DES M143: 3D FUNDAMENTALS

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College
Moorpark College

Discipline (CB01A)
DES - Design

Course Number (CB01B)
M143

Course Title (CB02)
3D Fundamentals

Banner/Short Title
3D Fundamentals

Credit Type
Credit

Start Term
Fall 2022

Formerly
MM M40 - 3D Fundamentals
MM M04 - Multimedia Design

Catalog Course Description
Introduces the fundamental concepts and tools used in the creation of 3D digital animation, including modeling, texture mapping, lighting, animation, and rendering. Explores the creation of characters, environments, and animation through visual narrative and design strategies, as well as a working knowledge of the industry standard software.

Taxonomy of Programs (TOP) Code (CB03)
0614.10 - *Multimedia

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

Y - Not Applicable

Support Course Status (CB26)

N - Course is not a support course

Field trips

Will not be required

Grading method

(L) Letter Graded

Alternate grading methods

(O) Student Option- Letter/Pass
(E) Credit by exam, license, etc.
(P) Pass/No Pass Grading

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
35
Maximum Contact/In-Class Lecture Hours
35

Activity

Laboratory
Minimum Contact/In-Class Laboratory Hours
52.5
Maximum Contact/In-Class Laboratory Hours
52.5

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
87.5
Total Maximum Contact/In-Class Hours
87.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
70
Maximum Outside-of-Class Hours
70

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
157.5
Total Maximum Student Learning Hours
157.5

Minimum Units (CB07)
3
Maximum Units (CB06)
3

Prerequisites
DES M121 (formerly MM M10)

Entrance Skills
Entrance Skills
DES M121

Prerequisite Course Objectives
DES M121-discuss the artistic and technological aspects of digital media in both historical and contemporary contexts.
DES M121-demonstrate the ability to present and discuss work in a professional manner, using appropriate digital media vocabulary.
DES M121-apply pre-visualization techniques to communicate design concepts for print and screen.
DES M121-create and edit media using industry-standard software applications.
DES M121-identify and explore career and educational paths in digital media.
DES M121-apply professional workflows for designing and producing digital media from conception to completion.

DES M121-identify aesthetic, technological, and social criteria, as well as professional ethics, in evaluating digital media.

Requisite Justification

Requisite Type
Prerequisite

Requisite
DES M121 (formerly MM M10)

Requisite Description
Course in a sequence

Level of Scrutiny/Justification
Part of a sequence of courses in a certificate of completion or a certificate of competency (noncredit only)

Student Learning Outcomes (CSLOs)	
	Upon satisfactory completion of the course, students will be able to:
1	discuss and evaluate current tools and trends in 3d modeling and animation.
2	utilize time-based storytelling to achieve audience response.
3	produce a professional-level 3D project utilizing 3D modeling, texturing, lighting, animation, and rendering workflows.

Course Objectives	
	Upon satisfactory completion of the course, students will be able to:
1	map out a narrative structure and create a storyboard for a 3D animation short and develop it utilizing design and cinematic concepts.
2	view and navigate 3D space, use view-handling commands and control object display.
3	create and edit geometric primitives, shapes, compound objects.
4	create copies and arrays and use generators, surface modeling, precision and drawing aids as well as effectors and particle systems.
5	design, edit and apply materials, maps and shaders.
6	use three-point lighting and control intensity and falloff, position, color, visibility and shadows.
7	choose the placement of the camera to determine the audience's point of view and animate cameras.
8	apply animation principles, control time and choose a frame rate and playback speed, and render a movie.

Course Content

Lecture/Course Content

(6%) 1. Getting to Know Cinema 4D

• Thinking in 3D
• Storytelling
• Cinema 4D
• Preferences
• Navigation
• Demonstrate: Primitives, Camera, Lighting, Materials, Rendering

(8%) 2. Parametric Objects

• Getting Comfortable in Cinema 4D
• Parametric Objects
• The Attributes Manager
• Move, Scale, Rotate Tools
• Object Hierarchy
• Null Objects

(8%) 3. Editable Objects

• Editable Objects in Cinema 4D

• Selection Tools
• Extrude Tool
• Extrude Inner Tool

(8%) 4. Splines

• Intro to Splines
• Parametric Splines
• Text Splines
• Splines from Illustrator

(8%) 5. Generators

• Extrude
• Sweep
• Loft
• Lathe

(8%) 6. Deformers

• Bend Deformer
• Using Multiple Deformers
• Squash & Stretch, Jiggle, and Bulge Deformers
• Wrap and Spline Wrap
• Collision Deformer

(8%) 7. Modeling

• Cloners
• Atom Array
• Boole
• Spline Mask
• Subdivision Surface

(6%) 8. Volume Modeling

• Volume Builder
• Volume Remesher
• Smooth Layers
• Merging Primitives into a Volume Object
• Setting the resolution

(8%) 9. Materials/Shaders/Illumination Models

• Intro to Materials
• Creating and Application of Materials
• Color Channel
• Reflectance Channel
• Transparency Channel

  • Alpha Channels

• Bump and Displacement Channels

• UV Unwrapping and Projections

• Image Maps vs Procedural Textures

(6%) 10. Lighting

• Intro to Lights
• Three Point Light Setup
• Spot Lights
• Visible and Volumetric Lights
• Shadow Quality

(4%) 11. Render Settings

• Global Illumination
• Global Illumination with Luminance Channel
• Ambient Occlusion
• Rendering a Scene

(4%) 12. Animation in Cinema 4D

• Intro to Animation
• Keyframes: Position
• Refining Keyframes
• Rotation
• Animating Lights
• Timeline Dope Sheet
• Bouncing Ball with the F-Curves
• Squashing the Bouncing Ball

(8%) 13. MoGraph in Cinema 4D

• Intro to MoGraph in Cinema
• MoGraph Cloners
• Object Mode Cloner
  • MoGraph Tracer
  • MoGraph Fracture
• Effectors

(6%) 14. Dynamics in Cinema 4D

• Intro to Dynamics
• Rigid & Collider Bodies
• Gravity
• Collision Shape & Custom Initial Velocity
• Current State to Object
  • MoGraph Voronoi Fracture

(4%) 15. Cameras in Cinema 4D

• Intro to Cameras
• Animating Cameras
• Align to Spline
• Stage Object
  • Takes System

Laboratory or Activity Content

(50%) 1. Design and development of 3D models, mapping and shading, rigging and lighting, animation and rendering.

(35%) 2. Hands-on tutorials, one-on-one instruction, and independent work experience in 3D modeling and animation.

(15%) 2. Project critiques based on a standard rubric.

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Written expression
Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Individual projects
Laboratory activities
Portfolios
Quizzes
Reports/papers
Skills demonstrations
Classroom Discussion
Projects
Participation

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
Case studies
Class discussions
Collaborative group work
Demonstrations
Distance Education
Group discussions
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Internet research
Lecture
Practica
Small group activities

Describe specific examples of the methods the instructor will use:
- Computer-aided presentation and lecture about geometric primitives, shapes and compound objects.
- Case study and the class discussion about the current trends in 3D.
- Demonstration and practice of applying the 12 principles of animation.

Representative Course Assignments

Writing Assignments
1. Write a short essay about the technical and aesthetic attributes of a professional 3D animation.
2. Write a sequence of events that tells a story for the final animation project. You will establish the story, introduce and develop conflict, reach climax and resolution, and provide a moral and message.
3. Find examples of memorable 3D characters. Describe the characters, who created them, and why you like them.

Critical Thinking Assignments
1. Analyze students' narrative and final movie in the context of societal and cultural concerns.
2. Compare and contrast students' work with the work of a traditional or digital animator.
3. Discuss the effectiveness of the final project narratives created by your peers. Identify the points where the mission statements have been reflected in the rendered 3D animation.

Reading Assignments
1. Read Johnston, Ollie, and Thomas, Frank, (1995), The Illusion of Life: Disney Animation in preparation for the class discussions about the early days of animation.

2. Read selected magazine articles, such as EJ, Borg, and Randall, Goldfarb, Virtual Production Is The Future Of The Animation Industry from Forbes, 2020, in preparation for the class discussions about the future trends in 3D.

Skills Demonstrations
1. Edit, resize, and format an image in Photoshop, and set it up as the background reference image in Cinema 4D.

2. Render an image sequence in Cinema 4D.

3. Create the three point lighting setup in Cinema 4D.

Outside Assignments

Representative Outside Assignments
1. Explore the environment with camera and start to build up your texture library.
2. Develop the narrative and illustrate the storyboard for the final animation project.
3. Watch EJ Hassenfratz - Cheating The Fundamentals of Animation in preparation for class discussion.
4. Research memorable characters in contemporary 3D animation.

Articulation

Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
CSU Channel Islands	ART 205	Multimedia	3
San Jose State Univ.	ANI 41	Introduction to 3D Modeling	3
CSU Northridge	MSE 106	Introduction to CAD Animation	3
CSU Fullerton	ART 255	Intro 3D Computer Animation	3

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
Santa Monica College	ANIM 3	3D Fundamentals	3
Santa Barbara City College	MAT/DRFT 136	Computer Animation I	3

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

Course is CSU transferable
Yes

CSU Baccalaureate List effective term:
F1999

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

UC TCA

UC TCA
Approved

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals
Resource Type
Textbook

Description

Mamgain, Pradeep. *MAXON Cinema 4D R20: Modeling Essentials*. Padexi Academy, 2018.

Resource Type

Textbook

Description

Mamgain, Pradeep. *MAXON Cinema 4D R20: A Detailed Guide to Texturing, Lighting, and Rendering*. Padexi Academy, 2019.

Resource Type

Textbook

Description

Chopine, Ami. *3D Art Essentials: The Fundamentals of 3D Modeling, Texturing, and Animation*. Focal Press, 2011.

Resource Type

Textbook

Description

Beane, Andy. *3D Animation Essentials*. Sybex, 2012.

Resource Type

Textbook

Description

Vaughan, William. *Digital Modeling*. New Riders, 2011.

Resource Type

Websites

Description

Skillshare (https://www.skillshare.com/)
Coursera (https://www.coursera.org/)
Udemy (https://www.udemy.com/)
and other training & tutorial video resources

Library Resources

Assignments requiring library resources

Research, using the Library's print and online resources, as appropriate to prepare the storyboard and characters for the final project.

Sufficient Library Resources exist

Yes

Example of Assignments Requiring Library Resources

Research and write a paper about the historical context and the core concepts behind multimedia analyzing the contributions and visions of scientists like Vannevar Bush, Douglas Englebart, and Norbert Wiener, and artists like John Cage, Nam June Paik, and William Gibson.

Distance Education Addendum

Definitions

Distance Education Modalities

Hybrid (1%–50% online)

Hybrid (51%–99% online)
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.
Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.
Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Discussion Forums will be used to disseminate course-wide information and facilitate ongoing collaborative course work. Students may also use the Discussion Forums to solicit help from the instructor and other students. Discussions may also be graded encouraging students to participate in the class.
E-mail	Email is a tool primarily used for course-wide updates and individual student contact. Students and the instructor can privately contact each other with questions, concerns.
Other DE (e.g., recorded lectures)	The instructor can provide text, presentation slides, audio/visual material, assignment examples, tutorials (which may be live or recorded), and links to supplemental publications, articles, and websites.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Discussion Forums will be used to disseminate course-wide information and facilitate ongoing collaborative course work. Students may also use the Discussion Forums to solicit help from the instructor and other students. Discussions may also be graded encouraging students to participate in the class.
E-mail	Email is a tool primarily used for course-wide updates and individual student contact. Students and the instructor can privately contact each other with questions, concerns.
Other DE (e.g., recorded lectures)	The instructor can provide text, presentation slides, audio/visual material, assignment examples, tutorials (which may be live or recorded), and links to supplemental publications, articles, and websites.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Discussion Forums will be used to disseminate course-wide information and facilitate ongoing collaborative course work. Students may also use the Discussion Forums to solicit help from the instructor and other students. Discussions may also be graded encouraging students to participate in the class.
E-mail	Email is a tool primarily used for course-wide updates and individual student contact. Students and the instructor can privately contact each other with questions, concerns.

| Other DE (e.g., recorded lectures) | The instructor can provide text, presentation slides, audio/visual material, assignment examples, tutorials (which may be live or recorded), and links to supplemental publications, articles, and websites. |

Examinations

Hybrid (1%–50% online) Modality
Online

Hybrid (51%–99% online) Modality
Online

Primary Minimum Qualification
MULTIMEDIA

Review and Approval Dates

Department Chair
05/05/2021

Dean
05/05/2021

Technical Review
10/07/2021

Curriculum Committee
10/19/2021

DTRW-I
MM/DD/YYYY

Curriculum Committee
MM/DD/YYYY

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000434477

DOE/accreditation approval date
MM/DD/YYYY