ROBERT MORGAN EDUCATIONAL CENTER

Course Syllabus

3-D Animation Technology

Room K-654

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ABSTRACT

As students are entering High School with more and more computing experience, there has been an increased interest in the area of computer graphics. However, many students do not understand the complexity behind computer graphics. Fortunately, there are many software packages available that allow students to use the methods that have been developed over the years without needing a strong understanding of the underlying programming.

The purpose of this class is to introduce to both the novice and experienced Graphics student to the exciting world of three-dimensional modeling and animation. Students are able to solidify essential concepts and methodologies through the production of a term long team project in which teams containing between one and three students will work to develop their own models that are then used in a short animations.

The class also explores the history, development, and theories behind modeling and animation. Throughout the four year program, we examine how the medium of computer arts in animation has evolved from traditional Cell animation to today's complex and fascinating computer graphics imagery.

INTRODUCTION AND MOTIVATION

The entertainment industry has provided us with breathtaking views of reality and fiction through the use of special effects. Nevertheless, when movies such as "Toy Story," "Jurassic Park", and “The Matrix” hit the big screen in the early 1990's and the continuing development of computer games such as “Unreal Tournament” the general public has become fascinated to know "How did they do that?" Many of today’s students wish to learn more about animation. As more and more students are entering our universities with background knowledge of the basics of computing, they are able to enter courses that allow them to learn how to use the tools offered by the computer science field and move forward with more professional projects.

A course of this type attracts a lot of attention from the student body as a whole. Both computer majors and non-majors are interested in the class. The challenge then, is to create a plan of study that is educational for those who have minimal experience as well as those who are well versed in the topic area.

This course provides the learner with an introduction to the terms and concepts of animation in general and the history of animation. The students will explore the 3D environment (simple modeling, materials, textures, lighting, animation and rendering) the mathematical concepts involved in the creation of animation and the production process (story telling, scripting, story boarding, production planning/timelines, production, and postproduction).

After learning the animation language and software, students will implement and use frequently recurring procedural building blocks such as structural/functional decomposition, iteration, stochastic functions, recursion, and high-level control. They will then, individually or in teams, implement or use an advanced application of these techniques, choosing one of the following areas: artificial evolution, rule based growth, physically based motion, and behavioral animation. In the advanced stages, students will already understand the basics of modeling, positioning, animating, and rendering three dimensional objects. Students will explore ways of coaxing the computer to do tasks that would be tedious or impossible to do "by hand".
Assignments will be frequent and simple, but open-ended, as in a computer art class. It should be possible to fulfill the minimum requirements for each assignment in a few hours or sometimes days depending on the complexity of the work. And students will be encouraged to create a resume as well as a digital portfolio/demo-reel as part of the Employability skills and also to showcase their talent.

THE PREREQUISITES ARE:

a) Students are required to have home/library access to the Internet for research on Specific assignments associated with the Animation class.
b) Students must have a 4GB flash drive/ jump drive to move and manage files.
c) Students must purchase a drawing pad 8.5”X11” to complete the assigned class drawings since all animation students are required to be able to draw as prescribed by industry.
d) Students will be required to pay a yearly lab fee of $20 to cover lab assignment expenses.

PURPOSE:

This program offers a broad foundation of knowledge and skills to prepare students for College and beyond. The content includes practical experiences in 3-D Animation design and production. Specialized skills including video editing and animation software are used to produce a variety of multimedia.

• Assure that students are able to acquire a fundamental understanding of modeling, rendering and animation from concept to final product.
• Allow students to express their artistic ability through the creative use of three-dimensional computer graphics.
• Expose students to traditional animation techniques and provide an understanding of the importance and incorporation of these techniques into the work of current computer.
• To lay a solid foundation in Graphic Animation for a higher level of education in college and beyond.
 Prepare student to achieve Adobe Photoshop industry certification.

COURSE DESCRIPTION

After learning the animation language and software, students will implement and use frequently recurring procedural building blocks such as structural/functional decomposition, iteration, stochastic functions, recursion, and high-level control. They will then, individually or in teams, implement or use an advanced application of these

techniques, choosing one of the following areas: artificial evolution, rule based growth, physically based motion, and behavioral animation.

Senior advanced student will embark in completing animation projects in modeling, positioning, animating, and advance rendering three-dimensional objects. In this class, students will explore ways of coaxing the computer to do tasks it would be tedious or impossible to do "by hand" or by traditional animation.

Assignments will be frequent and simple, but open-ended, as in a computer lab class. It should be possible to fulfill the minimum requirements for each assignment in a few hours or even days, but students interested in creating portfolio/demo-reel quality work, instead of just gaining an introduction to the main concepts, will be encouraged to do so as their time allows.

CURRICULUM FRAMEWORK

After successfully completing this four-year program, the High School student will be able to perform the following:

FRESHMEN YEAR: OCP-A

04.0 Understand the history of 3D Animation.
05.0 Understand the production process.
06.0 Understand intellectual property rights, copyright laws and plagiarism as it applies to creative assets.
07.0 Demonstrate proficiency in computer skills.
08.0 Demonstrate knowledge of photo editing software.
09.0 Demonstrate a knowledge of production writing as it relates to 3D animation.
10.0 Demonstrate knowledge of art direction.
11.0 Demonstrate knowledge of character development.
12.0 Demonstrate knowledge of storyboarding.
13.0 Demonstrate knowledge of animatics.
14.0 Demonstrate knowledge of video editing software.
15.0 Demonstrate appropriate voice acting skills.
16.0 Demonstrate basic audio production.
17.0 Demonstrate knowledge of audio editing software.
18.0 Demonstrate knowledge of funding presentations and pitches.

SOPHOMORE YEAR: OCP-B

19.0 Understand modeling in relation to the production process.
20.0 Demonstrate knowledge of animation principles as it relates to modeling.
21.0 Demonstrate knowledge of modeling principles.
22.0 Demonstrate knowledge of 3D Animation software.
23.0 Demonstrate knowledge of 3D Animation software navigation.
24.0 Demonstrate knowledge of NURBS modeling.
25.0 Demonstrate knowledge of polygon modeling.
26.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in 3-D Animation Technology.
27.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical

Subjects for student success in 3-D Animation Technology.
28.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in 3-D Animation Technology.
29.0 Demonstrate knowledge of basic lighting.
30.0 Demonstrate knowledge of basic materials and textures.
31.0 Demonstrate knowledge of basic animation.
32.0 Demonstrate knowledge of basic character setup.
33.0 Demonstrate knowledge of basic 3D rendering.

JUNIOR YEAR: OCP-C

34.0 Understand the role of texture artist in relation to the production process.
35.0 Demonstrate knowledge color theory.
36.0 Demonstrate knowledge of advanced material and texture creation.
37.0 Demonstrate knowledge of cloth and hair.
38.0 Demonstrate knowledge of cell-shading.
39.0 Demonstrate knowledge of texture baking.
40.0 Demonstrate knowledge of texture maps.
41.0 Demonstrate knowledge of 3D paint.
42.0 Demonstrate knowledge of rigging.
43.0 Demonstrate knowledge of morphing.
44.0 Demonstrate knowledge of facial animation.
45.0 Demonstrate knowledge of advanced rigging.

SENIOR YEAR: OCP-D

46.0 Demonstrate knowledge of motion capture systems.
47.0 Demonstrate knowledge of motion capture system setup.
48.0 Demonstrate knowledge of motion capture preproduction.
49.0 Demonstrate knowledge of motion capture production.
50.0 Demonstrate knowledge of motion capture post production.
51.0 Understand the role of a 3D Animator in relation to the production process.
52.0 Demonstrate knowledge of advanced animation.
53.0 Demonstrate knowledge of motion graphics.
54.0 Demonstrate knowledge animation behaviors and scripting.
55.0 Demonstrate knowledge of particle systems.
56.0 Demonstrate knowledge of advanced audio production.
57.0 Demonstrate knowledge of dynamics (physics).
58.0 Demonstrate knowledge of distributed rendering.
59.0 Demonstrate knowledge of video compositing software.
60.0 Demonstrate knowledge of post-production.
61.0 Develop professional portfolio of work.

Academic Expectations:

You are expected to bring all your personal supplies to class with you EVERYDAY. You will have a folder in class that serves as your portfolio and will remain in the file cabinet for the entire school year. The folder will contain your class contract, graded class assignments/homework, and all other pertinent paperwork. You will also have a folder on the server with your Student ID number in which you will save all the computer assignments. Any assignment that is not saved to your folder will be

considered an incomplete. (It is your responsibility to save your work to your folder).

Mandatory supplies include:

- Paper, Pens and pencils -- PLEASE! Blank paper (no line paper).
- 3-ring binder (3 inch thick)
- A 10 color pencil set.

- ALL work done in class MUST be saved in your folders on the server, I will periodically back up all the students work on a CD-Rom(s) and/or DVD Rom(s)
- (Optional) Dictionary or thesaurus due to the nature of this class

The student Rules and Procedure school Manual. It is extremely important for YOU the student to adhere to this School Policies for your success in my class. Therefore, it is extremely important that you bring your 3-ring binder EVERDAY. There should be NO EXCUSES what so ever for not bringing in your materials. You may be issued a textbook for use in and out of class. You will be responsible for transporting and the safety of these books to and from class, Students who lose books will be held financially responsible. The parents will be financially responsible for the replacement of this books; this is why you will be required to sign a financial obligation form the first day of school.

Grading Scale.

A 100-90	3.51-4.0	Excellent
B 89-80	2.51-3.50	Good
C 79-70	1.51-2.50	Average, Satisfactory
D 69-60	1.0-1.51	Poor; Improvement Needed
F 59-.0	.99-.00	Failure/Unsatisfactory
I 0-0		Incomplete/work not turned in

Effort Grades are assigned as follows:

1 = student hands in over 90% of the assignments
2 = student hands in over 70% of the assignments
3 = student hands in less than 70% of the assignments

- All work done for this class earns points or grades: homework, extra credit *(when granted),* class participation, quizzes, tests, and special projects.
- An assignment that does not receive a letter grade is given a check or check minus. These marks are given a corresponding letter grade at the end of the grading period.
- All work handed in late loses one grade each day it is late.
- Each missed assignment will receive a "0". If work is missed due to an absence (not long term), a valid written excuse is required.

- Pop quizzes may be given at any time, particularly if I see students have not been doing their assignments.
- Students are expected to read all handouts given throughout the week and highlight key facts.
- Students MUST READ A BOOK OR NOVEL DURINGREADING TIME - Magazines, catalogs, and textbooks are not allowed during this time.
- PLEASE Students must turn in all assignments headed in the following manner: Upper left hand comer: Your name, Date, Period and Assignment title Center of page before work.

Cheating

CHEATING WILL NOT BE TOLERATED. You are expected to complete all assignments on your own, unless there is a cooperative/group activity assigned.

Home Learning Policy
Homework will be assigned and collected for grades/points on a regular basis.

Typed work will be greatly appreciated. If you do not have access to a computer/typewriter/word processor at home, please see me after class. It is your responsibility to complete and turn in assignments on the day they are due.

Late Policy Class assignments are given with ample time for completion. It is your responsibility to keep track of the assignments I give you in order for you to complete them on time. Late work may be accepted, but for a reduced grade.

Assignment Make-up Policy

When you return to school after an absence, IT IS YOUR RESPONSIBILITY TO CONSULT ME REGARDING MAKE-UP WORK (be sure to provide me with a written excuse). You may see me with questions before/after class. Work not made up equals a "0" (2 F's). Work must be turned in NO LATER THAN ONE WEEK from the day the student was absent.
"If you do what you always did, you '11 get what you always got."

Behavioral Expectations
I do not expect behavioral problems from any member of my class; however I consider it appropriate to share my discipline plan/rules with you.

Policies/Procedures
- Follow directions the first time they are given
- Raise your hand before speaking
- Keep your hands, feet, objects and all negative comments to yourself.
- Follow school rules, ill policy, dress code and conduct code at all times. (They

will. be posted in the classroom)

- Do not bring out radios, beepers, cellular phones, hats, make-up, hair brushes, or other items to class. If you use these items during class, they will be taken away.

Tardy Policy, Attendance Policy, and Class Cuts

- Students must be in their seats when the final bell rings.
- Only two (2) hall passes per week will be allowed per student.
- All tardiness to class without a permissible excuse will receive a detention.
- See posted class materials for more detailed information.

Dress Code

Students should adhere to the Robert Morgan Educational Center Academy Dress Code at all times. The dress code includes:

- Academy Shirts are REQUIRED.
- Multiple layers of collared shirts not allowed.
- Undershirts are not allowed.
- NO SHORTS.
- Skirts are considered shorts and are not allowed.
- All shoes must be enclosed: No slippers, clogs, open-toed or bare backs allowed
- Tube tops, see-through tops, backless shirts, spaghetti straps, halter tops, Bare midriffs and sleeveless undershirts are not allowed.
- No hats or caps. They will be confiscated if worn or brought to school.
- No clothing with written messages, pictures, or symbols that portray ideas adverse to the health, safety, or welfare of students. This includes messages relating to alcohol, drugs, cigarettes, profanity, etc.

Consequences for dress code violations

- Teacher's detention (parents will be notified)
- Infraction warning slip'" sent to CSI

Furthermore, all students are to dress professionally if they have a scheduled meeting with or visit from faculty, administrators, or corporate executives.

"I Dress the way you want to be addressed"

You and your parents/guardians must read this handout carefully. Please have them sign the attached parent contract and return it to me by the next class. This hand out must be inserted in the front of your class notebook.

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