BIRZEIT UNIVERSITY
Computer Science Dept.

| COMP3351 | **3D Modeling and Animation** | **Spring 2024** |

1- Course information:

  a. Course Code: COMP3351

  b. Course Name: Animation.

  c. Prerequisite: Comp2311

  d. Co-requisite:.None.

2- Instructor Information (Sobhi Ahmed, Masri318, sahmed@birzeit.edu, office hours: TBA)

3- Course Description

The course introduces computer animation. Students will be able to explain common concepts in 3D animation, and to use software for character animation, and understand elemental topics in physics and geometry related to 3D animation. The course will cover the following topics: rigging for forward and inverse kinematics, skin weighting, morph targets, expression-driven animation, rigid-body and particle simulation.

4- Course Goals

- Students will be familiar with the history of animation and computer animation and distinguish common concepts in 3D modeling and animation.

- Understand model, rig, skin and animate 3D characters with inverse kinetics and forward kinetics.

- Implement and rendering 3D computer modeling and animations using computer 3D graphics tools.

5- Course Outcomes

Upon successful completion of this course, the student will be able to:

A. Knowledge and Understanding

A1 - Understand the main concepts of 3D modeling and animation, including, but not limited to, primitives, lighting, materials, texturing, rigging, and key frame animation.

A2 - Distinguish common concepts in 3D animation.

B. Intellectual/Cognitive Skills

B1 - Synthesize and communicate ideas visually in the form of computer modeling and animation.

B2 - Demonstrate computer modeling and animation skills to a real game project.

C. Practical/Professional Skills

C1 - Use software for 3D modeling and animation.

C2 - Model, rig, skin and animate 3D characters with inverse kinetics and forward kinetics.

D. General and Transferable Skills

D1 - Discuss and explain the animation principles in the literature.

D2 – Teams work skills.

D3 – Writing and presentation skills.

6- Course Content

Week #	Course Content	Assignments and Due Date
1	Introduction and basic concepts of 3D modeling	
2	Modeling tools, 3D scene, primitives, types of objects, Object manipulation, etc.	
3	Modeling techniques – manipulating objects parts, editing tools, sweeping, spin, subdivisions, screw, snaps, Modifiers, etc.	Assignment 1 due date
4	Other modeling tools and techniques : Sculpting, Curves, Nurbs Surfaces 3D text, Meta objects, etc.	
5	Material and Texturing	Assignment 2 due date
6	Lighting, Camera and Rendering	
7	Animation principles, theories and concepts	Assignment 3 due date
8	Computer Animation techniques: (Key Framing)	
9, 10	Rigging and hierarchical structures	Assignment 4 due date
11, 12	Skinning, skin binding and skin deformers	
13	Rigid body dynamics	
14	Rigging and character animation in 3d	Final Animation Project due date
15		

7- Teaching and learning methods

   A. Lectures

   B. Labs

   C. Modeling and animation assignments and projects

   D. Final Project

   E. Discussion

8- Weighting of assessments (can be modified later)

Classwork & Participation	10%
Individual Assignments & Quizzes	20%
Midterm	20%
Final project	15%
Final Exam	35%
Total	100%

9- References

   A. Essential books /text books

      1. Kerlow, I. V.: The Art of 3D Computer Animation and Effects (Edition: 4:e), John Wiley & Sons Ltd, 2008, 978-0-470-08490-8

      2. Flavell, Lance. Beginning Blender: Open Source 3D Modeling, Animation, and Game Design. Apress, 2011

   B. Recommended books and Readings

      1. Blender Community, Blender User Manual Release 2.78, 2017.

      2. Blain, John M. The Complete Guide to Blender Graphics: Computer Modeling & Animation. CRC Press, 2016....

   C. Web sites

      1. . https://www.blender.org/...........