MEIS | Softimage

Autodesk®

Introduction

Welcome to the *Media | Entertainment Industry Standards (MEIS) for Autodesk® Softimage®*. Autodesk provides this document to help instructors and educational institutions develop the necessary skills to teach Softimage and prepare their learners for the challenges of working in industry. This document is the result of extensive interviews with professionals, educators, and managers at prestigious production companies around the world. The *Media | Entertainment Industry Standards (MEIS)* ultimately provide the education and entertainment communities with clear benchmarks and definitions for instructing with Softimage.

TIP: Although this document is designed to help facilitate the development of instructor-led courses and lessons, it may also be referenced for self-paced learning by instructors. The Standards encourage self-learning through the use of the Softimage documentation and online help.

This introduction covers the following topics:

- Document Goals
- Document Objectives
- Prerequisites
- Using this Document
- Notes, Tips, Warnings, and Thoughts
- Feedback

Document Goals

The *Media | Entertainment Industry Standards (MEIS)* have the following goals:

- Ensure learners receive comprehensive instruction of Softimage, with a focus on its role and function in the computer graphics entertainment industry.
- Standardize the requirements and/or core competencies for fundamental and intermediate level instruction with Softimage.
- Provide a clear benchmark on the type and level of content that should be taught to new learners of Softimage.
- Provide a content framework for developing high-quality curriculum, courseware, and lessons involving Autodesk Softimage.
- Provide a content framework and reference guide for the Autodesk® Certified Instructor (ACI) program.

Document Objectives

- After reviewing this document, you will be able to:
- Explain the purpose of the Media | Entertainment Industry Standards (MEIS).
- Identify the structure and features of the Media | Entertainment Industry Standards (MEIS).
- Distinguish and organize instructional content typically associated with Softimage into four primary areas.
- Explain how to develop instructor-led lessons by referencing the Media | Entertainment Industry Standards (MEIS), indicating features in the document that will enable the collection of additional information around a particular subject.

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Prerequisites

The *Media | Entertainment Industry Standards (MEIS)* are designed for instructors who desire fast and efficient access to the essential principles of computer graphics theory, practice, and software technology typically associated with learning Softimage.

It is recommended that you have:

- A comprehensive understanding of computer graphics theory and practice.
- A good understanding of adult learning principles and instructional methodologies.
- A robust working knowledge of Autodesk® Softimage®.

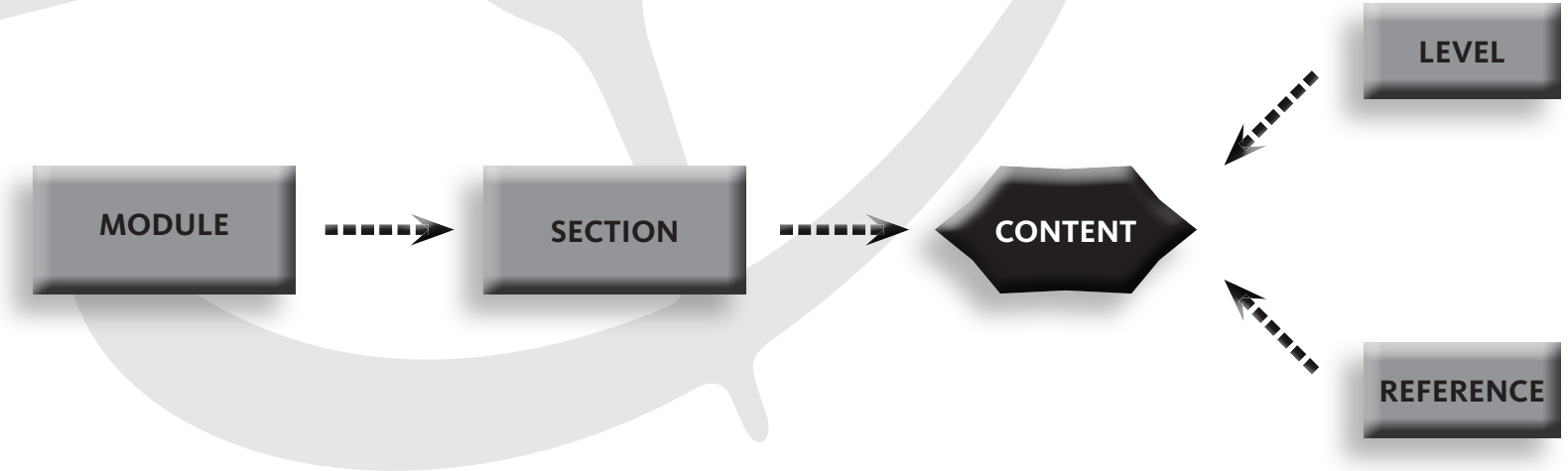
Using This Document

This section will provide an overview of the *Media | Entertainment Industry Standards (MEIS)*.

THOUGHT: The *Autodesk® Certified Instructor (ACI)* program includes online and live courses designed to help instructors learn how to best utilize the *Media | Entertainment Industry Standards (MEIS)*. For information on the program, visit: *http://www.autodesk.com/aci*. Using instructional tools like the *Media | Entertainment Industry Standards (MEIS)*, instructors will be able to develop the most compelling learning content and provide the most effective instruction.

The *Media | Entertainment Industry Standards (MEIS)* employs a hierarchical structure. This design is intended to provide organization and clarity around content (i.e. information) that can be perceived as highly complex or confusing to the computer graphics community. It is also meant to ensure instructors have the means to reference the document and get the information they need in the most efficient and productive manner

The structure of the *Media | Entertainment Industry Standards (MEIS)* includes a 3-tier hierarchy



THOUGHT: The structure of the *Media | Entertainment Industry Standards (MEIS)* is identical for *Autodesk® 3ds Max®*, *Autodesk® Maya®*, and *Autodesk® Softimage®*. Much of the content inside is similar or identical as well. This is strategically designed to promote cross-learning quickly and efficiently so instructors may increase their technical skills and abilities with Autodesk software.

MODULES

The *Media | Entertainment Industry Standards (MEIS)* is divided into 13 MODULES. Each MODULE relates to a standard, functional subject area or feature-set available in Autodesk® Softimage®. Several of the MODULES can be loosely associated to a standardized discipline or career path available in the computer graphics entertainment industry.

The MODULES are listed below in alphabetical order:

1. Animation
2. Cameras
3. Compositing
4. Dynamics / Simulation
5. Effects
6. Lighting
7. Materials / Shading
8. Modeling
9. Rendering
10. Rigging / Setup
11. Scene Assembly / Pipeline Integration
12. Scripting
13. UI / Scene Management

Each MODULE in the *Media | Entertainment Industry Standards (MEIS)* is divided into 4 SECTIONS:

1. Theory. This SECTION provides content that is conceptual or theoretical in nature. Historical/background information on a MODULE is also identified in this SECTION.
2. Applied. This SECTION provides content that is practical in nature (i.e. how the information or the software technology is typically applied in industry. Workflow and techniques that utilize the software technology are identified in this SECTION.
3. Activity. This SECTION provides recommended activities/exercises that instructors can offer to their learners. Adults typically learn the most knowledge and retain the most skills by 'doing things', so this SECTION is perhaps the most important asset for the instructor.

THOUGHT: It is up to the creativity of the instructor to create and provide the most stimulating and engaging ACTIVITIES. If you would like to share your ACTIVITY recommendations with Autodesk, please send correspondence to: me.certification@autodesk.com. Your contributions are welcomed and may be listed in future releases of this document!

Introduction

1. Tools. This section provides content relating directly to the features, toolsets, options, and commands available in Autodesk® Softimage®.

WARNING: The content in the Media | Entertainment Industry Standards (MEIS) is not listed in chronological order! Any instances of this are coincidental and should be evaluated by the individual.

SECTIONS

Each SECTION in the *Media | Entertainment Industry Standards (MEIS)* contains many rows of content. Each row of content has designations for LEVELS and connections to REFERENCES. The following section will explain the concept of LEVELS and REFERENCES.

LEVELS

All content in the *Media | Entertainment Industry Standards (MEIS)* has a LEVEL designation. The two LEVEL designations are Fundamental and Intermediate. Advanced LEVEL content is out of the scope of the documents.

NOTE: Teaching at a particular LEVEL does not establish the instructor's comprehension or skills with Softimage. An instructor's interest in teaching at the fundamental LEVEL courses does not typically mean their knowledge is limited to a fundamental LEVEL. In fact, most instructors teaching at the fundamental level are accomplished Softimage users.

The concept of the LEVEL designation is important for two reasons. First, the LEVEL attempts to highlight the amount of difficulty that most beginner computer graphics learners may have when attempting to absorb a particular piece of information. In this manner, it should be assumed that Fundamental LEVEL content should be taught before Intermediate LEVEL content. Second, the LEVEL attempts to distinguish content that is Fundamental LEVEL or Intermediate LEVEL from content that could be considered Advanced LEVEL. In this manner, it should be assumed that Advanced LEVEL content would directly follow Intermediate LEVEL content.

The most important point to remember when considering the LEVEL of any piece of information is how it could be perceived to the learner. Instructors need to remember that most subjects in the computer graphics field include information that could easily be perceived as Advanced LEVEL to learners that were not previously exposed to Fundamental or Intermediate LEVEL content around the same subject.

WARNING: In practice, LEVEL of content is highly subjective to the individual instructor and learner. The content one instructor identifies as Fundamental LEVEL may be Intermediate LEVEL content to another. Similarly, the LEVEL of difficulty learners have with any particular subject can be directly associated to their experience, knowledge, skills, and interests around the subject. Instructors must recognize this and act accordingly!

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REFERENCES

The *Media | Entertainment Industry Standards (MEIS)* contain two different kinds of REFERENCES.

1. (External Content) REFERENCES. This type of REFERENCE identifies content around the subject that is readily available through the internet. These REFERENCES are indicated in the Theory, Applied, and Activity SECTIONS of the Media | Entertainment Industry Standards (MEIS). Instructors should evaluate the appropriateness of the content available through this REFERENCE when designing instructor-led courses and lessons.

TIP: Every effort has been made to ensure each link is associated with live content. If you experience difficult using the links, please use the text in the link to search for this content on the internet. The internet contains a wealth of information on each subject listed in the content section of this document.

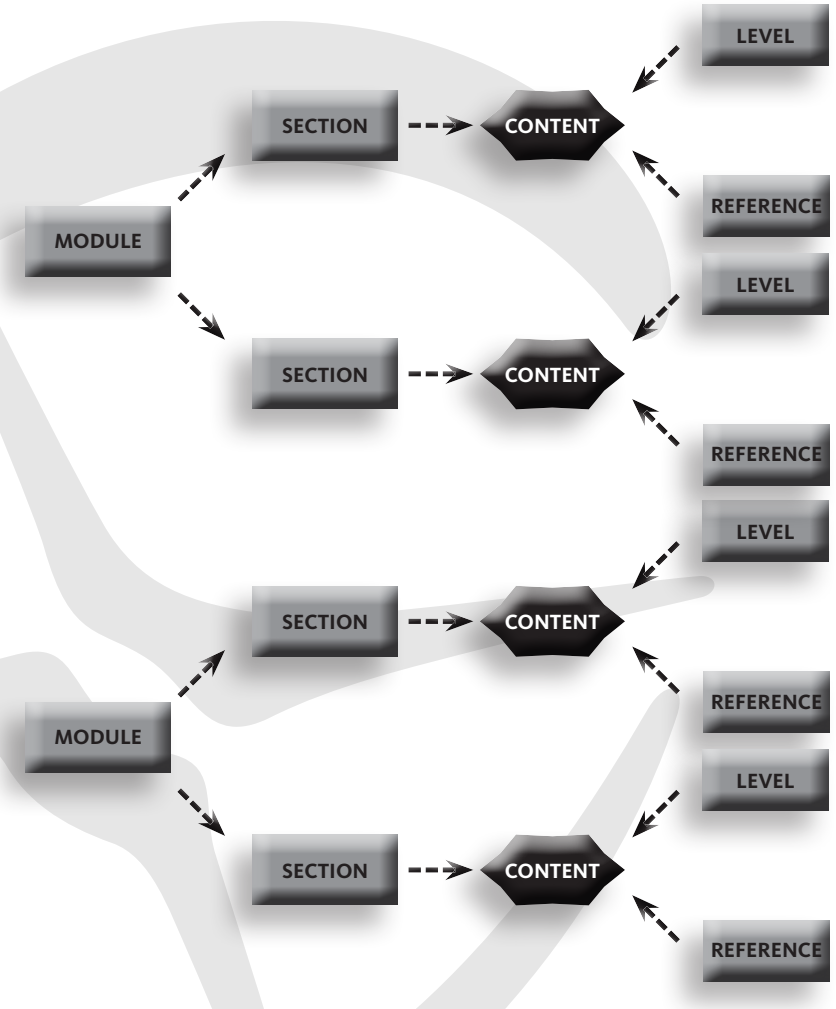
WARNING: The REFERENCES provided in the *Media | Entertainment Industry Standards (MEIS)* are not a complete collection of links around a subject. If you identify a better link, please use it! If you would like to share it, please send correspondence to: *me.certification@autodesk.com*. Your contributions are welcomed and may be listed in future releases of this document!

2. (Software Documentation and Online Help) REFERENCES. This type of REFERENCE indicates the string of text that can be entered into the search field of the software documentation and online help system in order to receive more information around a subject. These REFERENCES are indicated in the Tools SECTION of the *Media | Entertainment Industry Standards (MEIS)*. Instructors should evaluate the appropriateness of the content available through this REFERENCE when designing instructor-led courses and lessons.

NOTE: This document is complementary to the software documentation and online help. For detailed explanations of specific software features and functionality, refer to the documentation and online help system in the software. You may also reference the software documentation and online help that is available on Autodesk.com.

Introduction

The following graphic provides a more detailed illustration of the structure of the *Media | Entertainment Industry Standards (MEIS)*:



NOTE: The amount of content listed in each MODULE may vary according to several factors, including the relevance of the content, the variety of content available in the respective SECTION, and the difficulty that learners (at a particular LEVEL) may have in learning the content. For example, one MODULE may be extensive at the Fundamental LEVEL, while another MODULE may be more technically challenging and is therefore more limited at the Fundamental LEVEL. Similarly, one MODULE may be heavy in Theory, while another MODULE is sparse.

Introduction

Notes, Tips, Warnings, and Thoughts

Throughout this document, notes, tips, warnings, and thoughts are called out for special attention. Notes contain guidelines, constraints, and other explanatory information. Tips provide information to enhance your productivity. Warnings provide information about actions that might result in confusion experienced by yourself or your learners. Thoughts contain additional information that you may want to reflect upon or take further action.

Feedback

Autodesk welcomes feedback on the *Media | Entertainment Industry Standards (MEIS)*. After reviewing this document, if you have suggestions for improvements, or if you want to report an error, please send your feedback to: *me.certification@autodesk.com*.

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MEIS | Softimage

Image courtesy of Autodesk Customer Gallery

Topic	Sub-Topic	Recommendation	Reference	Level
Animation 101	Animation Paradigms	Use visuals examples to introduce and compare various animation techniques available in the software (i.e. Keyframe, Motion Path, Expression, Simulation, Motion Capture, etc.), discussing their common applications and benefits.		Fundamental
Motion Dynamics	Frame Rate (FPS)	Introduce the concept of Frame Rate and Frames Per Second (FPS), reviewing the standard rates used in various market segments (i.e. Film, Games, etc.)	Frame Rate	Fundamental
	Persistence of Vision	Introduce the concept of Persistence of Vision, identifying its relationship to object motion.	Persistence of Vision	Fundamental
Animation Techniques	Keyframing	Introduce the concept of the Keyframe, providing historical reference.	Keyframe	Fundamental
	Keyframing	Discuss the process of setting key frames for an object and review the use of coordinate systems to specify position in 3D space. Illustrate the Keyframing process using basic visuals (i.e. create and analyze a simplified timeline) and/or props.	Keyframe	Fundamental
	Inbetweening	Introduce the concept of inbetweening (i.e. creating intermediate images or frames between key frames in order to create the full motion of characters and objects), providing historical reference.	Inbetweening	Fundamental
	Interpolation	Review the principle methods of interpolation between key frames (e.g. linear, constant, stepped, spline, etc...). Introduce the concept of the function-curve and function-curve editor, discussing how the motion of objects can be changed precisely using a variety of controls in the software.	Interpolation	Fundamental
Newton's Laws of Motion	Inertia	Introduce Newton's first law (Inertia) and its relationship to object motion. Explain and illustrate that objects will remain at rest or continue in uniform motion and in a straight line unless a force acts upon them.	Inertia	Fundamental
	Acceleration	Introduce Acceleration and its relationship to object motion. Explain and illustrate the statement: "An object will accelerate depending on the amount and direction of the force used to move it."	Acceleration	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Newton's Laws of Motion	Force	Introduce Force and its relationship to object motion. Explain and illustrate the statement: "If you use twice the force an object will move twice as far."	Force	Fundamental
	Mass	Introduce Mass and its relationship to object motion. Explain and illustrate the statement: "If you double the weight of an object it will move half the distance when struck with the same force."	Mass	Fundamental
	Action and Reaction	Introduce Newton's Third Law of Motion. Explain and illustrate the statement: "For every action there is an equal and opposite reaction."	Action and Reaction	Fundamental
Motion Dynamics	Friction	Introduce the concept of friction and its effect on the motion and trajectory of objects in 3D space.	Friction	Fundamental
Animation Techniques	Breakdowns	Review the process of breaking down the action of a short motion sequence in order to identify the critical poses that distinguish the important stages or features of the motion.	Walk	Intermediate
Animation Principles	12 Basic Principles of Animation	Introduce the 12 Basic Principles of Animation, listing the principles and briefly discussing it's historical significance to the art of animation.	12 Basic Principles of Animation	Intermediate
	Straight Ahead and Pose to Pose	Illustrate and compare the differences in method and workflow between straight ahead animation and pose-to-pose animation and describe the advantages, disadvantages and combination of both techniques.	Straight Ahead and Pose to Pose	Intermediate
	Slow In and Slow Out	Explain and illustrate how objects and characters (and character actions) accelerate when they start moving and decelerate when they come to a stop.	Slow In and Slow Out	Intermediate
	Anticipation	Explain and demonstrate how anticipation captures and directs the viewer's attention, leads the viewer into the main action, gives cues about what to expect and guides the motivation of an object or character.	Anticipation	Intermediate
	Follow Through	Explain and demonstrate that as a result of the force created by the main action, characters and connected objects continue to move after the principle motion ends.	Follow Through	Intermediate
	Arcs	Explain and show how humans, animals, and organic life forms (and in some cases objects – e.g. a golf ball in flight) do not move in absolutely straight lines but through paths of action that are curved in space.	Arcs	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Principles	Overlapping Action	Explore how the motion of objects connected to a character (or another object) will overlap the main action as a result of the transfer of forces along the chain of connections to the furthest point.	Overlapping Action	Intermediate
	Secondary Action	Use visual examples to explain and illustrate how secondary actions create richer and more detailed natural movements, enhance the emotion and motivation of a character, embellish character traits and create a distinct personality.	Secondary Action	Intermediate
	Exaggeration	Explain and illustrate how disproportionate movement or amplified actions (breaking the rules of physics) can be used to intensify and accentuate the viewer's experience and draw attention to specific actions and emotions.	Exaggeration	Intermediate
	Squash and Stretch	Review and explore the process of deforming the shape of an object or character (while keeping its volume and apparent mass constant) to improve the expressive qualities of its motion.	Squash and Stretch	Intermediate
	Timing	Explain and illustrate how expressive timing decisions give meaning to movement by creating anticipation and surprise, by revealing the action, pacing a shot and conveying the mass, force and dynamics of motion in objects and characters.	Timing	Intermediate
	Staging	Explain and illustrate how the process of organizing and arranging the elements of a scene in 2D or 3D space (visual storytelling) is used to create specific actions, moods, character behaviors and interactions and to create visual clarity in a shot or scene.	Staging	Intermediate
	Solid Drawing	Review the importance of good solid drawing or modeling to clearly illustrate the anatomy, volume, weight, balance and form of characters, show how good silhouettes are key to character performance, and why twinning should be avoided.	Solid Drawing	Intermediate
	Appeal / Charisma	Illustrate how a character's design should clearly and immediately communicate to the audience its personal and cultural background as well as its psychological characteristics and personality.	Appeal	Intermediate
Animation Techniques	Euler vs. Quaternion	Introduce the two different methods of rotation and explain the pros/cons of each system	Euler vs. Quaternion	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Motion Dynamics	Frame Rate (FPS)	Demonstrate how to set frame rates for a variety of market standards in the Autodesk software application.	Frame Rate	Fundamental
	Persistence of Vision	Demonstrate the visual characteristics of an animated motion sequence viewed at various frames rates and explain the difference between shooting on 24, 12 and 8 frames per second.	Persistence of Vision	Fundamental
Animation Techniques	Keyframing	Review the coordinate system(s) used to specify position in 3D space, demonstrate setting key frames for a simple object (i.e. Box, Cube) moving in 3D space, show how key frames may be duplicated, cut and pasted on a time lime, and demonstrate how objects can be moved, rotated and scaled.	Keyframe	Fundamental
	Keyframing	Focus initial keyframing demonstrations on the ability to control object Position/Translation first, object Rotation second, and object Scale last. Also focus demonstrations on the transformations of real-world objects undergoing accurate, objective motions that learners can easily relate to. (i.e. a wooden crate that drops and rolls across the ground, the hands of a clock that rotate from a center point).		Fundamental
	Inbetweening	Demonstrate animation UI workflow with a simple activity (i.e. keyframing the movement of a single primitive object along 1 axis), focusing on how intermediate frames (inbetweens) are used to create motion between key frames.	Inbetweening	Fundamental
	Interpolation	Demonstrate the application of key frame interpolation and the use of and function-curve editor to visualize and manipulate the motion of an object between key frames.	Interpolation	Fundamental

WARNING: This document contains several instances where URL's of the same or similar name may link to different website addresses

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Techniques	Keyframing	Demonstrate digital animation basics by controlling simple object motion (i.e. non-deforming bouncing ball) along multiple axis		Fundamental
		Demonstrate digital animation basics by controlling the movement, rotation, and scale of a simple object (i.e. non-deforming box) interacting with other objects in a scene		Fundamental
	(Motion) Paths	Introduce (Motion) Path animation, providing historical and practical reference		Fundamental
		Showcase popular examples of (Motion) Path animation from contemporary media.		Fundamental
	Hierarchical Animation	Demonstrate the ability to control basic transformational motion through the use of simple parent/child and/or group-based object hierarchies (i.e. automobile>axle>wheel>tire, reciprocating fan>rotor>blades)		Fundamental
Newton's Laws of Motion	Inertia, Force, Mass, Acceleration	Demonstrate digital animation basics and Newton's Laws of Motion by controlling the motion of several simple (non-deforming) objects that transform and interact with each other in a simple environment (i.e. Pin Ball Machine, Billiards Table, or Rube Goldberg System). For example, a billiard ball moves and falls into a corner pocket when struck by a cue ball; Triggered by the impact of a cue stick striking the cue ball.	Rube Goldberg Machines	Fundamental
	Action and Reaction	Demonstrate Newton's Third Law of Motion by animating a ball interacting with a box to show how the two interact depending on the mass of the ball and the force with which it hits the box. Be sure to define the physical and visual properties of each object for added realism and objective critique of the motion.	Action and Reaction	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Motion Dynamics	Friction	Use visuals to illustrate various forms of friction that result from surface contact, mechanical friction, fluid friction, air resistance, and turbulence.	Friction	Fundamental
Animation Principles	Straight Ahead and Pose to Pose	Demonstrate both straight-ahead and pose-to-pose animation methods using examples from 2D, 3D and stop motion animation.	Straight Ahead and Pose to Pose	Intermediate
	Slow In and Slow Out	Demonstrate and analyze slow-in and slow-out movements for a variety of light and heavy objects as well as fast and slow character actions.	Slow In and Slow Out	Intermediate
	Anticipation	Illustrate anticipation using simple examples such as bending down before a jump, backward arm motion before throwing a ball, a downward bounce before a dive or shifting feet before lifting a weight.	Anticipation	Intermediate
	Follow Through	Demonstrate and show with visual examples that when an action stops, slows down, or changes direction, the parts of the object furthest away from the centre will tend to continue to move in the direction of the original force.	Follow Through	Intermediate
	Arcs	Demonstrate how the path of action of each part of the body moves in an arc as a result of the physical limitations of the body's joints. Illustrate this through analyzing the arc that result from all kinds of movement such as hip motion, throwing or kicking a ball, a martial arts move, or a punch.	Arcs	Intermediate
	Overlapping Action	Demonstrate and illustrate overlapping action using examples that involve connection between objects and joints characterized by the successive breaking of joints.	Overlapping Action	Intermediate
	Secondary Action	Demonstrate how a range of secondary actions can complement, enhance and support a character's primary action and personality through actions such as hand and head gestures, changes of expression, nervous movements, blinking, yawning, waving or shaking a fist.	Secondary Action	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Principles	Exaggeration	Demonstrate and explain how exaggeration helps the viewer better understand the behavior of an object, an event or the emotion of a character by enhancing (disproportionately increasing or decreasing) one or more animation principles.	Exaggeration	Intermediate
	Squash and Stretch	Demonstrate the use of squash and stretch techniques on a variety of characters and objects for both realistic effects and stylized or highly distorted. Show how changes in body shape, movements and facial expressions add lifelike attributes to characters.	Squash and Stretch	Intermediate
	Timing	Demonstrate how proper timing (together with spacing) is used to convey weight, force, scale, and the dynamics of motion through anticipation, slow in and slow-out, follow-through, reaction, arcs, overlapping action and secondary actions	Timing	Intermediate
	Staging	Demonstrate how effective staging and posing of characters in a shot can be used for maximum impact and to show how working out how characters in a scene will move assists the audience in clearly understanding the action.	Staging	Intermediate
	Solid Drawing	Demonstrate the importance of solid modeling in character design, illustrating with visual examples of how strong silhouettes are important to a character's physical and emotional state and why twinning should be avoided.	Solid Drawing	Intermediate
	Appeal / Charisma	Select and analyze the design of a variety of animated characters and objects and explain how their design conveys the essential elements of their character and personality.	Appeal	Intermediate
	Graph/Curve Editor VS. Dope Sheet	Compare the Dope Sheet to the Graph/Curve Editor (i.e. Using Dope Sheet to adjust timing and Graph/Curve Editor for general animation purposes)		Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Techniques	Ghosting/Unghosting objects	Demonstrate the ability to ghost an object as a tool for analyzing animation - timing, slow in/out, arcs		Intermediate
	Animating with Constraints	Demonstrate the use and benefits of animating with constraints (in context to real-world examples)		Intermediate
	Breakdowns	Demonstrate the process of breaking down a sample motion in order to identify the key frames and additional distinct poses (breakdowns) that characterize the movement.	Walk	Intermediate
Animation Performance	Critiquing Animation Performance	Demonstrate how to research and assemble examples of animation (i.e. traditional and digital) from contemporary media. Showcase the results, identifying the intent of the performance and evaluating any perceptible strengths or deficiencies in the motion.	Artistic Critique	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Motion Dynamics	Frame Rate (FPS)	Practice setting various frame rates, playback a given animation sequence at different frame rates and evaluate the results in terms of any perceptible visual differences.	Frame Rate	Fundamental
	Persistence of Vision	Animate and compare the motion of an object moving horizontally across the screen when shot on 1's 2's and 3's.	Persistence of Vision	Fundamental
Animation Techniques	Keyframing	In 3D space, animate a simple object (i.e. Box, Cube) moved between two key frames, then moved and rotated to a third key frame and further moved and scaled between the third and a fourth key frame.	Keyframe	Fundamental
	Keyframing	Keyframe animate a series of real-world objects undergoing accurate, objective motions. (i.e. a wooden crate that drops and rolls across the ground, the hands of a clock that rotate from a center point). Practice the ability to control object Position/Translation first, object Rotation second, and object Scale last.		Fundamental
	Inbetweening	Practice animation UI workflow with a simple activity (i.e. keyframing the movement of a single primitive object along 1 axis)	Inbetweening	Fundamental
	Interpolation	Use a function-curve editor to create and manipulate the motion between key frames of a forward bouncing ball. Change the interpolation methods to create different dynamic motions.	Interpolation	Fundamental
	Keyframing	Practice digital animation basics by controlling simple object motion (i.e. non-deforming bouncing ball) along multiple axis		Fundamental
		Practice digital animation basics by controlling the movement, rotation, and scale of a simple object (i.e. non-deforming box) interacting with other objects in a scene		Fundamental
	(Motion) Paths	Practice creating and controlling the motion of simple, mechanical objects (automobiles on a banked racetrack, airplanes in an aerial chase, etc. using Motion Path animation.		Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Newton's Laws of Motion	Inertia, Force, Mass, Acceleration	Practice digital animation basics and illustrate Newton's Laws of Motion by creating and controlling the motion of several simple (non-deforming) objects that transform and interact with each other in a simple environment (i.e. Pin Ball Machine, Billiards Table, or Rube Goldberg System). For example, a billiard ball moves and falls into a corner pocket when struck by a cue ball; Triggered by the impact of a cue stick striking the cue ball.	Newton's First Law - Example	Fundamental
	Action and Reaction	Create an animation that illustrates how a ball and a box will move as a result of varying the apparent mass and weights of both objects. Define the physical and visual properties of each object for added realism and objective critique of the motion by your peers.	Action and Reaction	Fundamental
Motion Dynamics	Friction	Animate an object that is affected by friction. Define the physical and visual appearance of the object and type of friction it encounters for added realism and objective critique of the motion by your peers. For example, the motion of a golf ball in flight is influenced by both gravity and air turbulence (wind force and direction).	Friction	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Techniques	Breakdowns	Using video reference, break down and draw or trace (rotoscope) the four key poses of a typical walk cycle (contact, up, down and passing).	Walk	Intermediate
Animation Principles	Straight Ahead and Pose to Pose	Animate a bouncing ball using straight ahead animation and compare it with a version using pose-to-pose.	Straight Ahead and Pose to Pose	Intermediate
		Animate a simple bipedal character walk cycle using straight ahead animation and a second example using pose-to-pose animation with four key poses (contact, up, down and passing).		Intermediate
	Slow In and Slow Out	Create slow-in and slow-out movements to show realistic motion for a simple action such as the motion of a swinging pendulum.	Slow In and Slow Out	Intermediate
	Anticipation	Using photographs or sketches, observe, record, and illustrate anticipation in a sports action, waiting for a bus, preparing to catch a ball, or a cat pouncing on a mouse.	Anticipation	Intermediate
		Create anticipation in a simple action such as a character preparing to jump over a box.		Intermediate
	Follow Through	Using photographs or sketches, illustrate follow-through of several actions such as the motion of a club after hitting a golf ball, the wings of a large bird in flight, the flow of a dress as a female character stops walking, or a robot's loose parts falling off after it hits the ground or recovery after a jump.	Follow Through	Intermediate
	Arcs	Select a complex human movement such as hitting a golf ball, a dive into water, a hurdler, or the path of action of a soccer ball kicked into the air, and illustrate in a sketch the primary arcs of motion.	Arcs	Intermediate
	Overlapping Action	Animate the overlapping motions of the shoulder, elbow, wrist, hand and fingers when throwing a ball using successive breaking of joints.	Overlapping Action	Intermediate
	Secondary Action	Create secondary actions for a character standing and waiting for a bus or a walking robot with loosely attached features.	Secondary Action	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Principles	Exaggeration	Research and present visual examples of how exaggeration can be achieved by amplifying or reducing either the size, shape, timing spacing, weight, forces, arc of action, pose, follow-through, slow in and out or staging of actions and characters.	Exaggeration	Intermediate
	Squash and Stretch	Apply squash and stretch to the motion of a forward bouncing ball.	Squash and Stretch	Intermediate
	Timing	Vary the timing and spacing of a bouncing ball to convey different weights and (e.g. table tennis ball and bowling ball). Vary the timing of slow-in and slow-out motions to convey varying forces on a billiard ball.	Timing	Intermediate
		Experiment with the timing of shots in a scene to best convey the action and engage the viewer's interest.		Intermediate
	Staging	Stage the positions and interaction of two characters in conversation Illustrating the conservation of the 180-degree rule.	180 Degree Rule	Intermediate
	Solid Drawing	Create a dramatic silhouette for a given character that clearly illustrates its intended motion or emotional state such as excitement, depression frustration or a sports action.	Solid Drawing	Intermediate
	Appeal / Charisma	Research, select, analyze and compare 2D, 3D and stop motion character designs that best convey clear, immediate and distinct aspects of a character's history, personality and psychology.	Appeal	Intermediate
Animation Techniques	Hierarchical Animation	Practice the ability to control basic transformational motion through the use of simple parent/child and/or group-based object hierarchies (i.e. automobile>axle>wheel>tire, reciprocating fan>rotor>blades)		Intermediate
	Animating with Constraints	Practice animating objects with constraints (in context to real-world examples).		Intermediate
Animation Performance	Critiquing Animation Performance	Research and assemble examples of animation (i.e. traditional and digital) from contemporary media. Present your findings to your peers, evaluating any perceptible strengths or deficiencies in the motion.	Artistic Critique	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Keyframing Basics	Animation Terminology	Introduce the concept of Keyframe, Breakdown, and Inbetween	*Animating with Keys*	Fundamental
Animation UI	Animation Layout Configuration	Demonstrate efficient UI layout for keyframe animation	*Overview of Layouts*	Fundamental
	TimeLine	Overview of Timeline	*Timeline*	Fundamental
	Range Slider	Setting Start and End range for playback	*Time Range*	Fundamental
	Playback Controls	Play, step, loop, RT buttons	*Playback controls*	Fundamental
	Keyframe button	Using the Key/Unkey button	*Overview of Setting Keys*	Fundamental
	Keyframe Icon feedback colors	Explain colors cues for keyed, onkey, offkey, changed	*Animation Icon*	Fundamental
	Animation Menu	Overview of the tools in the Animation Menu	*Tools for Animation*	Fundamental
	UI switcher buttons	Switching between the MCP and KP/L	*The Autodesk Softimage Interface*	Fundamental
	Ghosting and Trails	Show how to set up a ghosting per object, and the ghost options including trail	*Ghosting Animated Objects*	Fundamental
	Displaying Animation Stats	Display Frame Rate and Cache	*Camera Visibility Property Editor / stats*	Fundamental
Creating Animation: Keyframing	Animation Preferences	Animation settings in the Preferences Window for Time Slider and Playback	*Animation Preferences*	Fundamental
	Set Key	Setting keys with keyframe icon(s) and hotkeys	*Overview of Setting Keys*	Fundamental
	Auto Key	using autokey	*Setting Keys Automatically*	Fundamental
	Marking Params	Marking parameters for keys from either selected transform or using menu	*Marking Parameters for Animation*	Fundamental
	local vs. global parameters	Explain the difference on local and global params	*Animating Local versus Global Transformations*	Fundamental
	Using Key Panel (KP)	Overview of the KP/L (Key Panel)	*Keying Keyable Parameters in the Keying Panel*	Fundamental
	Using Property Windows	How to use property windows, virtual sliders, keyframe icons and the Keyframe Property editor (Ctrl K)	*Modifying Properties in Property Editors*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Editing Animation: Keyframing	Unkey	How to remove a single keyframe per object/selected parameters	*Overview of Setting Keys*	Fundamental
	Select Keys	Selecting keys in timeline		Fundamental
	Move keys in time	Moving selected keys in timeline	*Editing Keys in the Timeline*	Fundamental
	Delete Keys	Deleting keys in timeline		Fundamental
	Scale keys in time	Scaling selected keys in timeline		Fundamental
	Copy Keys	copying selected key in timeline		Fundamental
	Paste Keys	pasting keys in timeline		Fundamental
	Scrub without update to key	Middle mouse scrubbing	*Playing the Animation*	Fundamental
Editing Animation: Animation Editor (Fcurve)	Animation Editor	Overview of Curve editor UI and menus	*Overview of the Fcurve Editor*	Fundamental
	Select keys	Selecting keys		Fundamental
	Moving Keys in time and value	Moving keys, and constraining to time or value, also snapping options		Fundamental
	Deleting keys	Deleting keys from a Fcurve		Fundamental
	Inserting Keys	Inserting keys on a Fcurve		Fundamental
	Tangent Types	Linear, Spline, Plateau, Clamped…		Fundamental
	Adjusting Tangents	Editing Tangent handles angle, length and breaking tangents		Fundamental
	Cycles, Gradient and Relative Cycle	Creating cycles, and Freezing cycles	*Creating Function Curve Cycles*	Fundamental
	Snapping Keys to whole frames	Snapping Keys to whole frames	*Snapping Key Points*	Fundamental
Dope Sheets	Dope Sheet Overview	What is dope sheet used for, how is it different from timeline	*Dopesheet*	Fundamental
	Selecting Keys	Selecting keys		Fundamental
	Activating and Deactivating keys	How to turn off certain parameters		Fundamental
	Moving keys	Moving keys		Fundamental
	Scaling keys	Scaling keys		Fundamental
	Copying Keys	Copying Keys		Fundamental
	Pasting Keys	Pasting Keys		Fundamental
	Deleting Keys	Deleting Keys		Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Preview/Render Animation	Capture	Creating a camera capture to a movie file	*Capturing Animation in a Viewport (Flipbook)*	Fundamental
	Fast Playback and Caching	Setting display options for Animation playback	*Playing Back All Frames or Playing in Real Time*	Fundamental
Creating Animation: Motion Paths	Attach to Path	Attaching an object to a path	*Animating along Paths and Trajectories*	Fundamental
	Turning on Tangent and UpVector	Controlling tangent follow		Fundamental
	Editing Path animation in Curve editor	Controlling roll		Fundamental
Hotkeys	k = set key	using “k” hotkey	*Keyboard Shortcuts*	Fundamental
	Alt + k = set keys on all	using “Alt + K” hotkey		Fundamental
	Ctrl + k = keyframe parameters	using “ Ctrl + k” hotkey		Fundamental
Constraints	Animating with Constraints	Introduce the process and benefits of animating with simple Constraints (Point, etc…)	*Animating with Constraints*	Fundamental
Procedural Animation	Procedural Animation	Show the use of basic expressions and linking parameters	*Animation Overview*	Intermediate
	Basic Expressions	Simple expression like “rotation z = trans x / (size * pi)” to create an automatic roll	*Animating with Expressions*	Intermediate
	Link Params	Setting relationship between objects, like a door than opens when an object gets close	*Linking Parameters*	Intermediate
Deformers	Shape	Shape animation with Shape Manager	*Shape Animation*	Intermediate
	Cluster	Animating clusters to control curves points or surface areas	*Cluster Animation*	Intermediate
Audio	Importing Sound files	Importing Sound files	*Creating Audio Clips*	Intermediate
	Audio scrubbing options	Audio scrubbing options	*Playing Audio Clips*	Intermediate
Hierarchy Animation	Creating and Parenting Nulls as Animation helpers	Example parent a null to a box, then animate null in X axis, then animation ball jumping up and down to create bumpy ride animation	*Parent-Child Relationships Between Objects (Hierarchies)*	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Animating Pivots	Using the temporary pivot for Animation	Using ALT hotkey to edit pivot	*Transformation Basics*	Intermediate
	Animating actual pivot	Pivot Animation and compensate	*Pivot Animation*	Intermediate
Editing Animation: Animation Mixer	Non Linear Animation (NLA)	Provide an overview of the benefits and process of NLA	*What is NonLinear Animation*	Intermediate
	Adding Actions with the Biped Rig (pose and Fcurve)	Adding actions using Animation mixers or dragging from Browser to Mixer or rig	*The Animation Mixer*	Intermediate
	Creating new tracks	creating animation, shape or audio tracks	*Working with Tracks*	Intermediate
	Mute, Solo and ghosting tracks	Overview of the Mixer track display options	*The Animation Mixer*	Intermediate
	Moving actions	Moving an action in time or to a different track		Intermediate
	Scaling and cropping	Adjusting the length of an actions		Intermediate
	Looping actions	Creating and editing actions cycles		Intermediate
	Blending between actions using weight and layers	show simple weight based blending		Intermediate
	Creating offsets	pose offset and offset maps		Intermediate
	Editing Clip Properties	adjusting properties per clip		Intermediate
	Editing Source Properties	adjusting source properties, deactivating parameters		Intermediate
	Creating Pose Actions	Creating a current frame action (poses)		Intermediate
	Creating Animation Actions	Creating a Fcurve action (motion)		Intermediate
	Blending using standard blend	Blending between clips (poses and motion)		Intermediate
	Using compounds to group actions	Combining actions to a compound		Intermediate
	Using warp curve	Time warping actions and compounds		Intermediate

Cameras

Image courtesy of Michael White Films

Topic	Sub-Topic	Recommendation	Reference	Level
Cinematography	Aspect Ratio	Introduce and illustrate five common aspect ratios of film and television formats (4:3, 3:2, 16:9, 1.85:1 and 2.39;1)	Aspect Ratio	Fundamental
	Composition	Illustrate the principles of organization for screen design with emphasis on division of space and placement of elements.	Composition	Fundamental
	Depth of Field	Define the term depth of field and differentiate between deep focus (both foreground and background in focus) and shallow depth of field.	Depth of Field	Fundamental
	Camera Angles	Introduce the different cinematic Shot Types (ex. Establishing/ Wide Shot, Close-Up, Extreme Close-Up)	Cinematic Techniques	Fundamental
	Camera Position	Describe shots that result from specific camera positions such as Point of View (POV), bird's eye or crane, low angle, over the shoulder, reverse shot, and zoom together explanation of the with the 180 degree rule.	Camera Position	Fundamental
	Staging	Introduce the importance of staging the position and movement (blocking) of characters and objects in a scene in order to direct the viewer's attention and direct the action.	Staging	Fundamental
	Camera Movement	Differentiate Still Photography from Cinematography. Describe the primary camera movements used in film and televisionproduction including pan, tilt, dolly (tracking) and zoom.	Camera Movement	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Cinematography	Aspect Ratio	Using a selection of images from each format compare and discuss the advantages and limitations of each in terms of scene composition.	Aspect Ratio	Fundamental
	Composition	Introduce the Rule of Thirds and symmetrical/asymmetrical balance as methods of composition and the organization of scene elements.	Rule of Thirds	Fundamental
	Depth of Field	Illustrate narrow depth of field and deep focus using images from photography, cinematography and computer graphics.	Depth of Field	Fundamental
	Camera Angles	Demonstrate how different Shot Types can influence the meaning/impact of an Image/Story; Illustrate using examples from contemporary media.	Cinematic Techniques	Fundamental
	Camera Position	Demonstrate the application of different camera positions using practical examples from film or television.	Camera Position	Fundamental
	Staging	Illustrate good staging by selecting shots or stills from CG animated films where the staging clearly illustrates the relationship or action between two characters. Compare this to poor staging where the action is not clear.	Staging	Fundamental
	Camera Movement	Demonstrate how camera movement can be used to stage the action, direct the viewers attention, or emphasize the meaning/impact of an sequence/story; Present visual examples from contemporary media.	Camera Movement	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Cinematography	Aspect Ratio	Crop a given scene using the five formats above to analyze the advantages, limitations and uses of different aspect ratios.	Aspect Ratio	Fundamental
	Composition	Provide a scene with a basic, pre-defined set of primitive objects (ex. Cube or Sphere). Using only basic transformation methods (move, rotate, duplicate, etc…), ask the learners to create a composition of their choice. Afterwards, conduct a group critique to evaluate the compositions created by each learner.	Composition	Fundamental
	Composition	Select two aspect ratios and create compositions (drawings or by photography) of an outdoor scene containing a building and two characters using the rule of thirds.	Rule of Thirds	Fundamental
	Depth of Field	Use selective focus to isolate a single object from a series of objects placed at different distances from the camera's position. Use smaller apertures to increase the depth of field.	Depth of Field	Fundamental
	Camera Angles	Provide a scene with a pre-built environment that includes many pre-arranged props and several cameras. Ensure that each camera is named according to a specific Shot Type (ex. Wide/Establishing Shot, Close-Up, Extreme Close-Up, etc...). Ask the learners to brainstorm and visualize a simple storyboard that utilizes different Shot Types to introduce the environment to an audience. Next, ask the learners to place each camera in correspondence with its visual story-telling function in their scene. Afterwards, conduct a group critique to evaluate the creativity and effectiveness of the cinematic choices made by each learner.	Cinematic Techniques	Fundamental
	Camera Position	Create several images of a simple scene with two characters using a variety of camera positions to vary the viewer's experience.	Camera Position	Fundamental
	Staging	Stage two characters to illustrate a self-evident relationship between them such as confrontation, a sports activity, a greeting, a marriage proposal, or a sad parting.	Staging	Fundamental
	Camera Movement	Separate your learners into small teams. Provide a scene (for each team) that includes several pre-built models (ex. cars moving on a road, characters sitting at a table) and a series of cameras that are positioned to capture each of the models. Provide a simple story to introduce the scene and ask each team to visually stage the scene through a series of shots based on the story. Ask each team to animate one of the following: 1) The cameras moving around stationary models. 2) The models moving around stationary cameras. 3) The cameras moving around moving models. Ensure each option is animated by at least one team. Afterwards, conduct a group critique to compare and evaluate the cinematic impact of each team's work based on the story.	Camera Movement	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Camera Types	Perspective Camera	Provide a Perspective Camera Overview	*Types of Camera*	Fundamental
	Orthographic Camera	Provide an Orthographic Camera Overview		Fundamental
	User view	Demonstrate viewing with a Virtual Camera using User View	*Types of 3D Views*	Fundamental
Creating Cameras	Perspective Camera	Demonstrate creating a Perspective Camera	*Creating Cameras*	Fundamental
	Orthographic Camera	Demonstrate creating a Orthographic Camera		Fundamental
Camera Settings	Camera Format	Discuss setting Camera Type and Pixel Ratios	*Setting Camera Properties*	Fundamental
	Lens Settings	Discuss setting Lens type and Angles		Fundamental
	Clipping Planes	Demonstrate how the Near/Far Clip Planes control what is rendered in Camera		Fundamental
Working with Cameras	Display	Demonstrate unhiding a Camera	*Creating Cameras*	Fundamental
	Selection	Demonstrate selecting Camera, Root and Interest	*Working with Cameras*	Fundamental
	Positioning Cameras	Demonstrate moving the camera in 3D and Camera Tools		Fundamental
	Using Memo Cams	Introduce saving and restoring Camera Settings		Fundamental
Hotkeys	Navigation Tool	Introduce the “S” Hotkey	*Working with Cameras*	Fundamental
	Zoom and Pan Tool	Introduce the “Z” Hotkey		Fundamental
	Orbit Tool	Introduce the “O” Hotkey		Fundamental
	Dolly Tool	Introduce the “P” Hotkey		Fundamental
	Roll Tool	Introduce the “L” Hotkey		Fundamental
	Frame Tool	Introduce the “A” and “F” Hotkeys		Fundamental
	Reset Camera	Introduce the “R” Hotkey		Fundamental
Camera Display	Field Guide	Demonstrate displaying the Field Guide in Camera View	*Customizing the Display in 3D Views*	Fundamental
Camera Settings	Depth of Field	Demonstrate using Depth of Field Effects	*Creating a Depth of Field Effect*	Intermediate
Image Planes and Rotoscope View	Image Planes	Introduce using Images in Camera View	*Rotoscopy*	Intermediate

Compositing

Image courtesy of Modus FX

Topic	Sub-Topic	Recommendation	Reference	Level
Graphic Design Principles	Elements of Design	Review the basic elements of design including line, shape, color, form, value, texture, size, and composition plus one, two and three-point perspective.	Design Elements	Fundamental
	Principles of Design (Organization)	Review the basic principles of design organization with emphasis on composition, rule of thirds (geometry), center of interest, balance, contrast, directional movement, negative and positive space, rhythm, light, shade, and juxtaposition of elements.	Composition	Fundamental
	Color Theory	Review the foundations of color theory including additive color theory, contrast of hue, saturation, value; warm, cold and complementary colors and the relationship between the color temperature of various light sources and color balance in film and video.	Color Theory	Fundamental
Motion Graphics Principles	Cameras and Lenses	Review the relationship between local length, aperture and depth of field emphasizing their practical application to the isolation and importance of specific areas or characters in a scene and the effect of changing focal length on perspective.	Focal Length	Fundamental
	Film and Video Formats	Review the concepts of aspect ratio, safe title, and safe action in accordance with major film and television formats.	Film Formats	Fundamental
	Digital Matting	Introduce the process and benefits of digital matting, providing historical reference.	Digital Matting	Intermediate
	Motion Blur	Describe and explain the cause and visual characteristics of motion blur in still images, motion pictures and HD video. Explain why motion may be needed to add realism during the compositing process.	Motion Blur	Intermediate
	Rotoscoping	Introduce the process and benefits of rotoscoping, providing historical reference.	Rotoscoping	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Graphic Design Principles	Elements of Design	Use examples from a variety of graphic designs and film stills that illustrate the use of design elements to isolate and emphasize objects and their organization in one, two and three point perspective.	Design Elements	Fundamental
	Principles of Design (Organization)	Use stills from film and video to illustrate the principles of spatial organization and their use in directing the viewer's eye in the composition.	Composition	Fundamental
	Color Theory	Review a variety of still from film and video that illustrate the use of a variety of color selection and arrangements that support the action, complement the location, indicate time of day, influence the mood and enhance the viewer's experience of a shot or scene.	Color Theory	Fundamental
Motion Graphics Principles	Cameras and Lenses	Using shots and scenes from film and video, demonstrate control of depth of field under different emotional circumstances to isolate or emphasize the action and direction the viewer's eye to the key action. Also show how maximum depth of field can be used to set the stage for action on a grand scale such as battles and dramatic scenes and as a key technique in blending scene elements.	Depth of Field	Fundamental
	Film and Video Formats	Use illustrations to review the aspect ratios of major film and television formats and stress the critical importance of safe title and safe action areas.	Safe Area	Fundamental
	Digital Matting	Demonstrate the process of digital matting in a simple composition.	Digital Matting	Intermediate
	Motion Blur	Demonstrate a variety of motion blur phenomena in contemporary media using illustrative examples from still photography, film shots, game cinematics, and video sequences.	Motion Blur	Intermediate
	Rotoscoping	Demonstrate the process of rotoscoping in a simple composition.	Rotoscoping	Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Graphic Design Principles	Elements of Design	Given a variety of design elements, arrange them so that the relationship among them is clear to the viewer (key objects are emphasized) and so that there is consistent light direction and shading.	Design Elements	Fundamental
	Principles of Design (Organization)	Given a variety of aspect ratios for film and television formats, arrange a group of design elements (e.g. characters. props, and buildings) to create a strong composition and clear indication of the action in a shot.	Composition	Fundamental
	Color Theory	Using a black and white illustration of a scene with a description of specific time of day and atmosphere or mood, create an appropriate color pallet that supports and enhances the shot.	Color Temperature	Fundamental
		Use a digital camera to record different scenes lit by a variety of light sources and at different times of day (with and without color balance correction) to evaluate the resulting changes in color balance and its correction.	Color Balance	Fundamental
Motion Graphics Principles	Cameras and Lenses	Create a group of images using a digital still camera that demonstrate control of depth of field, its use to isolate objects in a scene, and the effects of changes in perspective on characters, objects and buildings photographed from different distances.		Fundamental
	Film and Video Formats	Research and create reference illustrations of the aspect ratios, safe title and safe actions areas on three major TV formats (NTSC, PAL and HD) and two major film formats (35mm and 70mm).	Film Formats	Fundamental
	Digital Matting	Use digital matting techniques in the Autodesk software to create a simple multi-layer composition of pre-rendered image elements.	Digital Matting	Intermediate
	Motion Blur	Create a variety of motion blur examples by experimenting with digital still images of moving objects (using long shutter speeds) and by variations of camera movement in different lighting conditions using film or video.	Motion Blur	Intermediate
	Rotoscoping	Use rotoscoping techniques in the Autodesk software to alter and/or remove a specific image element (such as an object) in an animation sequence over time.	Rotoscoping	Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Compositing Overview	Compositing Layout	Switching to the Compositing Layout	*Using Softimage Illusion*	Fundamental
	FX Tree	Overview of the FX Tree	*The FX Tree*	Fundamental
	FX Viewer	Overview of the FX Viewer	*The FX Viewer*	Fundamental
Input types	Image File Input	Getting an image from disk into FX Tree	*File Input*	Fundamental
	Clips	Using clips as FX Tree Input	*Building Effects*	Fundamental
	Passes	Using passes as FX Tree Input		Fundamental
Composite Types	Over	Compositing using Over	*Over*	Fundamental
	Math	Using Math Composite (add, multiply…)	*Math Composite*	Fundamental
	Composite with Matte	Compositing using Mattes	*Composite with Matte*	Fundamental
Color Correction	Color Adjust	Adjusting color with HSV and Color Correct	*Color Adjust Operators*	Fundamental
	Color Curves	Adjusting color using color curves (Luma and RGB adjust)	*Color Curve Operators*	Fundamental
Masks	Creating Masks	Creating Masks using Paint	*Mask Shapes*	Fundamental
	Masks from Images	Importing Masks	*File Input*	Fundamental
Effects	Painterly Effects	Using Painterly Effects	*Painterly Effects Operators*	Fundamental
Filters	Blur	Using Blur Filters	*Filter Operators*	Fundamental
Transform	Resizing	Adjusting Image size	*Resize*	Fundamental
Optics	Lens Flares	2D Lens Flare effect	*Lens Flare*	Fundamental
Paint Tool	Paint Clip	Painting with Paint Clip	*Paint Clip*	Fundamental
Paint Tool	Vector Paint	Painting with Vector Paint	*Vector Paint*	Fundamental
Output Types	Image File Output	Rendering a composite	*Rendering Effects to File*	Fundamental
Painting	Softimage Paint Tools	Raster Paint tools overview	*2D Raster/Vector Paint*	Fundamental
	Raster Paint overview	Overview of Raster Paint	*2D Raster/Vector Paint/ Raster Paint Overview*	Fundamental
	Setting Color	Choosing Colors for Painting	*2D Raster/Getting Started: Painting on Images*	Fundamental
Paint Hotkeys	[or] = Brush Size	Setting brush size hotkey	*2D Raster/Getting Started: Painting on Images*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Rotoscope	Overview of Rotoscopy	Using Rotoscopy for Modeling or Animation Reference	*Basics of Rotoscopy*	Fundamental
	Setting up a Rotoscope Camera	Setting up a Rotoscope Camera		Fundamental
	Adjusting Rotoscope Camera	Navigating Cameras with Rotoscope Images	*Rotoscopy Tips*	Fundamental
	Rotoscopy Options	Setting Rotoscope Properties	*Camera Rotoscopy Property Editor*	Fundamental
	Pixel Zoom	Locking the camera with the Pixel Zoom icon	*Rotoscopy Tips*	Fundamental
Rotoscope Hotkeys	Z+LMB or S+LMB = Pan Camera	Pan Camera Hotkey		Fundamental
	Z+MMB or S+MMB = Zoom Camera	Zoom Camera Hotkey		Fundamental
	O or S+RMB = Orbit Camera	Orbit camera Hotkey	*Navigating in 3D views*	Fundamental
	Shift+Z = Rectangle Zoom	Rectangle Zoom hotkey		Fundamental
	F = Frame selection	Frame selection hotkey	*Rotoscopy Tips*	Fundamental
	A = Frame All	Frame A hotkey		Fundamental
Compositing Types	Keyer	Luma and Color Keying	*Keyer*	Intermediate
	Z Composite	Compositing with Z depth	*Z Composite*	Intermediate
Transform	Warping	Adjusting Image shape	*Warper*	Intermediate
Optics	Depth of Field	2D Depth of Field effect	*Depth of Field*	Intermediate
Painting	Vector Paint Overview	Overview of Vector Paint and tools	*2D Raster/Vector Paint/ Vector Paint Overview*	Intermediate
	Creating Masks with Paint	Creating masks with Paint	*2D Raster/Getting Started: Painting on Images*	Intermediate
	Editing Paint Strokes	Editing Vector Paint Strokes	*2D Raster/Editing Shape Points*	Intermediate
	Animating Paint Strokes	Animating Vector Paint Strokes	*2D Raster/Animating Vector Shapes*	Intermediate

Dynamics/Simulation

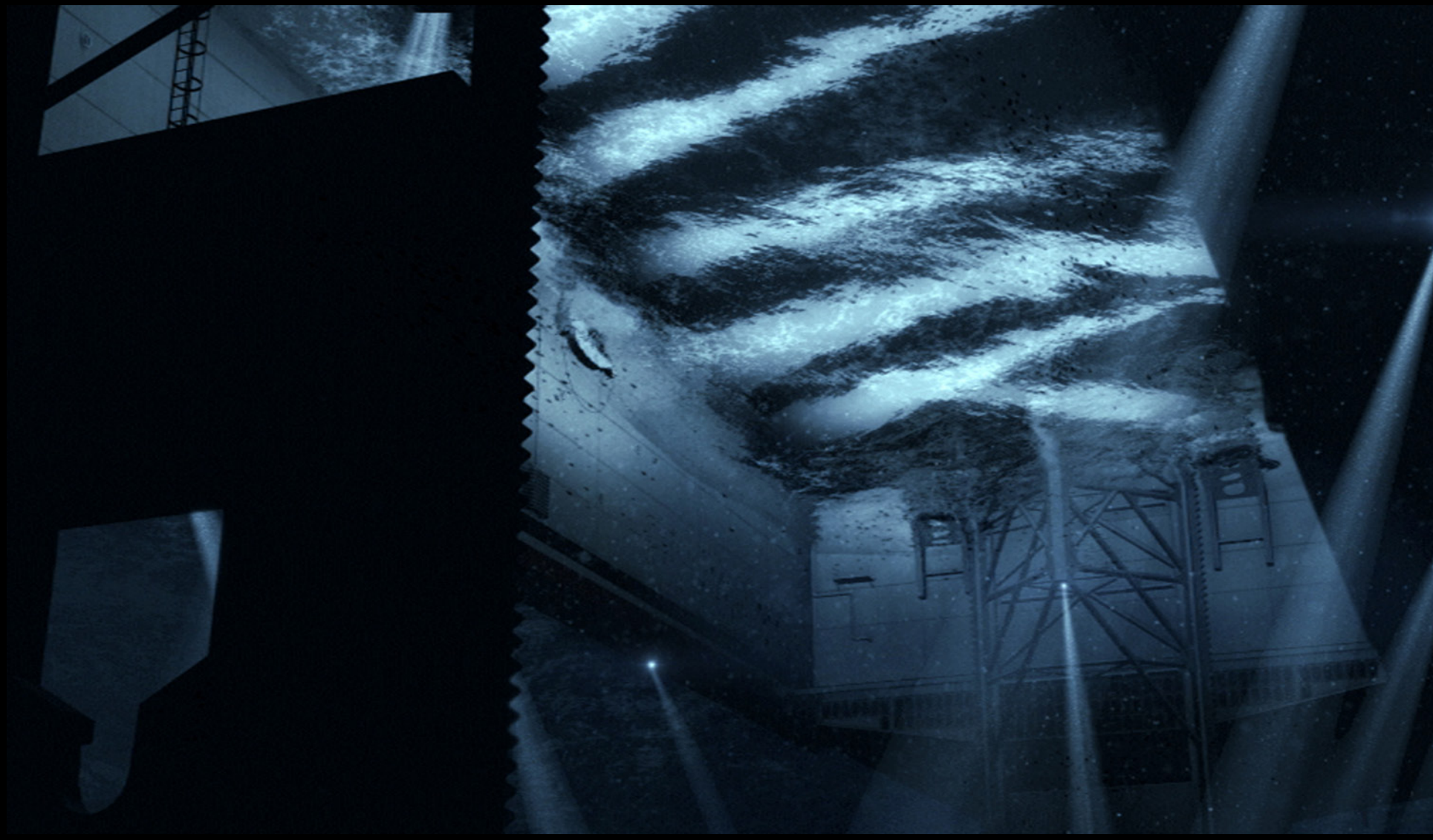

Image courtesy of Michael White Films

Topic	Sub-Topic	Recommendation	Reference	Level
Analytical Dynamics	States of Matter	Review the three principle states of matter (solid, liquid and gas) and the phenomenon of phase transition that can occur among them as they change state.	State of Matter	Fundamental
	Newton's Laws of Motion	Review Newton's three Laws of Motion	Newton's Laws of Motion	Fundamental
	Physical Properties	Review the physical properties (composition, mass, size, shape, physical distribution, texture, friction, elasticity, viscosity, tension, liquid density and compression) of a range of common soft and rigid objects around you.	Physical Properties	Fundamental
	Physical Forces	Review the physical forces that affect the size, position, shape and motion (behavior) of objects including mass, gravity, heat, friction, wind, vortex, turbulence (fluid dynamics – laminar and turbulent flow), potential and kinetic energy.	Force	Fundamental
Naturally Occurring Phenomena	Rock Slides	Using reference imagery, review the forces, physical motion, and evolution of a rock slide.	Rock Slides	Intermediate
	Earthquakes	Using reference imagery, review the forces, physical motion, and evolution of an earthquake.	Earthquakes	Intermediate
	River Flow	Using reference imagery, review the forces, physical motion, and evolution of a river flow.	River Flows	Intermediate
	Waterfalls	Using reference imagery, review the forces, physical motion, and evolution of a waterfall.	Waterfalls	Intermediate
	Avalanches	Using reference imagery, review the forces, physical motion, and evolution of a avalanche.	Avalanches	Intermediate
	Ocean Waves	Using reference imagery, review the forces, physical motion, and evolution of an ocean wave.	Ocean Waves	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Analytical Dynamics	States of Matter	Demonstrate the relationship among the primary states of matter (solid, liquid and gas) and explain the concept of phase transition between them.	State of Matter	Fundamental
	Newton's Laws of Motion	Demonstrate Newton's three laws of motion (Law of Inertia: Mass, Force, and Acceleration: Equal and Opposite Reaction) using the example of balls of different mass interacting with boxes of varying weight.	Newton's Laws of Motion	Fundamental
	Physical Properties	Demonstrate the physical properties of a wide range of rigid and solid objects such as metal, wood, plastic, paint, flesh, hair, fur, oil, feathers, fabrics (clothing), water, ice, balloons, glass, paper, clay, springs, egg shells, etc…	Physical Properties	Fundamental
	Physical Forces	Demonstrate the effect a range of forces on a wide range of soft and rigid objects when being struck by another soft or rigid object, subjected to forces (gravity, turbulence, friction, wind etc.) or ignited, heated, compressed, or bent, etc…	Force	Fundamental
Naturally Occurring Phenomena	Rock Slides	Demonstrate the forces, physical motion, dynamics, and evolution of a rock slide.	Rock Slides	Intermediate
	Earthquakes	Demonstrate the forces, physical motion, dynamics, and evolution of an earthquake.	Earthquakes	Intermediate
	River Flow	Demonstrate the forces, physical motion, dynamics, and evolution of a river flow.	River Flows	Intermediate
	Waterfalls	Demonstrate the forces, physical motion, dynamics, and evolution of a waterfall.	Waterfalls	Intermediate
	Avalanches	Demonstrate the forces, physical motion, dynamics, and evolution of a avalanche.	Avalanches	Intermediate
	Ocean Waves	Demonstrate the forces, physical motion, dynamics, and evolution of an ocean wave.	Ocean Waves	Intermediate
Dynamics Optimization	Surface Interpenetration	Introduce the concept of interpenetration and demonstrate how to identify and resolve it.		Intermediate
	Stand-in Objects	Demonstrate how to use low resolution objects to solve a simulation quicker.		Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Analytical Dynamics	States of Matter	Using water as an example – research and explain the relationship between ice and water (freezing and melting), water and water vapor (vaporization and condensation) as well as the formation of frost and clouds (sublimation).		Fundamental
	Newton's Laws of Motion	Create a simple animation demonstrating each law using billiard balls interacting on a billiard table to the force of a cue.	Billiards Example	Fundamental
	Newton's Laws of Motion	Create a simple animation demonstrating each law by setting up a ten pin bowling lane that requires the students to knock down the pins using a bowling ball.	Bowling	Fundamental
	Physical Properties	Select a range of rigid and solid objects such as metal, wood, plastic, paint, flesh, hair, fur, oil, feathers, fabrics (clothing), water, ice, balloons, glass, paper, clay, springs, eggs, etc.. and find reference footage demonstrating their physical properties from the internet or by personal observation.		Fundamental
	Physical Forces	Select an example of a physical phenomenon (e.g. rock slide, building demolition, earthquake, flood, pyroclastic flow, large impact event, or Tsunami) and research, analyze (collect reference video) of the basic forces that cause its formation.	Impact Events	Fundamental
	Naturally Occurring Phenomena	Select one of the following phenomena, then research, collect imagery, and describe the physical forces that affect its formation, physical appearance, dynamics and progression over time: rock slides, earthquakes, river flow, waterfall, avalanche, or ocean waves.		Fundamental
Naturally Occurring Phenomena	Rock Slides	Use Autodesk software to create a simplified simulation of a rock slide.	Rock Slides	Intermediate
	Earthquakes	Use Autodesk software to create a simplified simulation of an earthquake.	Earthquakes	Intermediate
	River Flow	Use Autodesk software to create a simplified simulation of a river flow.	River Flows	Intermediate
	Waterfalls	Use Autodesk software to create a simplified simulation of a waterfall.	Waterfalls	Intermediate
	Avalanches	Use Autodesk software to create a simplified simulation of an avalanche.	Avalanches	Intermediate
	Ocean Waves	Use Autodesk software to create a simplified simulation of an ocean wave.	Ocean Waves	Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Timeline	Setting Playback to All	Setting Playback Rate to All frames	*Playing Back All Frames or Playing in Real Time*	Fundamental
Rigid Body	Creating Rigid Body	How to create a Rigid Body	*Overview of Creating a Rigid Body Simulation*	Fundamental
	Rigid Body Properties	Overview of Rigid Body Properties	*Rigid Body Properties Editor*	Fundamental
	Creating Forces	Creating Forces (Gravity, Wind and Turbulence)	*Creating and Applying a Force*	Fundamental
	Using Forces with Rigid Body	Adding forces to the Environment Forces Group	*Applying Forces to Rigid Bodies*	Fundamental
	Collisions	Setting Collision Type	*Collisions with Rigid Bodies*	Fundamental
ICE	ICE Overview	Overview of ICE for Creating Dynamic Effects	*Introducing ICE*	Fundamental
Rigid Body	Rigid Body Constraint	Using Rigid Body Constraints	*Rigid Body Constraints*	Intermediate
Rigid Body Environment	Environment Settings	Using the Forces Group	*Applying Forces to Rigid Bodies*	Intermediate
	Environment Settings	Setting Simulation Time Control and Caching	*Time Simulation Environment*	Intermediate
Simulation	Animation with Simulation	Switching between Animated Passive Rigid Body to an Active Rigid Body	*Creating Rigid Bodies*	Intermediate
Soft Body	Creating Soft Body	Creating a Soft body	*Creating a Soft Body Deformation*	Intermediate
	Soft Body Properties	Overview of Soft Body Properties	*Soft Body Operator Property Editor*	Intermediate
	Setting Obstacles	Setting Obstacles for Collisions	*Setting up Soft Body Collisions*	Intermediate
	Apply Forces	Apply forces to Soft Bodies	*Creating and Applying a Force*	Intermediate
Cloth	Creating Cloth	Creating a Cloth from Selected object	*Getting Set Up for Using Cloth*	Intermediate
	Setting Obstacles	Setting Obstacles for Collisions	*Set Up for Cloth Collisions*	Intermediate
	Apply Forces	Apply forces to Cloth	*Set Up Forces for Cloth*	Intermediate

Effects

Image courtesy of UVPH

Topic	Sub-Topic	Recommendation	Reference	Level
Analytical Dynamics	States of Matter	Review the three principle states of matter (solid, liquid and gas) and the phenomenon of phase transition that can occur among them as they change state.	State of Matter	Fundamental
	Newton's Laws of Motion	Review Newton's three Laws of Motion	Newton's Laws of Motion	Fundamental
	Physical Properties	Review the physical characteristics (composition, mass, size, shape, physical distribution) of common physical phenomenon.	Physical Properties	Fundamental
	Physical Forces	Review the physical forces that affect the size, position, shape and motion (behavior) of objects including mass, gravity, heat, friction, wind, vortex, turbulence (fluid dynamics – laminar and turbulent flow), potential and kinetic energy.	Force	Fundamental
Naturally Occurring Phenomena	Fire	Using reference imagery, review the physical and dynamic properties of fire.	Fire	Intermediate
	Lightning	Using reference imagery, review the physical and dynamic properties of lightning.	Lightning	Intermediate
	Tornado	Using reference imagery, review the physical and dynamic properties of tornadoes.	Tornado	Intermediate
	Explosion	Using reference imagery, review the physical and dynamic properties of explosions.	Explosion	Intermediate
	Dust Storm	Using reference imagery, review the physical and dynamic properties of dust storms.	Dust Storms	Intermediate
	Rain	Using reference imagery, review the physical and dynamic properties of rain.	Rain	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Analytical Dynamics	States of Matter	Demonstrate the relationship among the primary states of matter (solid, liquid and gas) and explain the concept of phase transition between them.	State of Matter	Fundamental
	Newton's Laws of Motion	Demonstrate Newton's three laws of motion (Law of Inertia: Mass, Force, and Acceleration: Equal and Opposite Reaction) using the example of dust particles (i.e. dust storm) pushing and scattering small objects (i.e. rocks, etc.) around a desert floor.	Newton's Laws of Motion	Fundamental
	Physical Properties	Illustrate the physical properties of water in the form of a cloud, fog, light rain, heavy rain (hurricane), snow and hail.	Physical Properties	Fundamental
	Physical Forces	Illustrate using video examples, the typical forces that cause a phenomenon such as an avalanche to form, change and dissipate.	Force	Fundamental
Naturally Occurring Phenomena	Fire	Demonstrate the forces, physical motion, dynamics and evolution of fire.	Fire	Intermediate
	Lightning	Demonstrate the forces, physical motion, dynamics and evolution of lightning.	Lightning	Intermediate
	Tornado	Demonstrate the forces, physical motion, dynamics and evolution of a tornado.	Tornado	Intermediate
	Explosion	Demonstrate the forces, physical motion, dynamics and evolution of an explosion.	Explosion	Intermediate
	Dust Storm	Demonstrate the forces, physical motion, dynamics and evolution of a dust storm.	Dust Storms	Intermediate
	Rain	Demonstrate the forces, physical motion, dynamics and evolution of rain.	Rain	Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Analytical Dynamics	States of Matter	Using water as an example – research and explain the relationship between ice and water (freezing and melting), water and water vapor (vaporization and condensation) as well as the formation of frost and clouds (sublimation).	State of Matter	Fundamental
	Newton's Laws of Motion	Create a simple animation demonstrating each law using heavy rain falling on the rooftops of houses.	Newton's Laws of Motion	Fundamental
	Physical Properties	Select a naturally occurring phenomenon such as clouds, fog, light rain, heavy rain (hurricane), snow or hail and find reference footage demonstrating their physical properties from the internet or by personal observation.	Physical Properties	Fundamental
	Physical Forces	Select an example of a physical phenomenon (e.g. dust storm or tornado) and analyze the forces that affect its formation and progression over time.	Force	Fundamental
	Naturally Occurring Phenomena	Select one of the following phenomena, then research and describe the physical forces that affect its formation, physical appearance and progression: dust storm, lightning, fire, explosions, tornadoes, rainbow, river flow, smoke, waterfall, avalanches or volcanoes.		Fundamental
Naturally Occurring Phenomena	Fire	Use Autodesk software to create realistic looking fire (e.g. fireball, flame thrower, fireplace).	Fire	Intermediate
	Lightning	Use Autodesk software to create realistic looking lightning.	Lightning	Intermediate
	Tornado	Use Autodesk software to create a realistic looking tornado.	Tornado	Intermediate
	Explosion	Use Autodesk software to create a realistic looking explosion.	Explosion	Intermediate
	Dust Storm	Use Autodesk software to create a realistic looking dust storm.	Dust Storms	Intermediate
	Rain	Use Autodesk software to create realistic looking rain.	Rain	Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
ICE	ICE Overview	Overview of ICE for Creating Dynamic Effects	*Introducing ICE*	Fundamental
	Emitting Particles from Selected	Using the ICE, Create > Emit Particle from Selection	*Creating ICE Particle Emissions*	Fundamental
	ICE Tree Overview	Overview of ICE Tree view	*The ICE View*	Fundamental
	Creating and Linking Nodes	Creating Nodes and Compounds and Linking and Breaking links	*Adding Nodes to ICE Tree*	Fundamental
	Bringing in objects to ICE Tree	Using F3 to bring selected Objects into ICE Tree	*Specifying Scene References*	Fundamental
	Setting Particle Properties	Setting Particle Emission Attributes for Emit node	*Creating ICE Particle Emissions*	Fundamental
Lighting Effects	Lens Flare	Adding Property Lens Flare	*Creating a Lens Flare*	Fundamental
	Volumetric Lights	Adding Property Volume	*Creating Volume Effects*	Fundamental
	Glow	Adding Property Glow	*Creating a Glow Effect*	Fundamental
ICE	Add Forces Node	Adding an “Add Forces” node	*Using Forces in the ICE Tree*	Intermediate
	Adding a Force to Particles	Connecting an “Add Forces” node	*Creating and Applying Forces to ICE Simulations*	Intermediate
	Adding Collision	Using Bounce off Surface Compound	*ICE Particles Bouncing Off Obstacles*	Intermediate
	Caching and Previewing	Overview of ICE Caching options	*ICE Caching*	Intermediate
Hair	Hair Overview	Overview of Softimage Hair	*Hair and Fur Basics*	Intermediate
	Creating Hair	Creating Hair for Selected objects or curves	*Creating Hair*	Intermediate
	Modifying Hair	Modifying Hair Shader, Scale and Style	*Styling and Animating Guide Hairs*	Intermediate
	Rendering Hairs	Rendering Hairs	*Rendering Hair*	Intermediate

Lighting

Image courtesy of UVPH

Topic	Sub-Topic	Recommendation	Reference	Level
Color Theory	Color Basics	Introduce the elements of color theory as they relate to the aesthetic (emotional) influence on the viewer.	Color Theory	Fundamental
Illumination Theory	Light Sources	Review the major natural and artificial light sources in the real-world.	Lighting	Fundamental
	Color Temperature	Review the impact of color temperature on CG imagery.	Color Temperature	Fundamental
	Control of Contrast	Illustrate the importance of controlling contrast for film and TV media.	Contrast	Fundamental
	Lighting Subjects	Review the techniques of high-key, low-key and three-point lighting on an object or character.	3 Point Lighting	Fundamental
	Shadow	Review the standard properties of shadow.	Shadow	Fundamental
Cinematography	Lighting Techniques	Use visual examples to discuss the different lighting techniques used in cinematography.	Lighting Technique and Aesthetic	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Color Theory	Color Basics	Demonstrate the primary forms of color contrast and illustrate their use to support and enhance the location, time of day, mood and emotional context of both indoor and outdoor shots and scenes.	Color Theory	Fundamental
Illumination Theory	Color Temperature	Demonstrate the shift in color balance for light sources of varying color temperature - e.g. natural light sources and artificial light sources such as incandescent, florescent, sodium, etc.	Color Temperature	Fundamental
	Control of Contrast	Demonstrate the effect of lighting contrast on a simple scene (ball, cylinder, cube) using two lights at varying distances and a complex outdoor situation with high dynamic range.	Contrast	Fundamental
	Lighting Subjects	Demonstrate the practical application of portrait lighting techniques to character studies through stills from photography, film, and/or television.	3 Point Lighting	Fundamental
	Shadow	Using visual examples, demonstrate the technical and aesthetic impact that shadow has on a scene.	Shadow	Fundamental
Lighting Techniques	Location Lighting	Demonstrate lighting for a typical indoor scene so that contrast and detail are controlled.	Lighting Technique and Aesthetic	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Color Theory	Color Basics	Create color palettes with a range of colors and color contrasts for a series of scenes that take place in a variety of locations, times of day, and emotional situations.	Color Theory	Fundamental
Illumination Theory	Color Temperature	Use digital or video camera to record a range of scenes lit by different light sources and assemble a record of the resulting changes in color balance.	Color Temperature	Fundamental
	Control of Contrast	Using a simple scene with basic primitive objects, create high contrast lighting, low contrast lighting and a scene with 1:3 lighting ratio.	Contrast	Fundamental
	Lighting Subjects	Create a balanced three-point lighting of 1:3 ratio for a character's head and shoulders.	3 Point Lighting	Fundamental
	Shadow	Use shadow to control the mood of a multi-character scene.	Shadow	Fundamental
Lighting Techniques	Location Lighting	Create balanced, natural lighting in a typical, basic, indoor CG scene.	Lighting Technique and Aesthetic	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Lighting	Overview	Overview of Lighting in Softimage	*Lights and Shadows*	Fundamental
Ambience	Scene Ambience	What is Ambience, setting scene Ambience in Softimage (best at or near 0, default is 0.2)	*Scene Ambience*	Fundamental
Light Types	Point	Creating Point Light	*Creating Lights*	Fundamental
	Spot	Creating Spot Light (working with Light, Root and Interest)		Fundamental
	Infinite	Creating Infinite Light		Fundamental
Light Settings	Color	Setting Light Color	*Editing Light Properties*	Fundamental
	Intensity	Setting Light Intensity		Fundamental
	Cone Angle	Setting Cone angle for spot lights		Fundamental
	Spread Angle	Adjusting Cone edge using Spread Angle		Fundamental
	Light Falloff	Adjusting lights falloff and falloff types		Fundamental
Shadows	Shadows	Enabling Shadows and setting Shadow brightness	*Creating Shadows*	Fundamental
	Shadow Maps	Using Shadows Maps		Fundamental
Selective Lights	Associate Lights	Setting lights to be Inclusive and Exclusive using Menu and Light groups	*Using Selective Lights*	Fundamental
Hotkeys	Light Manipulator	“B” and “Tab” hotkeys to Manipulate lights (Spot and Infinite)	*Creating Lights*	Fundamental
Editing Lights	Light Manipulator	Looking Through a spot light using cameras pulldown		Fundamental
Render Region	Previewing Lighting	Previewing lighting using Render Region “Q”	*Previewing Interactively with the Render Region*	Fundamental
Light Types	Other lights	Using the Light Properties to make different light or Presets (lights use the same Properties)	*Editing Light Properties*	Intermediate
	Light Rig from Image	Overview of Using a HDR image to create a light rig		Intermediate
Shadows	Area Settings	Creating soft shadows using Area lights	*Creating Shadows*	Intermediate
Global Illumination	Photon Settings	Setting up lights for Global Illumination	*Editing Light Properties*	Intermediate

Materials/Shading

Image courtesy of UVPH

Topic	Sub-Topic	Recommendation	Reference	Level
Introduction to Materials	CG Shading 101	Provide an introduction to the shading process, identifying concepts such as the reflection of light, flat versus smooth shading, etc.	Shading	Fundamental
Surface / Light Interaction	Illumination	Discuss the theory behind the Angle of Incidence and the Angle of Reflection.	Angle of Reflection	Fundamental
Primary Material Properties	Color	Discuss the material property of color, focusing on standard CG color models such as HSV. Breakdown the HSV color model, describing the importance of each component (e.g. Hue = Color (i.e. rainbow), Saturation = intensity of the color, Value = lightness/darkness of the color).	Color	Fundamental
	Specularity	Use visual examples to explain and illustrate the concept of specularity. Indicate the importance of specularity in providing a strong visual cue for the shape of an object and its location with respect to light sources in the scene	Specularity	Fundamental
	Reflection	Use visual examples to explain and illustrate the concept of reflectivity, focusing on Specular Reflection versus Diffuse Reflection.	Specular Reflection	Fundamental
	Refraction	Describe refraction (using visual examples) and compare to reflection.	Refraction	Fundamental
	Transparency	Use visual examples to explain and illustrate the concepts of transparency and translucency.	Transparency	Fundamental
Surface Characteristics	Texture / Surface Relief	Review the effect of texture on the appearance of an object with emphasis on it's physicality and surface relief.	Texture (Visual Arts)	Fundamental
	Texture Mapping	Use visual examples to explain and illustrate the concept of texture mapping, focusing on basic considerations such as resolution and standard mapping options.	Texture Mapping	Fundamental
	Bump Mapping	Use visual examples to explain and illustrate the concept of bump mapping, focusing on basic considerations such as height/depth and image optimization.	Bump Mapping	Fundamental
	Displacement Mapping	Use visual examples to explain and illustrate the concept of displacement mapping, focusing on basic considerations such as image resolution, image quality, and image optimization.	Displacement Mapping	Intermediate
	Normal Mapping	Use visual examples to explain and illustrate the concept of normal mapping. Provide an overview on the standard technical process to generate and apply normal maps to objects.	Normal Mapping	Intermediate
Surface / Light Interaction	Light Reflection / Dispersion	Use visual examples to explain and illustrate how different surface characteristics influence light reflection and light dispersion.		Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Introduction to Materials	CG Shading 101	Demonstrate the typical processing of applying shading to CG objects using Autodesk software.	Shading	Fundamental
Surface / Light Interaction	Illumination	Demonstrate the concept of Angel of Incidence and Angle of Reflection using diagrams, simple film shots, or simply by reflecting a laser beam (i.e. laser pointer) off a mirrored surface in the room.	Angle of Reflection	Fundamental
Primary Material Properties	Color	Demonstrate how to research online imagery that depicts a strong and/or creative use of color in a composition. Using the examples, analyze the use of color to provide visual interest and/or visual direction in the composition.	Color	Fundamental
	Specularity	Demonstrate how to research online imagery that depicts a strong and/or creative use of specularity in a composition. Using the examples, analyze the use of specularity to provide visual interest and/or visual direction in the composition.	Specularity	Fundamental
	Reflection	Demonstrate how to research online imagery that depicts a strong and/or creative use of reflection in a composition. Using the examples, analyze the use of reflection to provide visual interest and/or visual direction in the composition.	Specular Reflection	Fundamental
	Refraction	Demonstrate how to research online imagery that depicts a strong and/or creative use of refraction in a composition. Using the examples, analyze the use of refraction to provide visual interest and/or visual direction in the composition.	Refraction	Fundamental
	Transparency	Demonstrate how to research online imagery that depicts a strong and/or creative use of transparency in a composition. Using the examples, analyze the use of transparency to provide visual interest and/or visual direction in the composition.	Transparency	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Surface Characteristics	Texture / Surface Relief	Demonstrate how to research online imagery that depicts a strong and/or creative use of texture in a composition. Using the examples, analyze the use of texture to provide visual interest and/or visual direction in the composition.	Texture (Visual Arts)	Fundamental
	Texture Mapping	Demonstrate the process of applying and aligning an assortment of Texture Maps to an assortment of simple, primitive CG objects (using Autodesk software) for a specific, creative purpose. For example, use Texture Mapping to help change the appearance of a simple primitive Box/Cube into a weathered/worn shipping crate that is made of wood.	Texture Mapping	Fundamental
	Bump Mapping	Demonstrate the process of applying and aligning an assortment of Bump Maps to an assortment of simple, primitive CG objects (using Autodesk software) for a specific, creative purpose. For example, use Bump Mapping to help change the appearance of a simple primitive Cylinder into a weathered/worn soup can that is made of tin/aluminum.	Bump Mapping	Fundamental
	Displacement Mapping	Demonstrate the process of applying and aligning an assortment of Displacement Maps to an assortment of simple, primitive CG objects (using Autodesk software) for a specific, creative purpose. For example, use Displacement Mapping to help change the appearance of a simple primitive Torus into a weathered/worn automobile tire that is made of rubber.	Displacement Mapping	Intermediate
	Normal Mapping	Demonstrate the process of generating and applying a Normal Map to a simple, primitive CG object (using Autodesk software) for a specific, creative purpose. For example, use Normal Mapping to help change the appearance of a simple primitive Plane/Polygon into an environment/terrain.	Normal Mapping	Intermediate
Surface / Light Interaction	Light Reflection / Dispersion	Demonstrate the variation in light reflection and light dispersion that occurs when simple primitive CG objects (e.g. Spheres) with a variety of surface characteristics (ranging from highly reflective to matte) are directly illuminated.		Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Primary Material Properties	Color	Accumulate imagery that depicts a strong and/or creative use of color in a composition. Present your findings to your peers, focusing on the use of color to provide visual interest and/or visual direction in the composition.	Color	Fundamental
	Specularity	Accumulate imagery that depicts a strong and/or creative use of specularity in a composition. Present your findings to your peers, focusing on the use of specularity to provide visual interest and/or visual direction in the composition.	Specularity	Fundamental
	Reflection	Accumulate imagery that depicts a strong and/or creative use of reflection in a composition. Present your findings to your peers, focusing on the use of reflection to provide visual interest and/or visual direction in the composition.	Specular Reflection	Fundamental
	Refraction	Accumulate imagery that depicts a strong and/or creative use of refraction in a composition. Present your findings to your peers, focusing on the use of refraction to provide visual interest and/or visual direction in the composition.	Refraction	Fundamental
	Transparency	Accumulate imagery that depicts a strong and/or creative use of transparency in a composition. Present your findings to your peers, focusing on the use of transparency to provide visual interest and/or visual direction in the composition.	Transparency	Fundamental
Surface Characteristics	Texture / Surface Relief	Accumulate imagery that depicts a strong and/or creative use of texture in a composition. Present your findings to your peers, focusing on the use of texture to provide visual interest and/or visual direction in the composition.	Texture (Visual Arts)	Fundamental
	Texture Mapping	Apply and align Texture Maps to a simple, primitive CG object (using Autodesk software) to 'bring it to life', creating a specific look and feel. For example, change the appearance of a simple primitive Box/ Cube into a cereal box containing your favorite cereal.	Texture Mapping	Fundamental
	Bump Mapping	Apply and align Bump Maps to a simple, primitive CG object (using Autodesk software) to 'bring it to life', creating a specific look and feel. For example, change the appearance of a simple primitive Cylinder into a ribbed, steel barrel or a copper water faucet pipe with an embossed logo.	Bump Mapping	Fundamental
Primary Material Properties	Surface Development	Using a primitive sphere, develop the look of a basketball, soccer ball, or billiards ball, comparing your results to a real-world object or photo-real imagery.		Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Surface Characteristics	Displacement Mapping	Apply and align Displacement Maps to a primitive CG object (using Autodesk software) for a specific, creative purpose. For example, change the appearance of a simple primitive Torus into a rubber automobile tire with a tread pattern.	Displacement Mapping	Intermediate
	Normal Mapping	Generate and apply a Normal Map to a simple, primitive CG object (using Autodesk software) for a specific, creative purpose. For example, change the appearance of a simple primitive Plane/Polygon into an environment/terrain for use in a game level.	Normal Mapping	Intermediate
Primary Material Properties	Surface Development	Using a pre-created drinking glass model, develop the look of the glass, comparing your results to a real-world object or photo-real imagery.		Intermediate
		Using a primitive cube/box, develop the look of an ice cube, comparing your results to a real-world object or photo-real imagery.		Intermediate
		Using a simple primitive object, develop the look of the object until it resembles a prism or a cut-diamond, comparing your results to a real-world object or photo-real imagery.		Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Materials	Material Overview	Overview of Material Types in Softimage (Blinn, Lambert, Phong…)	*About Surface Shaders*	Fundamental
	Material Manager	Overview and using the Material Manager to create and assign Materials	*The Material Manager*	Fundamental
	Material Menus	Creating and Assigning Materials from Main Toolbar	*Creating and Assigning Materials*	Fundamental
	Editing Material Properties	Editing Color, Transparency and other Material settings	*About Surface Shaders*	Fundamental
	Local vs. Scene Materials	Assigning Materials locally	*Creating and Assigning Materials*	Fundamental
	Material Libraries	Using Material Libraries	*Managing Material Libraries*	Fundamental
Texture Maps	Adding Image clips	Adding Images to Material colors	*Applying Textures*	Fundamental
	Editing Image clips	Editing Image clip properties	*Editing Image Clip Properties*	Fundamental
	Managing Image clips	Finding clips and removing unused clips	*Loading (Creating) Sources and Clips*	Fundamental
Projections	Creating UV Projections	Creating UV's in Clip Properties or Get>Property menu	*Types of Texture Projection*	Fundamental
	Editing Projections Texture Support Object	Editing Projections using Texture Support Object transformation	*Using the Texture Support Object*	Fundamental
	Editing Projections Properties	Editing Projection using properties (modify>Projection>Inspect current Uvs) and Manipulator "J" hotkey	*Modifying Texture Projections*	Fundamental
Shaders	Overview of RenderTree	Using Rendertree to view and create shaders	*Overview of the Render Tree*	Fundamental
	Adding Render Tree Nodes	Adding Render Tree nodes	*Adding Shader Nodes to the Render Tree*	Fundamental
	Adding Render Tree Nodes	Connecting Render Tree nodes	*Connecting Shader Nodes*	Fundamental
	Overview of RenderTree	Using Rendertree to view and create shaders	*Overview of Building a Render Tree*	Fundamental
	Bump and Normal Maps	Using Bump and Normal Maps	*Controlling Surface Attributes with Textures*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Texture Editor	Texture Editor	Overview Editing UV's with Texture Editor	*Working with UV's in the Texture Editor*	Fundamental
	Selecting Uvs	UV selection options	*Selecting Sample Points*	Fundamental
	Editing UV	Moving UV's in Texture editor, working with modes and filters (Tearing, Polygon, Edge and Vertex)	*Moving Selections*	Fundamental
	UV Tools	Collapse		Fundamental
	UV Tools	Mirror, Flip and Cycle...	*Flipping and Cycling Polygons*	Fundamental
	SubProjections	Using SubProjections	*Creating Subprojections*	Fundamental
	UV Tools	Healing (connecting uv clusters)	*Healing Separated Points*	Intermediate
	UV Tools	Relaxing Uvs	*Relaxing Polygons*	Intermediate
Texture Maps	Texture Layer Editor	Creating Layered Textures with the Texture Layer Editor	*The Texture Layer Editor*	Intermediate
Projections	Stick, Swim and Reproject	Using Stick and Swim	*Texture Projections and the Operator Stack*	Intermediate
Shaders	Gradient Shader	Generating and Using Procedural Gradient Shaders	*Creating Gradients*	Intermediate
	Creating Procedural Shaders and Maps	Generating and Using Procedural Shaders (Fractal, Cloud...)	*Texture Shaders*	Intermediate
	Real Time Shaders	Overview of Real Time Shaders	*Real-time Shader Basics*	Intermediate
	Importing and Exporting Shaders	Importing and Exporting Shader Compounds	*Saving and Loading Shader Presets*	Intermediate

Image courtesy of Jellyfish

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Principles	Solid Drawing	Review the importance of solid drawing (3D modeling) to produce visually dynamic and interesting objects and characters with a strong sense of proportion balance and weight.	Solid Drawing	Fundamental
	Appeal	Review the importance of strong appeal for a range of objects and characters illustrating the importance of appropriate design and form to emphasize their physical characteristics as well as the charisma, natural temperament and personality.	Charisma	Fundamental
Modeling Paradigms	Polygons	Review the basic terminology and concepts of polygonal modeling and constructive solid geometry.	Constructive Solid Geometry	Fundamental
	NURBS	Review the concept of spline-based modeling and the use of NURBS for generating curves and surfaces that compose freeform and complex organic shapes.	NURBS	Fundamental
	Subdivision Surfaces	Introduce and explain the concept of subdivision surfaces as a technique for creating smooth 3D models based on simple polygonal mesh.	Subdivision Surface	Intermediate
	3D Digital Sculpting	Review the use of 3D digital sculpting software such as Autodesk Mudbox to create complex surface detail and textures.	Mudbox	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Animation Principles	Solid Drawing	Use examples from a variety of 3D objects, characters and creatures, illustrate good and bad proportion, balance and weight.	Solid Drawing	Fundamental
	Appeal	Use examples of animated objects and characters from animated films to illustrate how their design and physical characteristics emphasis and support their intrinsic nature and personality.	Charisma	Fundamental
Polygon Modeling Techniques	Polygon Components	Describe the advantages and disadvantages of Polygonal modeling, illustrating the basics components of the polygonal surface including vertices, edges, faces, etc.	Polygon Components	Fundamental
NURBS Modeling Techniques	NURBS	Introduce and demonstrate the NURBS surface, explain its advantages and disadvantages and the use of control points to affect and control the shape of a complex surface.	NURBS	Fundamental
	Parameterization	Demonstrate the importance of correct paramaterization in correct surface construction.	Parameterization	Fundamental
Surface Topology	Non-Manifold Geometry	Explain the importance of avoiding non-manifold geometry, highlighting the effect on rendering, skinning, shading, etc.	Non-Manifold Objects	Fundamental
Subdivision Surface Modeling Techniques	Subdivision Surfaces	Describe and illustrate the application of subdivision surfaces to create objects with different levels of surface complexity (e.g. low to high polygon modeling)	Subdivision Surfaces	Intermediate
Modeling Paradigms	3D Digital Sculpting	Using a range of examples, Illustrate the use of 3D sculpting techniques to create complex organic models, characters and creatures.		Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Animation Principles	Solid Drawing	Select character designs from popular contemporary media and compare how proportion, symmetry, and weight impacts the character's distinct appearance and could impact surface modeling considerations.	Solid Drawing	Fundamental
	Appeal	Select characters from a range of popular contemporary media and review how their appearance reflects, amplifies and exaggerates their personality.	Charisma	Fundamental
Polygon Modeling Techniques	Using polygons	Provide a scene with a polygonal primitive. Demonstrate standard polygon modeling procedures such as moving vertices and edges, extruding and beveling, etc. Create a primitive with enough complexity to allow for experimentation with the various features. Next, create a simple model using these methods, explaining the benefit of starting with a logical primitive, depending on the desired outcome.		Fundamental
	Polygon Sub-Objects/Components	Provide a scene with a pre-built polygonal model, such as a section of terrain with an opening cut out for a lake, and several attached elements, like simple rocks. Use the model to demonstrate the Sub-Object/Component elements available when working with polygons.		Fundamental
NURBS Modeling Techniques	Surface Creation	Demonstrate how to build a glass from a profile curve using the revolve tool. Use several curves to create lofted surfaces, such as several circular shapes to form a rocket, bottle or airplane fuselage. Demonstrate how the shape of the completed surface can be changed by transforming the sub-object elements/components of the surface.		Fundamental
	Parameterization	Create curves using the uniform and chord-length knot spacing methods. Demonstrate rebuilding the curves using either method. Provide a surface created using each method with a texture applied and demonstrate the effects of the different parameterization methods on the fit of the texture by rendering.	Parameterization	Fundamental
Surface Topology	Non-Manifold Geometry	Demonstrate a non-manifold surface using the pages of a book. Hold up one page straight out to demonstrate more than 2 faces (represented by pages) sharing an edge. Create a plane with 2 length and width segments. Select the 3 center vertices in either direction and weld them together to demonstrate a non-manifold surface created by two faces sharing a point but not an edge.	Non-Manifold Objects	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Subdivision Surface Modeling Techniques	Smoothing	Provide a scene with a simple, low poly object with square edges, such as a hand created by extruding polygons on a box. Demonstrate the results of various smoothing solutions and settings. Enable the display of poly counts so the effect of smoothing the object is both visually and computationally apparent.		Intermediate
	Level of Detail	Using a variety of simple polygonal models, demonstrate the visual effects of several levels of iteration emphasizing the need to use only the level necessary to suit the final image size and detail.		Intermediate
Modeling Paradigms	3D Digital Sculpting	Demonstrate 3D sculpting applied to a single creature through several levels of refinement resulting in a complex and realistic final model.		Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Primitive Models	Creating Primitives	Overview of Creative Primitive shapes	*Primitives*	Fundamental
Text	Creating Text	Creating Text Models	*Creating Text*	Fundamental
Geometry Types	Polygon	Polygon Meshes	*Polygon Meshes*	Fundamental
	Subdivision Surfaces	Softimage Subdivision Surface (Geometry Approximation) Overview	*About Subdivision Surfaces*	Fundamental
	Nurbs	Surface Meshes	*Surface Meshes*	Fundamental
Selecting Objects	Selections Tools	Overview of Selection tools and modes	*Selecting Objects*	Fundamental
Editing Objects	Editing Object Properties	Editing the Object Properties	*Modifying Properties in Property Editor*	Fundamental
Transforming Objects	SRT Tools	Moving Objects and Components with SRT Tools	*Transformation Basics*	Fundamental
	COG Mode	Using COG Mode to adjust multiple Objects/Components	*Transforming Components and Clusters*	Fundamental
	“Alt” Pivot	Using the “Alt” to adjust the Transformation Pivot Temporarily	*Transformation Basics*	Fundamental
Polygon/Subdiv Components	Points	Working with Points	*Polygon Meshes*	Fundamental
	Edges	Working with Edges		Fundamental
	Polygon Faces	Working with Faces		Fundamental
Nurbs Components	Points	Working with Surface Points	*Surface Meshes*	Fundamental
	Knots	Working with Surface Knots		Fundamental
	Isolines	Working with Isolines		Fundamental
Selecting Components	Component Selection tools	Selecting Components using selection tools	*Selecting Components*	Fundamental
	Edge loop selection tools	Selecting Edge Loops “Alt + MMB”		Fundamental
Transforming Components	Using the Tweak Component Tool (M)	Using the Tweak Component Tool, and the Translate, Slide and Weld and RMB options	*Using the Tweak Component Tool*	Fundamental
	Moving Components with SRT Tools	Using the Scale, Rotate and Translate Tools for components	*Transforming Components and Clusters*	Fundamental
	Using Symmetry Mode	Using Symmetry Mode		Fundamental
	Using Proportional Modeling	Using Proportional Modeling	*Using Proportional Modeling*	Fundamental
	Adjusting Proportion Settings	Adjusting Proportional Properties and Adjusting falloff size interactively (R hotkey)		Fundamental
	Transform Settings	Setting Manipulator options, and how multiple components locally	*Transform Preferences*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Polygon Modeling	Add and Edit Polygon	Using the Add Polygon tool	*Adding and Editing Polygon Mesh Components*	Fundamental
	Add Edges	Adding Edges		Fundamental
	Add Vertex	Adding Vertex		Fundamental
	Split Edge / Split Edges (with Split Control)	Splitting Edges (Creating Edge Loops)		Fundamental
	Split Polygon	Splitting Polygons		Fundamental
	Extruding and Copying Polygons Components	Extruding polygons using the Extrude or by duplicating and moving components	*Extruding, Duplicating and Insetting Polygon Mesh Components*	Fundamental
	Weld Points	Welding points	*Adding and Editing Polygon Mesh Components*	Fundamental
	Merge	Merging Border edges between 2 objects	*Blending and Merging Polygon Meshes*	Fundamental
	Bridge Polygons	Using Bridge to create polygons between faces	*Bridging Polygons*	Fundamental
	Subdivide Polygons	Subdivide Polygons	*Adding and Editing Polygon Mesh Components*	Fundamental
	Boolean	Using Boolean	*Performing Boolean Operations on Polygon Meshes*	Fundamental
Polygon Cleanup	Triangulate	Converting Quads to Triangles	*Quadrangulating and Triangulating Polygons*	Fundamental
	Quadrangulate	Converting Triangles to Quads		Fundamental
Curves	Creating Curves	Creating Curves and Curve Primitives	*Drawing and Manipulating Curves*	Fundamental
	Curve Based Modeling	Generating Objects from Curves	*About Building from Curves*	Fundamental
Modeling From Curves	Revolutions Around Axis	Creating objects with Revolution tool	*Revolving Curves around Axis*	Fundamental
	Extrusion Along Axis	Creating objects using Extrusion Tool	*Extruding Curves along Axis*	Fundamental
	Loft	Creating objects using Loft	*Lofting Curves*	Fundamental
Converting Geometry Type	Nurbs to Mesh	Converting a Nurbs to a Polygon Mesh	*Converting NURBS Surfaces to Polygon Meshes*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Subdivision Surfaces	Geometry Approximation	Geometry Approximation Properties	*About Subdivision Surfaces*	Fundamental
	Create > Subdivision	Creating a Subdivision Surface		Fundamental
	Local Subdivision Refinement	Subdividing a part of an object		Fundamental
	using “+” and “-” hotkeys	Using Geometry Approximation Hotkeys + and -		Fundamental
Duplicating	Duplicate/Clone/Instance	Overview of Duplicate Tools and difference between Duplicate, Clone and Instance	*Duplicating and Cloning Objects*	Fundamental
	Duplicate Settings	Editing Duplicate Settings		Fundamental
Duplicate	Duplicate Single	Duplicating a single objects		Fundamental
	Duplicate Multiple	Duplicating Multiple times		Fundamental
	Duplicate Single without Options	Duplicating without settings		Fundamental
Clone	Clone Single	Clone a single objects		Fundamental
	Clone Multiple	Clone Multiple times		Fundamental
	Clone Single without Options	Clone without settings		Fundamental
Construction Modes	Construction Modes	Overview of Softimage Construction Modes	*Operator Stack*	Fundamental
Operator Stack	Softimage Operators	Editing the Operator stack (Freezing, Disable, Moving, Deleting)		Fundamental
Modeling Relations	Modeling Relations in Softimage	Modeling Relations between objects like a curve and surface	*Modeling Relations*	Fundamental
GATOR	Attribute Transfer	Transferring Attributes with GATOR and other tools that create a new object	*Attribute Transfer*	Fundamental
Deformations	Simple Deformations	Bend, Twist, Push…	*Simple Deformations*	Fundamental
	Lattices	Creating and using a lattice using Primitive Lattice	*Lattices*	Fundamental
	Smooth and Relax	Smoothing and Relaxing Geometry	*Smoothing and Relaxing*	Fundamental
Primitives Models and Characters	Models and Characters	Overview of Models and Characters like Man, Man Maker and Face Maker	*Using Ready-Made Characters*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Modeling Hotkeys	N = Add/Edit Polygon			Fundamental
	\ = Add Edge			Fundamental
	Insert = Add Vertex			Fundamental
	[= Knife Tool			Fundamental
	] = Split Edge Tool			Fundamental
	M = Tweak Component Tool			Fundamental
	Shift+D = Subdivide Polygon/ Edges			Fundamental
	Ctrl+D = Duplicate Object/ Component			Fundamental
Context Sensitive RMB Menu	RMB Menu	Overview of context sensitive RMB (Right Mouse Button) menu	*Accessing Commands and Tools*	Fundamental
Selection Tools	F7 = Rectangle Selection			Fundamental
	F8 = Lasso			Fundamental
	F9 = Freeform			Fundamental
	F10 = Raycast			Fundamental
	Shift+F10 Rectangle-Raycast			Fundamental
	F11 Paint Selection			Fundamental
	T = Rectangle Point			Fundamental
	E = Rectangle Edge			Fundamental
	I = Raycast Edge			Fundamental
	Y = Rectangle Polygon			Fundamental
	U = Raycast Polygon			Fundamental
Transformation Tools	X = Scale Tool			Fundamental
	C= Rotate Tool			Fundamental
	V= Translate Tool			Fundamental
	M=Move/Tweak Points			Fundamental
Polygon Modeling	Symmetrize Polygons	Using Symmetrize to mirror objects or work on 1 half and see the effect on the other side	*Symmetrizing Polygons*	Intermediate
	Bevel Components	Creating Bevels	*Beveling Polygon Meshes and Components*	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Polygon Cleanup	Polygon Reduction	Overview of Polygon Reduction tool	*Polygon Reduction*	Intermediate
	Filter Polygons (Edges, Points)	Removing or reducing Polygons, Edges and Points using Filter	*Filtering Polygon Mesh Components*	Intermediate
Modeling From Curves	Extrusion Along Curve	Creating objects using Extrusion Tool	*Extruding Curves along Curve*	Intermediate
	Birail	Creating objects using Birail	*Using Birail*	Intermediate
	Four Sided	Creating objects using Four Sides	*Picking Boundaries Using Four-Sided*	Intermediate
Converting Geometry Type	Curves to Mesh	Converting a curve to a Polygon Mesh	*Converting Curves to Polygon Meshes*	Intermediate
Deformations	Weight Maps	Creating and using weight maps with Deformers	*Weight Maps*	Intermediate
	Shrinkwrap	Using Shrinkwrap deformer	*Shrinkwrap*	Intermediate

Rendering

Image courtesy of UVPH

Topic	Sub-Topic	Recommendation	Reference	Level
Rendering Overview	Rendering Process (Pipeline)	Introduce the general process of rendering images from 3D graphics data and give an overview of where hardware and software solutions are used in different markets of the media and entertainment industry (i.e. film, TV/broadcast, games, design visualization).	Rendering	Fundamental
	Rendering Methods	Provide an overview of the major methods for rendering images including techniques such as scanline rendering, ray casting, ray tracing, radiosity, vector rendering, and stereoscopy.	Scanline Rendering	Fundamental
			Ray Casting	Fundamental
			Ray Tracing	Fundamental
			Radiosity	Fundamental
			Stereoscopy	Fundamental
	Render Layers	Identify how Render Layers can be used to separate image components into separate elements or layers, such as a foreground layer, a characters layer, a sets layer, a background layer, and a sky layer.	Render Layers	Intermediate
	Render Passes	Identify Render Passes as used to separate out different aspects of an image so that they may be deal with individually to assist in efficient changes of iterations of an image.	Render Passes	Intermediate
	Rendering Effects	Provide an overview of a range of effects rendering techniques that add realism to an image or scene such as textured elements, caustics, global illumination, camera effects, motion blur, HDRI, atmospheric effects and non-photorealistic effects..	Motion Blur	Intermediate
			Global Illumination	Intermediate
			Caustics	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Rendering Overview	Rendering Process (Pipeline)	Explain the general processes employed in creating a production pipeline for 3D rendering using either hardware or software solutions.		Fundamental
	Rendering Methods	Use stills from popular contemporary CG media to illustrate and compare the principle rendering methods and their visual differences in rendering 3D components and final images.		Fundamental
		Introduce and explain how the film industry is utilizing stereoscopic rendering techniques to create 3D movies.	Stereoscopic Movies	Fundamental
	Render Layers	Demonstrate the process of rendering in components or parts to allow more control over changes and/or iterations to an image or sequence.	Passes / Layers	Intermediate
	Render Passes	Illustrate the separate render passes that may be used to create a fully rendered and lit image or scene and explain the associated relevant terms such as beauty pass, highlight pass, shadow pass, reflection pass etc.	Passes / Layers	Intermediate
	Rendering Effects	Use stills from popular contemporary CG media to illustrate the added realism or embellishment of rendered effects to the final composition of a shot or scene.		Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Rendering Overview	Rendering Process (Pipeline)	Construct a simple diagram that illustrates an example of the 3D rendering processes required to create an image with highlights, reflections, shadows etc.		Fundamental
	Rendering Methods	Research, collect, and compare examples of rendering methods that illustrate the range of image attributes available for CG production.		Fundamental
	Render Layers	Research and collect (or create) a series of breakdown images, (separate render layers) and explain how they are combined to create a fully rendered image or scene.		Intermediate
	Render Passes	Research and collect a series of breakdown passes, (separate render layers) of the components of an image or scene that demonstrate how in combination they create a fully rendered and complete image.	Passes Example	Intermediate
	Rendering Effects	Research, collect, and compare examples of textured elements, caustics, global illumination, camera effects, motion blur, HDRI, atmospheric effects and non-photorealistic effects that illustrate the range of effects attributes available for CG production		Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Render Options	Types of Render Options	Scene, Renderer and Pass Options	*Rendering Basics*	Fundamental
Scene Render Options	Mental Ray	Using Mental Ray as Renderer	*Scene Render Options Property Editor*	Fundamental
	Hardware Renderer	Using Hardware Renderer		Fundamental
	File Output Settings	Setting file output options		Fundamental
Mental Ray Renderer Options	Scanline	Scanline Rendering	*Choosing a Rendering Algorithm*	Fundamental
	Raytracing	Raytrace Rendering		Fundamental
	Aliasing	Setting Aliasing options	*Controlling Aliasing*	Fundamental
	Secondary Rays	Secondary Ray settings	*mental ray Render Options Property Editor*	Fundamental
Hardware Renderer Options	Render Type	Setting Hardware render type	*Hardware Renderer Options*	Fundamental
Render Passes	Overview	Overview of Render Passes	*What is a Render Pass?*	Fundamental
	Creating a Render Pass	Creating a Render Pass	*Render Pass Workflow Overview*	Fundamental
Partitions	Overview of a Partition	Overview and use of partitions	*Defining Partitions*	Fundamental
Render Channels	Overview of Render Channels	Overview and use of Render Channels	*About Render Channels*	Fundamental
Rendering Methods	Render Region	Using Render Region	*Previewing Interactively with the Render Region*	Fundamental
	Preview Single Frame	Using Preview Render	*Previewing a Single Frame*	Fundamental
	Rendering to a File	Rendering a pass	*Rendering to File from the Softimage User Interface*	Fundamental
Rendering to Maps	Render Map	Rendering Texture and other Maps	*RenderMap Workflow Overview*	Fundamental
	Ultimapper	Creating Normal and other maps using Ultimapper	*Transferring Surface Attribute Maps (Ultimapper)*	Fundamental
Render Optimization	Optimization Scene for Rendering	Optimization models, lights and textures for rendering	*Optimizing a Scene for Rendering*	Fundamental
Rendering Hotkeys	Q= Render Region	Render Region Hotkey	*Previewing Interactively with the Render Region*	Fundamental
	Shift+Q = Toggle Render Region	Render Region Toggle Hotkey		Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Mental Ray Renderer Options	Rasterizer	Rasterizer Rendering	*Choosing a Rendering Algorithm*	Intermediate
	Motion Blur	Setting Motion Blur (Steps) options	*mental ray Render Options Property Editor*	Intermediate
	Optimization	Setting Renderer Optimization options		Intermediate
	Heavy Scene Optimizations	Setting up Renderer for Heavy Scenes	*Optimizing Large Scenes for Scalability*	Intermediate
	Memory Limit	Setting memory limits	*mental ray Render Options Property Editor*	Intermediate
	Shadow Settings	Shadow Rendering settings		Intermediate
Indirect Illumination	Ambient Occlusion	Ambient Occlusion Render settings	*Setting the Global Ambient Occlusion Options*	Intermediate
	Final Gathering	Final Gathering Render settings	*Final Gathering Workflow Overview*	Intermediate
	Global Illumination & Caustics	Global Illumination & Caustics	*Preparing Global Illumination and Caustics for Rendering*	Intermediate
	Photon Settings	Photon render settings		Intermediate
Geometry Approximation	Overview of Geometry Approximation	Setting Geometry Approximation Overview	*Geometry Approximation Property Editor*	Intermediate
	Settings for Displacement Maps	Setting Geometry Approximation for displacement		Intermediate
Rendering Methods	Batch Rendering	Rendering from command line	*Batch Rendering*	Intermediate
	Standalone Rendering Ray3.exe	Rendering using MI files and Ray3.exe	*Ray3.exe Rendering*	Intermediate
Distributed Rendering	Overview of Distributed Rendering	Setting up for Distributed Rendering	*Setting Up For Distributed Rendering*	Intermediate

Rigging / Setup

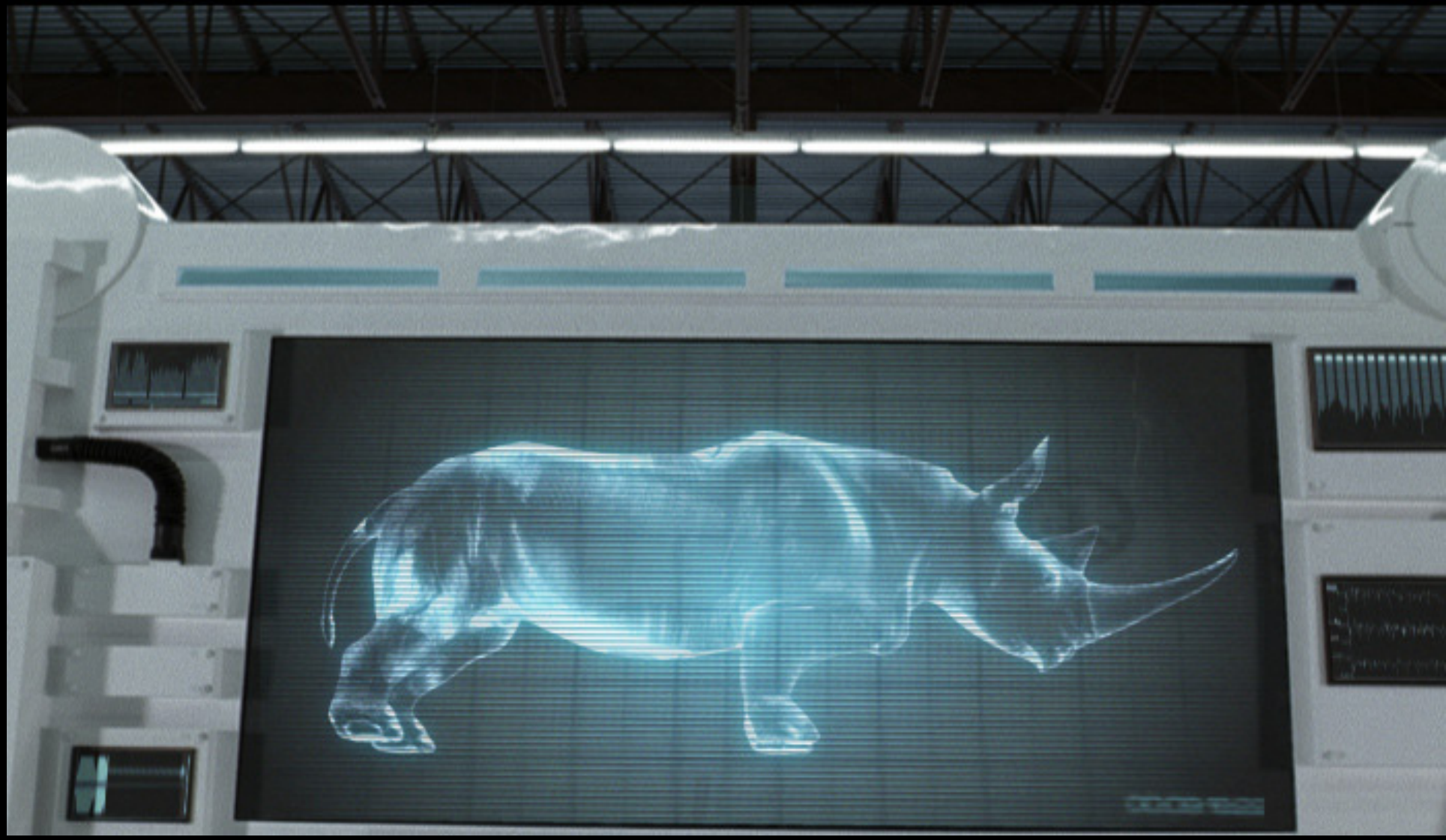

Image courtesy of Das Werk

Topic	Sub-Topic	Recommendation	Reference	Level
Anatomy	Basic Anatomy	Review the basic components of the human body, including bones, muscles, and major organs.	Human Anatomy	Fundamental
	Bipedal Anatomy	Review the basic bone structure (name, location, size of primary bones) of the human skeleton.	Biped Skeleton	Fundamental
		Review the primary muscles (name and location) in the human body.	Biped Muscles	Fundamental
Kinematics	Forward Kinematics	Introduce how the concept of forward kinematics and how it relates to animation controls.	Forward Kinematics	Fundamental
	Inverse Kinematics	Introduce how the concept of inverse kinematics and how it relates to animation controls.	Inverse Kinematics	Fundamental
Anatomy	Quadruped Anatomy	Review the basic structure of a typical quadruped skeleton.	Quadruped Skeleton	Fundamental
	Human Anatomical Variation	Illustrate and distinguish the major differences among male, female, old and young, quadruped and creature anatomy.		Fundamental
	Natural Biped Joint Rotation	Review the natural joint rotation limits (articulation) and root of motion (hips) of the biped anatomy.		Intermediate
	Natural Quadruped Joint Rotation	Review the natural rotation limits (the articulation) and root of motion (hips and shoulders) of a typical quadruped anatomy.		Intermediate
	Skin Deformation	Review how muscles deform skin and change the appearance of a character's body.		Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Anatomy	Bipedal Anatomy	Using a structural diagram of human anatomy, illustrate skeletal construction with an emphasis on joint position, rotation, the resulting limitations of movement and the root of motion (hips).		Fundamental
	Quadruped Anatomy	Using a structural diagram of quadruped anatomy, illustrate the skeletal construction with an emphasis on joint position, rotation, the resulting limitations of movement and the roots of motion (hips and shoulders).		Fundamental
	Human Anatomical Variation	Using reference video, 2D and 3D sample sequences, illustrate the differences in human motion due to body size, shape, age, gender and emotional state.		Fundamental
Kinematics	Forward Kinematics	Demonstrate and explain (through visual examples) the application of FK in the setup of a simple rig, such as a Luxo lamp or mechanical toy crane.		Fundamental
	Inverse Kinematics	Demonstrate and explain (through visual examples) the use of inverse kinematics to control a simple action such as a foot being raised and placed on a box or staircase.		Fundamental
Animal Motion	Human Locomotion	Using reference video, illustrate and analyze the dynamics of the human walk cycle with reference to each body component undergoing different types of forward movement (e.g. walk, run, sneak).	Human Locomotion	Intermediate
	Quadruped Locomotion	Using reference video, illustrate the specific characteristics of variations in basic quadruped motion such as walk, trot, or gallop.	Quadruped Locomotion	Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Kinematics	Forward Kinematics	Create an FK rig for a simple Luxo lamp, mechanical toy crane, or similar non-deforming model that is made of multiple moving parts.		Fundamental
	Inverse Kinematics	Use inverse kinematics to animate an arm and hand placing a ball on a solid surface.		Fundamental
Animal Motion	Human Locomotion	Using reference video, analyze and communicate the structural motion of the human walk cycle with reference to the transformation required by each body component.	Human Locomotion	Fundamental
	Quadruped Locomotion	Using reference video, analyze and communicate the structural motion of a quadruped walk cycle with reference to the transformation required by each body component.	Quadruped Locomotion	Fundamental
	Human Anatomical Variation	Compare the skeletal structure and discuss the resulting motion characteristics of a child, middle-aged, and elderly person.		Fundamental
	Bipedal Motion	Using a simple humanoid character rig, create a series of realistic poses to illustrate a simple action such as jumping over a box. This should be achieved without tearing the model geometry.		Intermediate
	Quadruped Motion	Using a simple quadruped character rig (e.g. cat or dog), create a series of realistic poses for a simple motion (e.g. a pounce). This should be achieved without tearing the model geometry.		Intermediate

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Topic	Sub-Topic	Recommendation	Reference	Level
Predefined Characters	Basic Skeleton	Overview of the Primitive Model > Basic Skeleton	*Using Ready-made Characters*	Fundamental
	Complex Skeleton	Overview of the Primitive Model > Complex Skeleton		Fundamental
	Biped	Overview of the Primitive Character> Biped		Fundamental
Rigging Overview	Basic Rig Components	Overview of Chains, Nulls, Controllers	*Overview of Creating Your Own Rig*	Fundamental
	Connecting Components	Overview of Parenting and Constrains		Fundamental
Chains	Creating Chains	Creating and Elements of Chains	*Creating Chains*	Fundamental
	2D vs. 3D Chains	Difference between 2D and 3D chains		Fundamental
	Chain properties	Editing Chain Properties	*What Makes Up a Skeleton*	Fundamental
	Chain and Bone Display	Using Display options, Shadow Display and more	*Changing the Chain Element Display*	Fundamental
	Duplicating Chains with Symmetry	Creating half a skeleton and using symmetry to create other side	*Duplicating Chains in Symmetry*	Fundamental
	Bone Length	Adjusting Bone Length	*Resizing (Scaling) Chains*	Fundamental
	IK/FK Blending	chain IK/FK blending properties	*Blending Between FK and IK Animation*	Fundamental
Nulls	Creating Nulls	Creating and Using Nulls for Rigs	*Primitives*	Fundamental
	Null Display Options	Setting Null Display Options	*Changing the Chain Element Display*	Fundamental
Controllers	Creating Controller Objects	Creating a controller objects with Polygons, Curves, Implicit or Nulls	*Primitives*	Fundamental
Parenting	Parenting Elements	Connecting Chains and Chain Elements using Parenting	*Creating Hierarchies*	Fundamental
	Unparenting Elements	Unparenting Chains and Chain Elements		Fundamental
Skeletons	Setting up a Skeleton	Setting up a basic Skeleton	*Setting Up a Basic Skeleton*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Envelopes	Envelope Overview	Overview of Envelopes	*About Envelopes*	Fundamental
	Set Envelope	Using Set Envelope to connect skeleton elements to a object	*Assigning Envelopes to Deformers*	Fundamental
	Selecting Elements for Envelope	Creating or using Envelope groups to allow easy enveloping	*Grouping Objects*	Fundamental
	Automatic Envelope Assignment Options	Overview of Options when setting Envelope	*Assigning Envelopes to Deformers*	Fundamental
	Editing Weights	Using Edit Weights or Paint Weights	*Modifying Envelope Weights*	Fundamental
	Reassign Locally	Editing weights using Reassign Locally	*Changing Deformer Assignment Manually*	Fundamental
	Mirror Weights	Using Mirror Weights	*Modifying Envelope Weights*	Fundamental
	Reset Actor	Resetting Skeleton back to Envelope assignment stance	*Before You Envelope*	Fundamental
Rigging	Creating a custom Rig	Overview of Creating a Rig	*Overview of Creating Your Own Rig*	Fundamental
	Using Rig Guides	Using Biped or Quadruped Guide	*Setting up the Biped or Biped Dog Leg Guides*	Fundamental
Custom UI	Custom Toolbars	Creating custom toolbars and toolbar buttons	*All-Purpose Tools for Increasing Productivity*	Fundamental
Constraints	Constraint Overview	Overview of Constraints	*Overview of Working with Constraints*	Fundamental
	Position	Constrain Position	*Position Constraints*	Fundamental
	Orientation	Constrain Orientation	*Orientation (Rotation) Constraints*	Fundamental
	Scale	Constraint Scale	*Scale Constraints*	Fundamental
	Direction	Constrain Direction	*Direction Constraints*	Fundamental
	Pose	Constrain Position, Orientation and Scale	*Pose Constraints*	Fundamental
	Constraint Compensation	Constraint Compensation and Constrains offsets	*Animating with Constraints*	Fundamental
UI	Schematic View	Viewing Rigs and Skeletons in the Schematic View	*The Schematic View*	Fundamental
Spring Operators	Spring Operators	Spring Operators for jiggle effects	*Spring Operators for Tail, Ear, and Belly Rig Controls*	Intermediate
Envelopes	Set Reference Pose	Setting a new initial Envelope assignment stance	*Changing Reference Poses*	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Rigging	Creating Tail	Using the Skeleton Tail	*Creating a Tail*	Intermediate
	Creating Spine	Using the Skeleton Spine	*Creating a Spine*	Intermediate
	Control Splines	Creating Control Spines that can be used for facial setup	*Creating Control Splines for Facial Rigs*	Intermediate
	Constraints	Using Constrains with Controllers	*Constraints and Rigs*	Intermediate
	Expressions	Using Expressions for Rigs	*Linking Parameters*	Intermediate
	Linked parameters	Using Linked Parameters for Rigs	*Animating with Expressions*	Intermediate
MOTOR	Overview of MOTOR	Overview of Retargeting motion using MOTOR	*Overview of Retargeting Animation with MOTOR*	Intermediate
	Tagging Rig Elements	Tagging rigs for use with MOTOR	*Tagging a Rig's Elements*	Intermediate
	Retargeting Rig to Rig	Retargeting Rig to Rig	*Retargeting Animation from Rig to Rig*	Intermediate
	Retargeting Mocap to Rig	Retargeting Mocap to Rig	*Retargeting Mocap Data from C3D or BVH Files to a Rig*	Intermediate
Custom UI	Synoptic Views	Creating a Synoptic View for rig control	*All-Purpose Tools for Increasing Productivity*	Intermediate
	Custom Parameters	Creating custom Property windows and custom sliders		Intermediate
Constraints	Soft vs. Rigid Constraints	Difference between Soft and Rigid Constraints	*Creating Offsets between Constrained and Constraining Objects*	Intermediate
	N Points	Constrain to a number of Objects	*Constraints between Points*	Intermediate

Scene Assembly / Pipeline Integration

MEIS | Softimage

Image courtesy of UVPH

Topic	Sub-Topic	Recommendation	Reference	Level
Production 101	Production Workflow	Explain and demonstrate the process of analyzing a typical animation and/or visual effects workflow by breaking down the activity into discrete and identifiable phases or stages.	Flowchart	Fundamental
	Assignment Checklist	Explain the critical importance of collecting and itemizing all of the information and instructions an employee should request and receive in order to carry out a specific assignment.	Organizational Structure	Fundamental
	Review Cycles	Review the importance of including regular progress review of assigned tasks stressing the critical need for immediate feedback, rapid iteration, revision control, quality assessment (critique) and continuous improvement.	Dailies	Fundamental
	Teamwork and Group Dynamics	Review how successful techniques are required to achieve continuous improvement and flexible pipeline integration through individual contribution, superior teamwork, agile methods, skillful coordination and effective communications.	Group Dynamics	Fundamental
			Agile Software Development	Fundamental
	Productive Pipeline integration	Explore how sharing the personal knowledge and collective skill sets of all personnel involved in the production pipeline is a critical asset for organizational productivity and governs its effectiveness, flexibility and continuous improvement..	Skill	Fundamental
			Mentorship	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Production 101	Production Workflow	Demonstrate the creation of a production workflow analysis using a step-by-step breakdown of each individual activity and create a flowchart that shows the relationships among them.	Flowchart	Fundamental
	Assignment Checklist	Select a typical animation or visual effects task or shot and explore and list the detailed information and instructions required by the employee to successfully undertake the work to completion.	Organizational Structure	Fundamental
	Review Cycles	Select a representative production activity and describe the value of regular feedback and critique in the form of checkpoints (sweatbox, dailies) that evaluate the quality and timelines of the work to be completed.	Dailies	Fundamental
	Teamwork and Group Dynamics	Demonstrate and describe a range of practical and constructive techniques for organizing and facilitating production teams, supporting group dynamics and communicating business, technical and creative information across the production pipeline.	Group Dynamics	Fundamental
			Agile Software Development	Fundamental
	Productive Pipeline integration	Review the importance of acquiring personal skills, experience and new knowledge from a wide variety of sources such as peer exchange, mentorship, communities of interest, social and professional organizations, conferences and personal networking.	Skill	Fundamental
			Mentorship	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Production 101	Production Workflow	Create a personal workflow of a typical production task or process in the form of a simple flowchart.	Flowchart	Fundamental
	Assignment Checklist	Create a detailed specification checklist of a typical animation task that addresses its technical, aesthetic, creative and time requirements as well as the tools, methods, instructions and assets needed to complete the assignment.	Organizational Structure	Fundamental
	Review Cycles	Create a thorough checklist of performance criteria for a representative assignment that includes the evaluation of technical, aesthetic, and creative components.	Dailies	Fundamental
	Teamwork and Group Dynamics	Develop an inventory of personal and corporate roadblocks to team effectiveness. Create a list of methods that communicate ways to improve and sustain personal contributions and improved collaborative teamwork that will result in enhanced quality as well as saving time and reducing costs.	Group Dynamics	Fundamental
			Agile Software Development	Fundamental
	Productive Pipeline integration	Develop a plan for acquiring new knowledge and skills from a wide variety of personal and professional sources and for sharing and contributing it for the purpose of improving the integration of expertise across the production pipeline.	Skill	Fundamental
			Mentorship	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Data Management	Workgroups	Creating and Using Workgroups	*Creating and Using Workgroups*	Fundamental
Importing and Exporting	Supported File types	Softimage supported file types	*Supported File Formats for Data Transfer*	Fundamental
	Softimage Models	Softimage Models Import and Export	*Importing and Exporting Softimage Models*	Fundamental
	DotXSI Files	DotXSI Import and Export	*Importing and Exporting dotXSI Files*	Fundamental
	OBJ	OBJ Import and Export	*Importing and Exporting Wavefront OBJ Files*	Fundamental
Models	Overview of Models	Using and Creating Softimage Models	*What are Models*	Fundamental
	Local Models	Local models	*Creating Local Models*	Fundamental
Referenced Models	Referenced Models Overview	Referenced models	*Using Referenced Models*	Fundamental
	Creating Referenced Models	Creating Referenced Models		Fundamental
	Multiple Resolutions	Using Multiple Resolutions		Fundamental
External Files	External File Overview	Working with External Files	*Managing External Files*	Fundamental
	Using External File Manager	Using the External File Manager	*External File Manager Overview*	Fundamental
	Cleaning Unused Files	Finding and Removing unused files	*Clearing Unused Image Sources/Clips and Materials*	Intermediate
Importing and Exporting	Softimage|3D	Softimage3D Import and Export	*Importing SOFTIMAGE|3D Files*	Intermediate
	IGES	IGES Import and Export	*Importing and Exporting IGES Files*	Intermediate
	DirectX	DirectX Import and Export	*Importing and Exporting DirectX Files*	Intermediate
	Point Oven	Point Oven Import and Export	*Importing and Exporting with Point Oven*	Intermediate
Crosswalk	DotXSI Files	Crosswalk with DotXSI files	*Importing and Exporting dotXSI Files*	Intermediate
	COLLADA	Crosswalk with COLLADA files	*Importing and Exporting COLLADA Files*	Intermediate
	FBX	Crosswalk with FBX	*Importing and Exporting FBX Files*	Intermediate
	Maya	Crosswalk with Maya	*Importing and Exporting with Crosswalk for Maya*	Intermediate
	Max	Crosswalk with Max	*Importing and Exporting with Crosswalk for Max*	Intermediate

Topic	Sub-Topic	Recommendation	Reference	Level
Referenced Models	Modifying and Animating Referenced Models	What you can and can't modify with Referenced Models	*Using Referenced Models*	Intermediate
	Working with Deltas	Using Delta		Intermediate
	Updating Referenced Models	Updating Referenced Model		Intermediate
Locking	Overview of Locks	Using Locks Overview	*About Locks*	Intermediate

Image courtesy of Psyop

Topic	Sub-Topic	Recommendation	Reference	Level
Task / Process Analysis	Production Workflow	Explain and demonstrate the process of analyzing a typical animation and/or visual effects workflow by breaking down the activity into discrete and identifiable phases or stages.	Flowchart	Fundamental
	Automation of Repetitive or Complex Tasks	Using a step-by-step analysis in the form of a flowchart, identify individual tasks or procedures that are either repetitive or complex and that would benefit (the user) from being automated through the use of a script.	Procedural Analysis	Fundamental
Scripting Benefits	Scripting Applications	Identify (find existing sources) and describe a range of useful tasks, tools, user interfaces and procedures that have been created using scripting methods for a specific application software.		Fundamental
	Scripting for Personal Productivity	Identify the primary benefits of using scripts to enhance personal workflow, productivity and skills set.		Fundamental
	Scripting Impact on Team Collaboration	Identify the importance of collaboration among production animators, technical directors and script developers in identifying, developing and using scripting procedures to improve workflow, accelerate production, share expertise and enhance teamwork.	Computer Programming	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Task / Process Analysis	Production Workflow	Demonstrate the creation of a production workflow analysis using a step-by-step breakdown of each individual activity and create a flowchart that shows the relationships among them.	Flowchart	Fundamental
	Automation of Repetitive or Complex Tasks	Identify a typical repetitive task, procedure or potential custom interface that would benefit from being scripted - emphasizing the advantages in terms of accumulated time saved and improved production efficiency.	Analysis Techniques	Fundamental
Scripting Benefits	Scripting Applications	Demonstrate the result of creating scripts for a range of applications and tools in the production process that will increase efficiency, save time and improve productivity.		Fundamental
	Scripting for Personal Productivity	Demonstrate how application of a sample script can improve an individual's productivity through automatic repetitive tasks and release more time for creative and innovative activities.		Fundamental
	Scripting Impact on Team Collaboration	Use practical production examples to demonstrate the critical importance of identifying key tools and tasks that can be automated through scripting and communicated among the production team to develop better workflow, speed up production, improve quality and enhance the collective skill set.	Computer Programming	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Task / Process Analysis	Production Workflow	Create a personal workflow of a typical production task or process in the form of a simple flowchart.	Flowchart	Fundamental
	Automation of Repetitive or Complex Tasks	Select and break down a typical repetitive or complex production task and identify specific procedures that could be automated with a simple script.	Procedural Analysis	Fundamental
Scripting Benefits	Scripting Applications	Research and collect from the Internet or other sources, several scripts that may be applied directly to the animator's workflow to automate repetitive animation production tasks.		Fundamental
	Scripting for Personal Productivity	Using a sample script to automate a key task, evaluate its implementation in terms of the impact on (your) individual workflow, production time, personal productivity and job satisfaction.		Fundamental
	Scripting Impact on Team Collaboration	Working in small teams (3 or 4 people), brainstorm and select an example of a key task that needs to be scripted to improve production. Write brief specification for how it should function in terms that can be shared among production staff, computer programmers and technical directors.	Computer Programming	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Scripting Overview	Softimage Scripting APIs	Object Model and Command Model	*Fundamentals of Scripts*	Fundamental
	Softimage Supported Languages	Overview of Softimage supported scripting Languages	*Scripting Languages*	Fundamental
	Setting Scripting Language	Setting the scripting Language		Fundamental
	Running Scripts	Running Scripts	*Running Scripts*	Fundamental
	Command Box	Entering scripts in Command Box	*Using the Command Box*	Fundamental
Script Editor	Using the Script Editor	Overview of the Script Editor	*Editing Scripts*	Fundamental
	F5 = Run Script	Run Script F5 hotkey	*Running Scripts*	Fundamental
	Log Messages	Using and Setting Log Messages	*Scripting Preferences*	Fundamental
Custom Commands	Creating Script Based Commands	Creating Custom Commands with Scripting	*Creating Script-based Custom Commands*	Fundamental
	Custom Toolbar Commands	Adding custom commands to custom Toolbars	*Custom Toolbars*	Fundamental
Sharing Scripts	Add-ons	Packaging and Installing scripts using Add-ons	*Working with the Plug-in Manager*	Intermediate
	Plug-in Manager	Packaging and Installing scripts using Plug-in Manager	*Working with Add-ons*	Intermediate
Scripting Overview	Batch Scripts	Creating Batch Scripts	*Batch Scripts*	Intermediate
Custom Commands	Adding Hotkeys to Custom Commands	Adding hotkeys to custom Commands	*Running Custom Commands*	Intermediate

Image courtesy of UVPH

Topic	Sub-Topic	Recommendation	Reference	Level
UI Workflow	UI Task Analysis	Explain the importance of analyzing user workflow, focusing on a productive arrangement of the user interface (UI) to perform specific tasks. Compare software UI interaction to the human/UI interaction associated with other task-based products around us (mobile phones, automobile dashboards, television remotes, musical instruments, etc...).	Workflow	Fundamental
	Reflective Practice (Identifying Roadblocks)	Review the benefits gained by evaluating UI interaction and explain why well-organized use of the UI can best support and sustain efficient workflow.	Reflective Practice	Fundamental
	Reviewing UI Tools	Explore how the effective use of a well-organized and simplified UI reduces CPU overhead, streamlines workflow, ensures easily accessible tools, and processes and results in enhanced productivity.	User Interface	Fundamental
	Improving UI Application	Explore and illustrate how comparing UI strategies and workflow among peers and mentors who do the same or similar tasks, and making changes based on their feedback and recommendations, has a positive effect of personal productivity, multi-user production workflow, creative teamwork, and job satisfaction.	Mentorship	Fundamental
	Multiple Competing UI's (Digital Distractions)	Illustrate the positive and/or negative effects on specialized tasks and workplace productivity of adding additional UI's that involve "continuous partial attention" and explain the importance of reducing digital distractions.	Continuous Partial Attention	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
UI Workflow	UI Task Analysis	Demonstrate the process of analyzing a production task by capturing and recording a user's workflow and associated UI organization using peer or mentor evaluation.	Workflow	Fundamental
	Reflective Practice (Identifying Roadblocks)	Select a suitable production task and demonstrate how a disorganized application of the UI can hinder workflow and how inefficient arrangements can dramatically reduce productivity.	Reflective Practice	Fundamental
	Reviewing UI Tools	Demonstrate the application of a well-organized and efficient UI for two or three selected core tasks and show how application workflow is enhanced and system response is improved.	User Interface	Fundamental
	Improving UI Application	Demonstrate the positive effects of peer and mentor feedback on the accessibility, organization, sequencing, simplicity, consistency, workflow and efficient use of UI tools and techniques.	Mentorship	Fundamental
	Multiple Competing UI's (Digital Distractions)	Demonstrate the effect of multitasking on a single task compared to using a single, user-defined UI.	Continuous Partial Attention	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
UI Workflow	UI Task Analysis	Carry out a typical production task engaging the services of a peer or mentor to observe and record your use of the UI in an annotated timeline.	Workflow	Fundamental
	Reflective Practice (Identifying Roadblocks)	Deconstruct and examine the results of your task analysis with feedback from your peer or mentor. Discuss and analyze your use of the UI, identifying organizational arrangements that obstruct productivity.	Reflective Practice	Fundamental
	Reviewing UI Tools	As a result of your task analysis, reconstruct the user interface to accommodate the best use of UI tools include the simple arrangement of views and windows, menus and shelves, the use of keyboard shortcuts, scripting, readable text, color coding and other user-defined UI system attributes.	User Interface	Fundamental
	Improving UI Application	Test and evaluate the revised UI, assess the resulting changes in productivity and progress, and document the result of peer and mentor feedback on personal productivity, continuous improvement, and corporate effectiveness.	Mentorship	Fundamental
	Multiple Competing UI's (Digital Distractions)	Evaluate and compare personal productivity under two conditions; working solely on a single application with user defined UI, and working with multiple applications using one or more additional inputs in the form of internet access, social networking, e-mail, audio and/or video channels, IM, chat, conferencing and other applications and/or services.	Continuous Partial Attention	Fundamental

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Topic	Sub-Topic	Recommendation	Reference	Level
Getting Started	Starting Softimage	Starting Softimage from Icon, Start menu or command	*Starting Autodesk Softimage*	Fundamental
	Exiting Softimage	Exiting Softimage	*Exiting Softimage*	Fundamental
	Setting Interaction Model	Setting the Interaction Model	*The First Time You Start Softimage*	Fundamental
Interface Overview	Interface Overview	TitleBar, Viewports, Main Menu Bar, Main Toolbar Icons and MCP	*The Autodesk Softimage Interface*	Fundamental
Menus	Repeat Last menu command	Repeat last menu with MMB	*Accessing Commands and Tools*	Fundamental
	Tearing Off Menus	Tearing off menus		Fundamental
	Context Menus	Using Context and ALT context menus		Fundamental
	Menu Hotkeys	Using Hotkeys to navigate menus		Fundamental
Hotkeys	Sticky vs. Supra Mode	Sticky and Supra Mode		Fundamental
	Repeat Last Command = .			Fundamental
Interface Hotkeys	Model Toolbar = 1		*The Autodesk Softimage Interface*	Fundamental
	Animate Toolbar = 2			Fundamental
	Render Toolbar = 3			Fundamental
	Simulate Toolbar = 4			Fundamental
	Hair Toolbar = CTRL+2			Fundamental
	Main Toolbar = CTRL+1			Fundamental
	Paint Panel = CTRL+3			Fundamental
	Palette = CTRL+4			Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Properties Editors	Title Bar Icons	Overview of Properties Editors Title bar icons	*Modifying Property in Property Editors*	Fundamental
	Key frame Icons	Overview of Properties Editor Key frame icons		Fundamental
	Navigation Icons	Overview of Properties Editor Navigation icons		Fundamental
	Setting Values	Setting values in Property editors		Fundamental
	Sliders	Using Sliders in Property editors		Fundamental
Properties Hotkeys	increase value = [			Fundamental
	decrease value =]			Fundamental
	0.1 increment = SHIFT			Fundamental
	10 increment = CTRL			Fundamental
	virtual slider marked = F4			Fundamental
	drag multiple colors = CTRL			Fundamental
	open Property Editor = ENTER			Fundamental
Views	Browser = 5	Overview of Browser	*The Browser*	Fundamental
	Scene Layer Manager = 6	Overview of Scene Layer manager	*About Scene Layers*	Fundamental
	Render Tree = 7	Rendertree hotkey	*The Render Tree*	Fundamental
	Explorer = 8	Overview of Explorer	*The Explorer*	Fundamental
	Schematic View = 9	Overview of Schematic	*The Schematic View*	Fundamental
	Animation Editor = 0	Animation Editor hotkey	*The Animation Editor*	Fundamental
	Netview = ALT+5	Overview of Netview	*Netview*	Fundamental
	XSI Explorer = ALT+8	Overview of XSI Explorer	*The XSI Explorer*	Fundamental
Viewports	Viewport Overview	Viewport Overview	*Viewports*	Fundamental
	Memo Cams	Using Memo Cams	*Navigating in 3D Views*	Fundamental
	Visibility Options	Setting Visibility Options	*Setting Camera Visibility*	Fundamental
Layouts	Switching Layouts	Switching Layouts	*Overview of Layout and Relation Views*	Fundamental

Topic	Sub-Topic	Recommendation	Reference	Level
Scene Management	File Operations	Open, Save, Merge and other file Ops	*Scenes*	Fundamental
	Backup/Recovery	Backing up and Recovering files	*Backing Up and Recovering Your Work*	Fundamental
Projects	Projects	Setting and Creating Projects	*The Project Manager*	Fundamental
Preferences	Keyboard Mapping	Editing and creating Keyboard Maps	*The Keyboard Mapping Editor*	Fundamental
	Preferences	Setting Preferences	*Preferences Reference*	Fundamental
Layouts	Custom Layouts	Creating custom Layouts	*Creating and Editing Layout and Relation Views*	Intermediate

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