CSC/CPE 474 Computer Animation

1. CSC/CPE 474 Computer Animation

2. **credit units** 4  **contact hours** 6

3. **Course Coordinator:** Shinjiro Sueda

4. **Textbook:** (and/or other required material) Computer Animation Algorithms and Techniques by Parent, Morgan Kaufman, 2002

5. a. **Course Description:** Basic and advanced algorithms for generating sequences of synthetic images. Interpolation in time and space, procedural and keyframe animation, particle systems, dynamics and inverse kinematics, morphing and video. 3 lectures, 1 laboratory. Crosslisted as CPE/CSC 474.

   b. **Prerequisite:** CSC/CPE 471.

   c. **Required/Elective/Selective Elective for CPE, CSC, EE, SE**

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6. a. **Course Goals/Outcomes**

   The student will be able to:
   - Gain a thorough understanding of classic and current computer graphics animation techniques. The course is taught from a toolbuilder's point of view; very little in the way of animation application programs (such as 3D Studio Max or Maya) or the artistic principles of animation are taught.

   b. **How Student Outcomes addressed**

   ("B" = Basic level, "I" = Intermediate level, "A" = Advanced level)

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7. **Major Topics Covered:** (number of lecture hours each)

   - Introduction to animation concepts (1.5)
   - Human visual system (1.5)
   - Classical animation (1.5)
   - Interpolation and curves
     - Linear, quadratic, cubic (1.5)
- Bezier, parabolic, Catmull-Rom, Hermite (1.5)
- Curves in time and space (1.5)
- Distance control on curves (3)
- Procedural motion and keyframing (1.5)
- Spatial and temporal antialiasing (1.5)
- Particle systems
  - Forces, acceleration and velocity (1.5)
  - Euler solution for particle systems (1.5)
- Dynamics and inverse kinematics (2.5)
- Character animation (3)
- Quaternions (1.5)
- Skinned meshes (1.5)

Principles of animation (artistic considerations) (1.0)