-class/tutorial tests)

Assessment Task	Value	Due Date
Assignment 1	20%	Monday Week 5
Assignment 2	20%	Monday Week 9

## Unit Schedule

Assignment 3	30%	Week 14
Tutorial Tests	30% (10% each)	Weeks 5, 9 and 12

# Assessment Requirements

## Assessment Policy

Faculty Policy - Unit Assessment Hurdles

(<http://intranet.monash.edu.au/infotech/resources/staff/edgov/policies/assessment-examinations/assessment-hurdles>)

Academic Integrity - Please see resources and tutorials at

<http://www.monash.edu/library/skills/resources/tutorials/academic-integrity/>

## Assessment Tasks

### Participation

- **Assessment task 1**

**Title:**

Assignment 1

**Description:**

Students are to source a real object (as opposed to just an image of an object) which they can bring into class and recreate in digital 3D space. The modelling technique(s) used will be based upon tutorial exercise work, though students are welcome to implement additional techniques that they have researched in their own time.

Selecting your object is important; it should be portable and small so you can easily turn it around and examine it. For example, if you choose to model a car, you would be referencing your geometry from a plastic or metal model car (like one of the 'matchbox' series), and not photographs of a full size vehicle.

While some objects will be too complex to model in 3D, others can be too simple, so students will ***need to negotiate their ideas/models with their tutors at least two weeks prior to submission***. Students are encouraged to look further afield than the object that they may be merely carrying on their person; mobile phones and sets of keys are hardly original modelling candidates. The miscellaneous trinkets, souvenirs, children's toys and small collectable items that can be purchased in opportunity shops, weekend markets and '\$2' shops are some ideas for possible modelling candidates.

**Weighting:**

20%

**Criteria for assessment:**

- ◆ Modelling effectiveness and efficient geometry
- ◆ Basic lighting and colouring of subject/objects
- ◆ Presentation, composition and visual impact of rendered scene
- ◆ Accompanying project documentation, working files and reference images

**Due date:**

Monday Week 5

**Remarks:**

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This assessment task is relevant to the following learning outcomes -

*deploy 3D design applications over a range of digital media;*  
*navigate the simulated spatial environment and taxonomy of the 3D discipline;*



*interpret issues involved in the 3D development process;  
use 3D modelling and 3D imaging as a medium of digital graphic creation;  
design, create and detail 3D models and scenes for various outputs;  
evaluate and assess techniques used in the 3D creation process;  
manage and implement efficient 3D modelling production workflows*

• **Assessment task 2**

**Title:**

Assignment 2

**Description:**

In this assignment students will be creating an original 3D character with Maya software. As your character concept is hypothetically targeted for a computer game environment, and because further levels of detail are easier to add than subtract, your final Maya character has a limit of 10,000 polygons and needs to be modelled as a single mesh.

You are encouraged to research your creation with a range of references as your character should be an original one and not simply a copy of a character from an existing game, animation or movie. Your Maya character should include basic colouring and texturing: character UV texturing is encouraged but is not mandatory. Because this assignment concerns the creation and detailing of a character, no environment or background is required.

**Weighting:**

20%

**Criteria for assessment:**

- ◆ Modelling technique and quality of geometry
- ◆ Texturing techniques and character colouring (UV texturing is optional)
- ◆ The presentation and visual impact of your rendered character
- ◆ Accompanying project documentation, character explanatory brief, working files, character prototype reference images

**Due date:**

Monday Week 9

**Remarks:**

This assessment task is relevant to the following learning outcomes -

*deploy 3D design applications over a range of digital media;  
navigate the simulated spatial environment and taxonomy of the 3D discipline;  
interpret issues involved in the 3D development process;  
use 3D modelling and 3D imaging as a medium of digital graphic creation;  
design, create and detail 3D models and scenes for various outputs;  
evaluate and assess techniques used in the 3D creation process;  
manage and implement efficient 3D modelling production workflows*

• **Assessment task 3**

**Title:**

Assignment 3

**Description:**

This assignment involves the 3D creation of either an interior or exterior architectural environment which is coloured (textured), lit with a 3D lighting scheme and rendered. While the 3D modelling of your scene may or may not draw from real world references, your textures must derive from your own photographic images. Using a digital camera, you must capture and edit digital images and integrate these into your modelled scene.

## Assessment Requirements

Your preparation and editing of textures forms an important part of your documentation and assessment.

Your architectural scene can be inside or outside and your scene choice must be negotiated with your tutor at least a week prior to submission. An interior scene entails not only modelling and detailing an enclosed space but also considering the light from lamps/windows/candlelight and shadows within it. Choosing an exterior scene means considering not only sunlight or moonlight but also the environmental surroundings of your architectural visualisation.

### Weighting:

30%

### Criteria for assessment:

- ◆ Modelling technique and quality of geometry
- ◆ Lighting and texturing techniques
- ◆ Presentation and visual impact of renders
- ◆ Accompanying project documentation, working files, reference images and annotated screenshots of image editing process

### Due date:

Week 14

### Remarks:

This assessment task is relevant to the following learning outcomes -

*deploy 3D design applications over a range of digital media;  
navigate the simulated spatial environment and taxonomy of the 3D discipline;  
interpret issues involved in the 3D development process;  
use 3D modelling and 3D imaging as a medium of digital graphic creation;  
design, create and detail 3D models and scenes for various outputs;  
evaluate and assess techniques used in the 3D creation process;  
manage and implement efficient 3D modelling production workflows*

## • Assessment task 4

### Title:

Tutorial Tests

### Description:

There will be three tutorial tests during the semester. These tests will be carried out within the Maya software editing environment. Each test will cover a theme closely related to one of the three assignments.

#### ***Tutorial Test 1: 3D Modelling - Reinterpreting a 2D image into a 3D model***

**Outline:** Students will be required to model and render sample 3D objects supplied by their tutors and produce renders with basic colours and lighting.

#### ***Tutorial Test 2: Basic 3D Character Creation***

**Outline:** Students will be required to model a basic 3D character supplied by their tutor and produce renders with colours and lighting.

#### ***Tutorial Test 3: 3D Texturing and Lighting***

**Outline:** Students will be required to texture and light a simple 3D environment supplied by their tutors with a limited number of textures (jpegs).

Please note that in contrast to the previous tests, this third tutorial test takes place in Week 12, **before the final assignment submission** in Week 14.

### Weighting:

## Assessment Requirements

30% (10% each)

### Criteria for assessment:

#### ***Tutorial Test 1: 3D Modelling***

**Grading Criteria:** Modelling Procedures, Scene Lighting, Colouring and Rendering.

#### ***Tutorial Test 2: Basic 3D Character Creation***

**Grading Criteria:** 3D Modelling Technique, Rendering, Colouring and Composition.

#### ***Tutorial Test 3: 3D Texturing and Lighting***

**Grading Criteria:** Image Editing and Texturing Techniques, Rendering and Lighting.

### Due date:

Weeks 5, 9 and 12

### Remarks:

The tutorial tests are relevant to the following learning outcomes -

*deploy 3D design applications over a range of digital media;*  
*navigate the simulated spatial environment and taxonomy of the 3D discipline;*  
*interpret issues involved in the 3D development process;*  
*use 3D modelling and 3D imaging as a medium of digital graphic creation;*  
*design, create and detail 3D models and scenes for various outputs;*  
*evaluate and assess techniques used in the 3D creation process;*  
*manage and implement efficient 3D modelling production workflows*

## Learning resources

Monash Library Unit Reading List (if applicable to the unit)

<http://readinglists.lib.monash.edu/index.html>

## Feedback to you

Types of feedback you can expect to receive in this unit are:

- Informal feedback on progress in labs/tutes
- Graded assignments with comments
- Test results and feedback

## Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process: <http://www.monash.edu.au/exams/special-consideration.html>

## Returning assignments

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

## Referencing requirements

In the course of researching their assignments, students are encouraged to reference online resources related to the 3D modelling and animation discipline in their assignment documentation. When including images or text references in their documentation, students should cite the URL and author (if applicable) and the date when the page was accessed.

## Assignment submission

It is a University requirement

(<http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-managing-pla>

for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at <http://www.infotech.monash.edu.au/resources/student/forms/>. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an electronic submission). Please note that it is your responsibility to retain copies of your assessments.

## Online submission

If Electronic Submission has been approved for your unit, please submit your work via the learning system for this unit, which you can access via links in the my.monash portal.

## Recommended Resources

**Autodesk® Maya® 2015** software will be provided on campus lab computers, and students are encouraged to register with the Autodesk Education Community for their own educational trial version of Autodesk® Maya® 2015 (*please note - **not Autodesk® Maya® 2016***) and related Autodesk software under the company's terms and conditions. Please visit:

<http://students.autodesk.com/>

Again, please **do not download and install Autodesk® Maya®2016** as your tutors will be unable to open your files.

See **Recommended text(s)** listed below:

The following titles are available on reserve or through a short term loan through the Monash library. Please note that though these mainly general references. There is also a considerable collection of books and DVDs for specific 3D studies (3D characters, architecture, lighting and texturing) at the Monash Caulfield library.

See also:

The Art of 3-D : Computer Animation and Imaging / Isaac Victor Kerlow (various editions)

The Art of 3-D : Computer Animation and Effects / Isaac Victor Kerlow (various editions)

## **Recommended text(s)**

Todd Palamar. (2014). *Mastering Autodesk Maya 2014*. () Sybex (ISBN: 9781118574966).

Dariush Derakhshani. (2014). *Introducing Autodesk Maya 2014*. () Sybex (ISBN: 978-1-118-57490-4).

## **Additional subject costs**

Assignment 1 requires students to source a small object that they can bring to tutorials to model in 3D.

Getting the right object is tricky: some objects will be too easy to model and others are too complex.

While sometimes students might be able source suitable objects from home, the scope of more interesting, original and very affordable objects (between 50 cents to \$5) is much broader at second hand stores, trash and treasure fairs and opportunity shops.

Assignment 2 requires students to create and model a character for a fictional computer game. Before modelling their character with 3D software, students may want to prototype their character with modelling plasticine. This material costs approximately \$10 and is available from the campus bookshops at Berwick and Caulfield. Alternatively, multicoloured modelling plasticine from Coles or Safeway costs between \$3 and \$5. Students should discuss this with their tutor before proceeding.

Assignment 3 requires students to take digital photos of textures (walls/carpets/skies etc.) and edit them for inclusion in their model. Though digital cameras would offer more options and better quality images, most mobile phones will be sufficient for this exercise and the photos do not have to be high resolution.

## Other Information

### Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at:

[www.policy.monash.edu.au/policy-bank/academic/education/index.html](http://www.policy.monash.edu.au/policy-bank/academic/education/index.html)

### Faculty resources and policies

Important student resources including Faculty policies are located at

<http://intranet.monash.edu.au/infotech/resources/students/>

### Graduate Attributes Policy

<http://www.policy.monash.edu/policy-bank/academic/education/management/monash-graduate-attributes-policy.h>

### Student Charter

[www.opq.monash.edu.au/ep/student-charter/monash-university-student-charter.html](http://www.opq.monash.edu.au/ep/student-charter/monash-university-student-charter.html)

### Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at <http://www.monash.edu.au/students>. For Malaysia see <http://www.monash.edu.my/Student-services>, and for South Africa see <http://www.monash.ac.za/current/>.

### Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research. Go to [www.lib.monash.edu.au](http://www.lib.monash.edu.au) or the library tab in [my.monash](#) portal for more information. At Malaysia, visit the Library and Learning Commons at <http://www.lib.monash.edu.my/>. At South Africa visit <http://www.lib.monash.ac.za/>.

### Disability Liaison Unit

Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis.

- Website: <http://www.monash.edu/equity-diversity/disability/index.html>
- Telephone: 03 9905 5704 to book an appointment with a DLO; or contact the Student Advisor, Student Community Services at 03 55146018 at Malaysia
- Email: [dlu@monash.edu](mailto:dlu@monash.edu)
- Drop In: Equity and Diversity Centre, Level 1, Building 55, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Malaysia Campus