Provides a foundation in 3D animation using state of the art render time 3D modelling and animation software such as Maya, Blender, and 3DS Max. The course will provide a survey of various animation techniques and approaches with an emphasis on render time animation as it is used in 3D art, 3D animation, data visualization and games. Topics include, scene building, character animation, timeline based animation techniques, and the use of 3D graphics in simulation and visualization. Prerequisites: FA/DATT 2500 3.00, or by permission of the Instructor.

This course provides a foundation in 3D animation using the 3D modelling and animation software Maya. The course will provide a survey of various animation techniques and approaches with an emphasis on render time animation as it is used in 3D art, 3D animation, data visualization and games. Topics include, scene building, character animation, timeline based animation techniques, and the use of 3D graphics in simulation and visualization. Some animation techniques covered in the course are straight ahead action and pose-to-pose keyframing, rigging, motion paths, set driven keys, and particle and physic effects. Each class consists of a one hour lecture and two hours of lab practice to accomplish a combined theoretical and practical approach.

Prerequisite: DATT 2500 3.00, or by permission of the instructor.

Students will learn:

**Theoretical points:** The principles of animation. An overview and comparison between traditional and digital animation. An overview of various production workflows. An overview of traditional cinematography techniques and how they can be utilized in digital animation.

**Practical points:** Introduction to the Maya interface. An overview of straight ahead action and pose-to-pose key-frame animation. Motion path and set driven key animation. Model and character rigging with forward and inverse kinematics and humanIK rigging. Deformers & blend shapes, particle
animation and physics effects. Camera & lighting animation. Adding a soundtrack to an animation.
Batch Rendering.
Details may change by circumstance.

Course Objectives:
-To build a framework of skills and vocabulary to create 3D animation.
-To understand the fundamental components and their position in various 3D animation workflows.
-To apply theory and concept in 3D animation art-making.
-To appreciate the interdisciplinary research attitudes of art and technology.
-To invest independent and artistic expression along with problem solving processes during construction.
-To develop awareness of current 3D animation practices through diverse examples of animation, films, videogames, art, etc.

TOPICS AND CONCEPTS

Course Schedule:
Week 1: Lecture: Overview of the course: review course outline, intro to projects. Intro to digital animation. Lab: Set-up account for the class portfolio website. Intro to Maya animation interface and key-framing animation. Assignment 1.


Week 4: Lecture: Introduction to Rigging Lab: Adding a joints to simple objects. FK and IK kinematics. Assignment 3.


Week 6: Lecture: Advanced rigging systems and controls. Lab: Using HumanIK to rig a character. Assignment 5.


Week 8: Lecture: Staging a Scene Lab: Adding Custom Controls to rigs. Project 2: Character Motion Animation.

Week 9: Lecture: Storyboards Lab: Importing and cleaning up motion capture data. Assignment 7.

Week 11: Lecture & Lab: Integrating Maya into various workflows. Lab: Maya animation techniques: Motion Path animation & Set Driven Key, expressions and dynamics.

Week 12: Lecture: Advanced Cinematography in Animation. Lab: In-progress critique, bring a playblast animation of your final project to the lab for peer evaluation and feedback. Project 3: Short Rendered Animation.

LIST OF LEARNING OUTCOMES AND EXAMPLES OF PROJECT DESCRIPTIONS:

Full Project Descriptions and requirements will be uploaded to course website. Specific details and requirements for each project and assignment will be discussed in the course labs.

Project 1 - Ball Animation (5-10 seconds - 120-240 frames): Using the principles of animation (squash and stretch, slow in and slow out) create a 8-10 second animation of a ball bouncing or moving that represents a certain characteristic of the ball, either emotional or physical (ex. cheerful, weighty, fluffy, etc.). Students will submit a Playblast animation along with a brief explanation of what characteristic your animation depicts.

Project 2 - Character Motion Animation (10-15 seconds - 240-360 frames): Students will choose a 3D model of a character and fully rig it using either the rig tools or HumanIK. Then in a 10-15 second animation, animate the character moving (climbing, running, dancing, etc.) using straight ahead action or pose-to-pose keyframing. The character's motion should depict the emotion, size and weight of the character. Students will submit a Playblast animation along with a brief explanation of what motion and emotion your character animation depicts.

Project 3 - Short Rendered Animation (15-20 seconds - 360-480 frames): The subject or theme for the project is open. Students will make a short animation and render each frame using batch renderer. The animation should use a range of techniques from the course such as rigging, deformers, motion paths, parenting, set-driven key, physics effects, and paint effects. Students should consider how staging (lighting, camera movement and sound) can further enhance their final animation. Students will submit a fully rendered video file, a Playblast animation along with a brief explanation of your final animation, how it uses the principles of animation and what cinematography tools it utilizes.

Assignments: After each week's lab, short assignments will be assigned that challenge the students to use the techniques taught that week. Completion of these assignments is essential to become comfortable with the necessary techniques needed to complete each project. Assignments will be evaluated by their level of completion and submission date.

Issues to consider:
- Please be patient to repeat practice exercises until you feel familiar with the logic & structure of the 3D software interface, pipeline, processes, and vocabularies since the complexities can overwhelm. If you have any question or difficulty following, don’t hesitate to ask your instructor.
- Develop your unique preference as a maker/producer among a variety of 3D animation methods.
- As this is a cumulative learning environment attendance in all classes is mandatory.
- Extensions on Assignments and projects will only be considered by the Course Instructor if the proper required supporting documentation is submitted (ex. a doctor’s note).
- All work submitted for evaluation will be original work created in full by the student. York students are required to maintain high standards of academic integrity and are subject to the Senate Policy on Academic Honesty (http://www.yorku.ca/secretariat/legislation/senate/acadhone.htm). It is highly recommended that all
students complete the Academic Integrity Tutorial (http://www.yorku.ca/tutorial/academic_integrity/).

GRADED ASSESSMENT

Grade Breakdown:

<table>
<thead>
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<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Project 1- Ball Animation</td>
<td>16%</td>
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<tr>
<td>Project 2- Character Motion Animation</td>
<td>30%</td>
</tr>
<tr>
<td>Project 3- Short Rendered Animation</td>
<td>30%</td>
</tr>
<tr>
<td>Assignments</td>
<td>24%</td>
</tr>
</tbody>
</table>

Failure to complete any project, assignment or to participate in lectures and lab practice will result in failure of the class. It is mandatory for all students to adhere to the course schedule.

The evaluation will be based on cumulative achievement, regular attendance and the student’s participation in research, making, and creative expression. It is expected that students will show a commitment to completing all projects and assignments with creative & aesthetic solutions based consistent work habits both in class time and outside of class time.

Evaluation/Grading Criteria:

- Quality of the work produced; with the balance of the student’s artistic expression & sensitivity as well as technical understanding, with integration of techniques and subject.
- Ability to use 3D animation techniques and to solve problems into the process of making.
- The progress and engagement of the student in their research studies, as well as their curiosity and motivation to learn and achieve.
- The degree and details to which students can set challenges for her or himself.
- Commitment (includes participation, completing work on time, ambition of project)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade Point</th>
<th>Per-Cent Range</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>A+</td>
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<tr>
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<td>Marginally Failing</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>Below 50</td>
<td>Failing</td>
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</table>
ADDITIONAL INFORMATION

Computer Lab:
Please turn your cell phones off before entering class and/or the computer lab. Please clean your seat and log out before you leave for a next lab session. If you have any questions about using the lab, address them to the lab technician or instructor.

Supplies:
Students will be required to supply headphones in the lab to follow web tutorials. Please also bring a notebook to take notes.

Course Texts and References:
(not mandatory to purchase)
- Maya Help File (in Maya menu, F1 key)
- The Art of Maya: An Introduction to 3D Computer Graphics by Autodesk Maya Press
- Getting Started in 3D with Maya by Adam Watkins, Focal Press, 2012
- Autodesk Maya 2014 Essentials by Paul Naas, Sybex, 2013
- Digital Art Masters series by 3DTotal publishing
- Rig it Right! Maya Animation Rigging Concepts by Tina O'Hailey, Focal Press, 2013

http://www.creativecrash.com/maya/

Important Course Information For Students:
All students are expected to familiarize themselves with the following information, available on the Senate Committee on Academic Standards, Curriculum & Pedagogy webpage (see Reports, Initiatives, Documents)
- Senate Policy on Academic Honesty and the Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation

Many courses utilize Moodle, York University's course website system. If your course is using Moodle, click here to access it.
Moodle @ York University