COURSE CALENDAR DESCRIPTION

Introduction to simulation and animation techniques used in computer games, with a focus on the algorithms and methods that support moving objects in the virtual environments. Prerequisites: General prerequisite; LE/EECS 2030 3.00 or LE/EECS 1030 3.00; LE/EECS 3431 3.00, SC/MATH 1310 3.00. (NOTE: The General Prerequisite is a cumulative GPA of 4.50 or better over all major EECS courses. EECS courses with the second digit "5" are not major courses.)

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
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<td>Faloutsos, Petros</td>
<td>Sec. A / LECT / F</td>
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TOPICS AND CONCEPTS

This course presents the conceptual foundation of simulation and animation methods used in the Digital Media industry, including computer games. Students will get an understanding of the theory and techniques behind making objects "move" in an interactive environment. The course covers all aspects of computer animation, including key-framing and interpolation, physics based animation of particles and rigid bodies, kinematics and dynamics of articulated characters, techniques based on motion capture, and automated control.

Topics covered:

- Principles of classical animation
- Vector spaces, and Affine transformation
- Key-framing and interpolation
- Kinematic and dynamic animation of particles
- Spring-mass systems
- Collision detection and resolution for spring mass systems and rigid bodies
- Kinematics of articulated characters
- Inverse kinematics of articulated characters
- Dynamic simulation of articulated characters
- Motion capture techniques for animation
- Automated control of animated characters
- Facial Animation based on blend-shapes
Course Learning Outcomes:

After successful completion of this course, students are expected to be able to understand the concepts behind and to implement:

- Key-frame interpolation techniques for animating virtual characters
- A basic yet complete physics-based simulator for spring-mass systems
- Kinematic techniques for articulated characters
- Motion capture techniques such as motion graphs to animate articulated characters

ACADEMIC INTEGRITY LINKS

- Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
- Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS

- Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
- Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
- Counselling and Disability Services - http://cds.info.yorku.ca

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

Moodle @ York University