



NGEE ANN

SCHOOL OF INFOCOMM TECHNOLOGY



ART OF 3D MODELLING & ANIMATION



COURSE OVERVIEW

This is a three year long course for secondary students covering on the various aspects of Drawing, 2D animation and 3D animation. At the end of each year, students will have to complete individual and group assignments.

In the first year, students will concentrate on developing their drawing skills and creative expressions; learning how to put their imagination down on paper. They will learn the various visualising and drawing techniques, drawing and brainstorming concepts; from pencil sketches to 2D drawings with lighting and 3D rendering concepts.

The second year focuses on animation basics and 3D character modeling, students are taught how to use 3D Studio Max for modeling, texturing, and creating models for animation in year 3.

The final year focuses on 3D animation, cinematography and video techniques. The students will be designing 3D environments and animate the character(s) they created in their second year.

OBJECTIVES:

- To expose students to the world of video game development and what it takes to be a Character Developer or Animator.
- To equip students with the knowledge, experiences and technical skills vital for success in vocational endeavours.

YEAR ONE

	Instructional Procedures	Time (hrs)	Activities	Outcomes
DRAWING FUNDAMENTALS	Basic line drawing <i>From sight to paper</i>	2	Line drawing of basic shapes with confidence Sketches of clear, distinct basic shapes	Students to understand the fundamentals of drawing
	Drawing Freely <i>From sight to paper II</i>	4	Introduction to contour drawing Fun synchronizing hand and eye coordination	
	2 hrs - Hands On Tutorial/Project Session <i>Working on drawing basics</i>			
	Basic 3D principles <i>Giving depth to paper</i>	4	Indoor sketching of basic objects with two point perspective Outdoor sketching exercise to understand concept of single vanishing point and the horizon.	Sketches of landscapes and objects with perspective in mind
VISUALISING IN 3D	Basic 3D principles II <i>Let there be light and colours</i>	5	2 hr – Indoor observation and hands-on practice to understand relationship between light and shade, basic colour theory 3hr - Outdoor sketching exercise	Sketches of landscapes and objects with shading and colour application
	Rendering 3D on paper <i>Capturing actual objects</i>	3	3 hr - Outdoor freehand sketching exercise	Detailed 3D Sketches of various objects with colour application, contours and shading

YEAR ONE

Instructional Procedures		Time (hrs)	Activities	Outcomes
EXPOSITION	Field Trip <i>Visiting a design company</i>	4	NA	Exposure to professional design environment and products
	2 hrs - Hands On Tutorial/Project Session <i>Working on drawing basics.</i>			
FUN WITH DRAWING	Expression through drawing <i>Developing ideas in style</i>	6	2-hour – Hands-on to try converting daily objects (eg. A water bottle, a pencil) into fun characters 2 hour - Students to share their research findings on animated objects and different drawing styles– eg. Stick-man, Tim Burton’s animation, Life drawing, Caricature, Cartoon, Manga, etc 2 hour – Students to attempt drawing their favourite animation character	Exploration of creation of characters from objects Experiments on different drawing styles
	4 hrs - Hands On Tutorial/Project Session <i>Working on cartoon drawing for a drawing competition</i>			
DRAWING 3D	Visualising complex forms <i>Piecing shapes together</i>	4	Game to identify the basic shapes that form complex objects. Drawing exercise to build complex object with simple 3D forms	Sketches of a complex 3D object with breakdowns of its forms
	4 hrs - Hands On consultation/Project Session <i>Working on cartoon drawing for a drawing competition</i>			

YEAR ONE

Instructional Procedures		Time (hrs)	Activities	Outcomes
MONSTER CAMP (2 Day)	Visualising figures <i>Making Monsters</i>	16	2 hrs - Watching a Movie: Monsters Inc	Getting Monstrous ideas
			Sketching of Monsters <ul style="list-style-type: none"> • Putting monsters into common objects • construction monster figure with simple forms • Capturing poses of figure 	Sketching of a few figure poses with breakdowns of its forms
	Brainstorming <i>Who and what is the character?</i>		Fun with mind maps Story writing	Simple story outline for the character to be animated.
	Brainstorming with sketches <i>Visualising ideas</i>		Random freehand ideation sketches of ideas and concept	2D Pencil/pen character design in selected style 3D colour pencil character design with 3 poses and 4 different views.
Course presentation <i>simple design critique and sharing</i> <ul style="list-style-type: none"> • Presentation 		Presentation group / individual games	Students to understand what is meant by design presentation and critique session	

YEAR TWO

	Instructional Procedures	Time (hrs)	Activities	Outcomes
EXPOSITION	Scriptwriting and Storyboarding <i>Piece by piece, word for word</i> <ul style="list-style-type: none"> • Introduction to storyboarding <ul style="list-style-type: none"> ○ Definitions, Purpose and Methods ○ Using templates • Basic camera techniques <ul style="list-style-type: none"> ○ Compositions and framing ○ Type of shots ○ Camera movements ○ Rule of the line • Script writing 	2	Learning about storyboarding and basic camera techniques Take-home activity: Writing a simple script for a short story	Students understand camera techniques, preparing them for storyboarding Storyboard for basic 2D animation
	Field Trip <i>Visiting an commercial animation studio</i>	4	TBC	Exposure to professional animation
CARTOON ANIMATION	Introduction to animation concepts <i>Getting the right picture</i> <ul style="list-style-type: none"> • Principles of animation <ul style="list-style-type: none"> ○ Key poses, breakdowns and inbetweens ○ Timing ○ Anticipation ○ Movement and cycles 	2	Watching a making of an animated cartoon movie	Students to understand animation techniques
	Course work <i>Moving monster</i> <ul style="list-style-type: none"> • 2D Animation 	8	Working with Adobe Flash 8	A complete simple 2D animation using Adobe Flash 8
	3 hrs - Hands On Tutorial/Project Session <i>Working on Flash animation for competition</i>			

YEAR TWO

	Instructional Procedures	Time (hrs)	Activities	Outcomes	
3D BASICS	Nature of 3D <i>Breaking down our vision</i> <ul style="list-style-type: none"> Understanding how our mind registers 3D images Coordinate systems Orthographic projection 	3	Drawing simple orthographic projections	Students to understand how 3D is registered in reality and how it can be replicated using coordinates in space. Students to understand the relationship between 2D drawing and 3D form	
	3D Basics with 3D Studio Max <i>Getting started</i>	4	Lab session with hands-on using the 3D Studio Max controls	Students to be able to use 3D Studio Max confidently.	
3 hrs - Hands On Tutorial/Project Session <i>Working on Flash animation for competition</i>					
EXPOSITION	Modelling Basics <i>Making sense to modeling</i>	6	Lab session to create basic 3D objects and decorating them with colours, textures and lighting	Create a very simple 3D object using 3D Studio Max.	
	Modeling the character <i>Base up</i> <ul style="list-style-type: none"> Principles of character modeling 	6	Lab Course work: <i>Working on the 3D character through manipulating basic forms and joining them into one complex form</i>	Basic character model.	
	2 hrs - Hands On Tutorial/Project Session <i>Working on the project</i>				
	Modeling the character <i>Putting in the details</i>	2	Lab Coursework: clothing your character with skin details.	Exported skin template for use in Adobe Photoshop.	

YEAR TWO

	Instructional Procedures	Time (hrs)	Activities	Outcomes
SKINNING	Paint brushing with Adobe Photoshop <i>Getting started</i>	4	Lab session: Fun with Adobe Photoshop virtual canvas	Completed skin design for the 3D character.
	Course work <i>Skinning the character</i>	8	Lab coursework (continue): more details added to the character	Completed character with skin. 3D model storyboard.
PRESENTATION	Course presentation <i>simple design critique and sharing</i>	3	Project Presentation Sharing for refinement of 3D storyboards	Students to learn to present their work confidently and learn to accept criticism of their work for improvements.

Note: Year 2 character creation: from Simple Monster to AI Robots. Students make their own choice whether to create monster robots or manga type of robots, as long as they are having fun and are passionate about their own creation.

YEAR THREE

	Instructional Procedures	Time (hrs)	Activities	Outcomes
EXPOSITION	Designing the Set <i>Location, Props and Atmospheres</i>	2	Students to watch extracts on film/animation-making	Student to understand about concept art for animation, movies, and learn to create a setting for their animation story.
	Light and surface <i>Illumination</i> <ul style="list-style-type: none"> • 4 types of lights (Point, Spot, Distant, Areas) • Ambient lights • Using shadow maps • Lighting concepts (Single, Two, Three points) • Understanding how light affects materials and textures • Colour bleeding 	4	Students to play with photography setting and impromptu stage setting and understand the effects of types of lights casting onto objects Students to sketch out their plan for light and staging of their 3D animation space	Animation stage plans with proper character staging and ambient lightings. *Students are to use their project hours to translate the plan into their 3D Studio Max stage rendering at later stage
	2 hrs - Hands On Tutorial/Project Session <i>Working on the project</i>			
ANIMATION	Basic character animation <i>Giving life to a character</i>	6	Lab session: learning how to create lip and limp movements of their character through biped manipulation	Students understand how to biped their character and continue the rigging process.
	Course work <i>Rigging the character</i>	6	Lab session (continue)	Complete character rigging process.
	2 hrs - Hands On Tutorial/Project Session <i>Working on the project</i>			

YEAR THREE

	Instructional Procedures	Time (hrs)	Activities	Outcomes
ANIMATION	Working with the timeline <i>Making objects move</i>	3	Lab session: learning about timeline and keyframes	Students understand how animation is done in 3D Studio Max.
	5 hrs - Hands On Tutorial/Project Session			
	Course work <i>Character animation</i>	14	Lab consultation/project session	Complete character animation.
EXPOSITION	Working with cameras <i>Looking through the lens</i> <ul style="list-style-type: none"> • Using cameras • Camera movements • Understanding depth of field effects • Creating depth of field • Animating a camera along a path • Working with multiple camera • Camera definition in video post • Project rendering 	2	Lab session: <i>Adding Camera movements and effects</i>	Students understand the uses of the camera. Complete character animation with camera effects and movements.

YEAR THREE

	Instructional Procedures	Time (hrs)	Activities	Outcomes
DISCUSSION	Discussion <i>Talking about work</i> <ul style="list-style-type: none"> • Presentation • Group Critique 	2	Work preview and round table discussion	Critique for improvements and understanding.
VIDEO ENHANCEMENTS	Video editing with Adobe Premiere Pro <i>Getting started</i>	6	Lab session: <i>Video editing</i>	Students understand the concept of video editing and learnt the necessary tools for editing. Finalise animation project with titles, music, voice over and effects.
	2 hrs - Hands On Tutorial/Project Session <i>Working on the project</i>			
	Screening <i>Sit back and relax</i>	4	Screening of Students' work	Students viewing final projects.