Animation: 3D Animation, Rigging, and Simulation

ANIM 302 – 2 | TR, 12:30PM – 3:15PM | RB134

Instructor Information

Name: Zachary Craw

Instructor Contact Information:

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Canvas Address: bsu.instructure.com

Office Hours: AJ275, TR 10:45am – 12pm, by appointment

Zoom Personal Address: Zoom Link

Course Information

Course Description

Intermediate study of 3D computer animation. Topics will include animation, rigging, and simulation.

Prerequisites

ANIM 203 and ANIM 211

Course Objectives and Outcomes

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

- Understand the basic principles of 3D character animation
- Understand basic rigging principles
    1. Create solid skeleton rig for biped
    2. Differentiate between IK and FK and demonstrate ability to implement each.
    3. Use Mel Scripting and expressions as they apply to character rigging.
    4. Create blendshape deformers, for facial animation and deformation correction.
    5. Create simple interfaces and customize environment to enhance workflow and productivity.
    6. Differentiate between lattice, rigid, and smooth binding, as well as wrap deformers.
    7. Define deformation order as well, editing membership of points, and point weighting.
    8. Describe rotation order as well as gimbal locking.
    9. Use pole vector, aim, orient, and point constraints.

10. Use non-linear deformers, such as squash, sine, wave, and bend.
11. Describe how local rotation axis affects animation.
12. Describe how modeling affects setup concerns.
13. Optimize binding, for quick feedback, as well as the creation of low-res models for instant feedback.

- Understand basic Maya dynamic principles
- Apply rigging principles and setup solutions to animation

Software Needed: Maya, After Effects, Photoshop and others as needed.

Course Modality/Structure

The format for this class will combine lecture, demonstration, studio work time, group discussion, and critique. There will be a Course Calendar located on the Canvas course site, which includes all weekly tasks, assignments, and due dates. This calendar will be updated as the semester progresses.

Course Time Commitment

It is expected that students will spend approximately 2 hours of study time outside of class for every one hour in class. Since this is a 3-credit hour studio, you should expect to study an average of 6 hours outside of class each week.

Course Materials

Reference Material: Udemy (all Ball State Students have access at my.bsu.edu)
Required Texts: None
Recommended Texts:
The Animator's Survival Kit, Richard Williams, Farber and Farber Pub; ISBN: 0571202284
The Illusion of Life, Frank Thomas and Ollie Johnston ISBN: 0786860107
Stop Staring: Facial Modeling and Animation Done Right, Jason Osipa, Sybex; ISBN-10: 0470609907

Course Fee: None

Recommended Hardware: Wacom Grip Pen: Model Number KP501E2

Materials and Supplies: Note taking material, flash drive, Portable hard drive, or some type of media storage device.

Making Back-ups: Students are responsible for all digital work. Never rely on the local computer "M" drive or Desktop in the computer labs for any overnight storage or long-term storage. The "M" drives on the computers will not be touched until the end of the semester over the breaks for cleanup unless the drive becomes full. The loss of class work due to the

lack of back-up is not a viable excuse in this class. Hard drives go corrupt and flash drives break. As a digital artist, expect this and plan ahead for it. Always back up everything and do not leave all your files in one location. I would highly recommend using cloud storage such as OneDrive, Dropbox, or a Google drive to aid with online storage. Course assignments and assessments

Course Assignments and Assessments

The Value of Your Work: As an artist/designer/creative, you help to determine the worth of your work and to cultivate respect for the work that you create. You should take care of your work, the execution, craftsmanship and maintenance of your work reflects on you. Maintaining a portfolio (physical/digital) is an important aspect of your development and education.

Grading Scale: Based on Industry Standards
A = You excelled and added techniques not taught by instructor
B = Did the work asked for with acceptable results
C = Did the minimally acceptable work and attended all classes
D = Unacceptable work but attended all class and completed all homework
F = Unacceptable work, unacceptable homework, and unacceptable attendance

Course Assignments

Please see the weekly outline at the bottom of this syllabus.

Course Weights and Grading Scale

Assignment/Exam	Points/Percent
Homework	50%
Final Projects	50%
• Animation “Run and Jump”	15%
• Rigging: Complete Biped Character Rig	15%
• FINAL: Effects/Rigging/Character Animation	20%

Homework: Worth a total of 2 points each
- Turned in on time and complete = 2 points
- Turned in late or on time and incomplete = 1 points
- Not turned in at all or late and incomplete = 0 points

Final Project Grade: Based on a 1 – 10 scale, half points included

Letter Grade	Percentage Lower Bound
A	98%
A-	92%
B+	88%
B	83%
B-	80%
C+	78%
C	73%
C-	70%
D+	68%
D	63%
D-	60%
F	<60%

Assignment and Examination Schedule

Assignment/Exam	Due Date
Ball Bounce	Week 2
Walk Cycle	Week 4
Run and Jump	Week 6
Character Rig: Biped	Week 11
Character Rig: Advanced Skeleton	Week 12
Dynamics: Bowling Alley	Week 12
Dynamics: Ball Throw and Shatter Dynamics	Week 13
FINAL: Blocking Pass Stage 1	Week 13
FINAL: Blocking Pass Stage 2	Week 14
FINAL: Completed Animation with Dynamic Simulation	Week 16

Course Statements and Policies

Participation Policy

- This course is designed with weekly activities, discussion, and other forms of regular collaboration and communication.
- Class time will be spent in a productive manner.
- It is recommended that you log into your course 3 to 4 times a week and check your official Ball State email account daily to view announcements and prepare for class.
- Complete all assignments, quizzes, tests, and any other activities by the stated due dates.

In-class critique: In-class critiques are very important to your growth as an animation student and one day as a professional artist. A professional animation studio conducts "daily's", which means every day your work is viewed in different stages to make sure that it adheres to the larger project's needs. If you turn in work that is not complete to the stage the class is currently critiquing, your work will be passed over during the critique. If there is time at the end of class, your work will then be critiqued as best as possible in its current form.

Feedback Policy

- I will respond to emails from your official Ball State email address within 24 hours during weekdays (Monday-Friday) and within 48 hours on the weekend.
- I will read every discussion post, but I will not always personally comment on posts.
- I will grade your quizzes, assignments, and discussions no later than within 5 business days of submission.
- Contact me directly if you have questions or concerns about your performance in class.

Late Assignment Policy

- All assignments are due by the time and dates indicated on Canvas.
- Assignments posted after the indicated due dates will be subject to a decreased letter grade for each day late.
- Internet connectivity and technical issues may occur and impede you from turning in work on time. Turn in work early and often, and set up a back-up plan, such as visiting a local library or borrowing a peer's computer.
- Late work on final projects will receive a grade of zero.
- On-time projects may be redone with instructor approval.
- ABSOLUTELY NO WORK WILL BE ACCEPTED AFTER THE FINAL CLASS.

Assignment Submission Policy

- All assignments should be submitted using the standardized methods established for the animation program. Please see examples below.
- Assignments, unless otherwise indicated, should be submitted to our designated dropbox folder on astar**.** Assignments will **NOT** be submitted directly through Canvas.

Naming in Maya scenes – All objects, groups, objects within groups, textures or shaders are to be named, or there will be a **0.5 point deduction** on homework assignments.

Naming convention for all animation homework files –
'last name_first name_name of project' If your completed homework file name does not conform to naming convention, the homework will not be accepted.

Examples:

- Beane_Andy_FinalRig.mb
- Ludwick_Brian_FinalStoryboard.pdf
- Condie_Brad_FirstDraftAnimation.ma

Default Deliverable File Format Standards – all files are to be formatted for homework or final projects using one of the following standards. If your file does not conform to file format standard, the homework will not be accepted.

Movie File - Resolution 1920 x 1080, Format H.264, Aspect Ratio square pixels, Profile main (Media Encoder use the VimeoHD preset) **File Type:** .mp4

Rendered Images - Resolution 1920 x 1080, dpi 72. **File Type:** .png

Grading Policy

It is my policy that appropriate evaluation of your academic performance is an integral part of your learning experience. In the absence of mistake, fraud, bad faith or incompetence, I will be the key decision-maker on the assignment of grades. For information concerning grade appeals, consult the Ball State website.

University Policies

Disability Services Statements

We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse. If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's Disability Services office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

Attendance

Students are required to attend all classes and critiques. After three absences you will drop one letter grade at the fourth absence and after 5 absences you will automatically fail the course. This course is designed to include discussion and other forms of collaboration and communication. You will need to check Canvas each week and your official BSU University email account daily. Doing so will allow you to view announcements, participate in class activities, prepare for and complete assignments and assessments. You are expected to complete all assignments and any other activities by the due date.

Ball State Academic Ethics

Honesty, trust, and personal responsibility are fundamental attributes of the university community. Academic dishonesty and other forms of academic misconduct threaten the foundation of an institution dedicated to the pursuit of knowledge and will not be tolerated. To maintain its credibility and reputation, and to equitably assign evaluations of scholastic and creative performance, Ball State University is committed to maintaining a climate that upholds and values the highest standards of academic integrity. Visit the complete Student Academic Ethics Policy.

Plagiarism Policy

Plagiarism is not acceptable, unless otherwise indicated for all assignments, you must work independently by yourself. Sharing of files is not permitted for any reason.

Potential Violations

Examples of academic integrity violations include but are not limited to:

- Working with another person on any assignment other than authorized group projects.
- Sharing or allowing others to access your files, whether done with permission or not.
- Use or possession of a file created by someone else.
- Reusing work from another semester, course, or section.
- Fraudulent submission of work.

- Using unauthorized materials during Exams.
- Impersonating someone else or having them impersonate you.
- Making fraudulent or dishonest statements regarding your work.
- Soliciting others to complete work for you.
- Posting course files and resources on study or content sharing websites.

Plagiarism Detection

The campus subscribes to Turnitin, a plagiarism prevention service, through Canvas. You may need to submit written assignments to Turnitin. Student work will be used for plagiarism detection and for no other purpose. The student may indicate in writing to the instructor that he/she refuses to participate in the plagiarism detection process, in which case the instructor can use other electronic means to verify the originality of their work.

AI Policy

As part of this course, students are permitted to use text-based AI tools, including ChatGPT, to support their creative and technical work. However, the responsible and ethical use of AI is essential and should align with the principles of academic integrity, originality, and respect for the creative process.

Guidelines for AI Use:

1. **Purposeful Assistance**: AI tools may be used for brainstorming, generating ideas, refining written content, or solving technical challenges. AI should serve as a supplement to your own critical thinking and creativity, not a replacement.
2. **Transparency**: Clearly document when and how AI tools were used in your project.
3. **Originality and Ownership**: Ensure that the final work reflects your personal vision and effort. AI-generated content must be reviewed and integrated thoughtfully, not submitted as-is, to maintain the integrity of your artistic voice.
4. **Critical Evaluation**: Verify the accuracy, relevance, and originality of AI-generated content. Be cautious of relying on AI-generated outputs that may perpetuate biases, inaccuracies, or unoriginal ideas.
5. **Respect for Collaboration**: If collaborating with peers, discuss and agree upon the role AI will play in your shared work to maintain fairness and equitable contribution.

Ethical Considerations:

1. **Moral Responsibility**: Recognize the broader ethical implications of using AI tools, including potential issues of copyright infringement, plagiarism, and over-reliance on automated processes.
2. **Creative Integrity**: Understand that your projects are a demonstration of your skills and creativity as an artist and professional. Misuse of AI tools to shortcut the creative process can undermine the purpose of the course and your learning experience.

Consequences for Misuse:

Failure to comply with these guidelines may result in academic penalties, including loss of credit for assignments or projects where misuse is identified. Additionally, such behavior may be reported in accordance with the university's academic integrity policies.

By adhering to this policy, you will demonstrate professionalism and ethical decision-making while leveraging AI as a valuable tool in your creative journey. (AI was used to help create this AI policy)

Proctoring

This course will require the use of the Respondus LockDown Browser and Monitor for online exams. Watch this short video to get a basic understanding of LockDown Browser and the optional webcam feature (which may be required for some exams.) Instructions for obtaining the software can be found in our course.

Canvas and Student Privacy

Canvas Accessibility

Canvas provides a user experience that is easy, simple, and intuitive. Special attention has been paid to making Canvas screen-readable. The Rich Content Editor encourages users to create accessible content pages (i.e. text formatting is accomplished using styles). Canvas is designed to allow limited customization of colors and schemes to be accessible for all users. The National Federation of the Blind granted Canvas the Gold Level Web Certification in 2010.

Find more information by visiting the Canvas Voluntary Product Accessibility Template (VPAT).

FERPA and Privacy

As a student, your educational records are considered confidential. Under FERPA (Family Educational Rights and Privacy Act), your records are confidential and protected. Under most circumstances, your records will not be released without your written and signed consent. However, some directory information may be released to third parties without your prior consent unless a written request to restrict this is on file. You can learn more about student rights to privacy by reading Ball State's FERPA and Privacy and Protection.

Video Conferencing Recording

In this class, software may be used to record live class discussions. As a student in this class, your participation in live class discussions may be recorded. These recordings typically will be made available only to students enrolled in the class, to assist those who cannot attend the live session or to serve as a resource for those who would like to review content that was presented. Students who prefer to participate via audio only will be

allowed to disable their video camera so only audio will be captured. Students who prefer to listen only must disable their audio capability and visual camera. If you have concerns, please discuss these options with me.

Academic Support Services

The Writing Center

All writers improve with practice and feedback, so as a student in this course, you are encouraged to use the Writing Center (in Robert Bell 295 during weekdays, Bracken Library First Floor West in the evenings, or online during any of our regularly scheduled hours) to get additional feedback on your writing. The Writing Center offers free planning, feedback, and accountability sessions (in person and online) to all students composing essays, reports, reflections, research projects, web content, lesson plans, slideshows, poster presentations, resumes, and other digital or print texts. To schedule a free appointment to discuss your writing, go to http://www.bsu.edu/writingcenter. Online and in-person appointments are available; however, plan ahead because appointments book quickly!

The Learning Center

The Learning Center offers free tutoring for many courses. We also provide writing and study skills tutoring. Students can make appointments for virtual (Zoom) or in-person (NQ 350) appointments. To make an appointment, visit my.bsu.edu and click on “Navigate” in the Additional Tools section, or just go directly to https://bsu.navigate.eab.com. You can also download the Navigate Student app. The Learning Center also has drop-in tutoring (no appointment necessary) for math, chemistry, and biology. Check our website for more information. Testing accommodations for students with disabilities are available for students who have received the appropriate documentation from Disability Services. Tests may be administered in the Learning Center.

For more information about all of our programming visit www.bsu.edu/learningcenter or call 765-285-1006. Email us at learncenter@bsu.edu. Follow us on Instagram and X: BallStateLC

Subject to Change Statement

This syllabus and schedule are subject to change.

Weekly Outline

Week 1: Intro to Class and Animation
Tue – Intro to class and Lab / Intro to Animation 12 principles / Ball Bounce
Thur – Ball Bounce
Homework: Three Ball Bounce Due Next Class

Week 2: Animation Characters and walks
Tue – Looking at Character Rigs, Walk Cycle
Due: Turn in Ball Bounces for grade.
Thur – Walk Cycle

Week 3: Animation Walks
Tue – Walk Cycle
Thur – Walk Cycle
Homework: Walk Cycle Due Next Class

Week 4: Animation Begin Animation project
Tue – Critique Walk Cycle
Thur – Run and Jump

Week 5: Animation Finish Animation project
Tue – Run and Jump
Thur – Run and Jump
Homework: Finish Animation Run and Jump Project (Animation Final Project)

Week 6: Animation / Rigging
Tue – Critique Animation Run and Jump Project
Thur – Intro to Rigging - Joints, Nodes, Channels Attributes, Constraints and Controllers
Homework: Character Model due next class

Week 7: Rigging
Tue – Begin Rigging Character, Joints Layout
Thur – Controllers Layout

Week 8: Rigging
Tue – **NO CLASS, Fall Break**
Thur – Controllers Layout, Skinning

Week 9: Rigging
Tue – Skinning, Deformers, Blendshapes
Thur – Final Rig Cleanup

Week 10: Rigging
Tue – Rig Workday
Thur – Rig Workday
Homework: Complete Rig for next class / No critique just grade

Week 11: Rigging – Advance Skeleton Auto Rig
Tue – Advanced Skeleton
Thur – Advanced Skeleton
Homework: Complete Adv. Skeleton Rig for next class / No critique just grade

Week 12: Rigid Body Dynamics
Tue – Intro to Rigid Body Dynamics – Bowling Alley
Homework: Bowling Alley Due Next Class
Thur – Rigid Bodies Dynamics – Shatter Dynamics
Homework: Ball Throw with Shatter Dynamics Due Next Class

Week 13: FINAL Animation
Tue – Final Animation Start – Reference and Blocking Pass Stage 1
Homework: Blocking Pass Stage 1 Due Next Class
Thur – Final Animation Start – Reference and Blocking Pass Stage 2
Homework: Blocking Pass Stage 2 Due Next Class

Week 14: FINAL Animation
Tue – Workday
Thur – **NO CLASS, Thanksgiving Break**

Week 15: FINAL Animation
Tue – Workday
Thur – Workday
Homework: Complete VFX/Animation/Rigging Project for Finals Week

Week 16: Finals Week
Fri – Final Due, Refer to Canvas for Final Date and Time
NO LATE WORK WILL BE ACCEPTED FOR THE FINAL
HAVE A GREAT BREAK!