



BS Computer Science: Computer Game Design

The Bachelor of Science in Computer Science: Computer Game Design is a new undergraduate degree program focused on the construction and design of interactive computer games. Reflecting both the growing cultural and economic importance of the computer gaming industry within California and the increasing complexity and specialization of computer gaming systems, the new program focuses on the technical, narrative, and artistic underpinnings of these games. The degree features a freshman year game design experience, two upper-division digital media electives, and an intensive senior-year game design studio where students work in teams to develop a substantial video game. This four year interdisciplinary degree program provides a rigorous education in computer science, in concert with a broad introduction to those aspects of art, music, narrative, digital media, and computer engineering most relevant to games. Campus general education requirements ensure that students are exposed to a wide range of topics in the humanities, social sciences, and the arts.

Students wishing to matriculate in this degree program should apply for admission to UC Santa Cruz and the degree program for studies commencing either Freshman year, or Junior year (for transfer students from California community colleges). For additional information on the degree program, contact the School of Engineering Undergraduate Advising Office, advising@soe.ucsc.edu, (831) 459-5840.

Curriculum

Math and Physics

MATH 19A: Calculus for Science, Engineering, and Mathematics (*derivatives, limits*)

MATH 19B: Calculus for Science, Engineering, and Mathematics (*integrals, series*)

(*Students can alternately take Honors Calculus, MATH 20A/B.*)

MATH 21: Linear Algebra OR AMS 27/L Mathematical Methods for Engineers (*linear algebra, ODEs*)

CMPE 16: Applied Discrete Mathematics (*honors section also available*)

PHYS 5A/L: Introduction to Physics I (*mechanics, Newton's laws, work and energy, can also take PHYS 6A/L*)

Computational Foundations

CMPS 12A/L: Introduction to Programming (*or honors section, CMPS 13H*)

CMPS 12B/M: Introduction to Data Structures

CMPE 12/L: Computer Systems and Assembly Language Laboratory

CMPS 109: Advanced Programming (*object-oriented programming and design*)

CMPS 101: Algorithms and Abstract Data Types (*includes complexity analysis of algorithms*)

Game Design

CMPS 20: Game Design Experience (*lower division group-based game design project course*)

CMPS 170: Game Design Studio I (*software engineering for game projects, group-based game design project, upper division*)

CMPS 171: Game Design Studio II (*software and game design, group-based game design project, upper division*)

CMPS 172: Game Design Studio III (*advanced game development technology, group-based game design project, upper div.*)

Curriculum (cont'd)

Computer Game Engineering Electives

Pick five of the following electives, which cover a broad range of game technologies:

CMPS 160: Introduction to Computer Graphics
CMPS 161/L: Visualization and Computer Animation
CMPE 163/L: Multimedia Processing and Applications
CMPS 164/L: Graphic Elements for Computer Games
CMPS 140: Artificial Intelligence
CMPS 146: Artificial Intelligence for Games
CMPE 110: Computer Architecture
CMPS 105: Systems Programming (*file i/o, processes, synchronization, signals, interprocess communication*)
CMPS 111: Introduction to Operating Systems
CMPS 128: Distributed Systems: File Sharing, Online Gaming, and More
CMPE 150: Introduction to Computer Networks
CMPE 152: Analysis and Design of Communication Protocols
CMPE 113: Parallel and Concurrent Programming
CMPS 180: Database Systems I
CMPS 181: Database Systems II
CMPS 183: Hypermedia and the Web
CMPS 102: Introduction to Analysis of Algorithms
CMPS 130: Computational Models
CMPE 117/L: Embedded Software
AMS 131: Introduction to Probability Theory
AMS 147: Computational Methods and Applications
AMS 162: Design and Analysis of Computer Simulation Experiments

Digital Media Electives

Pick two of the following courses:

FILM 170A: Introduction to Digital Media Production
FILM 177: Digital Media Workshop: Computer as a Medium
FILM 171D: Social Information Spaces
Any course offered in the Digital Arts New Media (DANM) curriculum (*requires approval of professor*)

Art and Social Foundations

Satisfy the ethics requirement, then choose one course in 3 of the 5 following elective categories, which partially satisfy campus general education requirements:

Ethics Requirement

One of:

CMPE 80E: Engineering Ethics
PHIL 22: Introduction to Ethical Theory
PHIL 24: Introduction to Ethics: Contemporary Moral Issues
PHIL 28: Environmental Ethics
BME 80G: Bioethics in the Twenty-First Century: Science, Business, and Society

Curriculum (cont'd)

Art and Social Foundations (cont'd)

Art Elective

One of:

ART 10G: 2D Foundation (*introduction to two-dimensional art practice and history*)

ART 10H: 3D Foundation (*introduction to three-dimensional sculpture, intermedia, performance art*)

ART 80A: Introduction to Drawing

ART 80F: Introduction to Issues in Digital Media

Music Elective

One of:

MUSC 11A: Introduction to Western Art Music (study of selected masterworks in relation to their periods)

MUSC 11B: Introduction to Jazz

MUSC 11C: Introduction to American Popular Music

MUSC 11D: Introduction to World Music

MUSC 80C: History, Literature, and Technology of Electronic Music

MUSC 80L: Artificial Intelligence and Music

MUSC 80M: Film Music

MUSC 80R: Music and the World Wide Web

Economics Elective

One of:

ECON 1: Introductory Microeconomics: Resource Allocation and Market Structure

ECON 2: Introductory Macroeconomics: Aggregate Economic Activity

ECON 80H: Wall Street and the Money Game (*structure of financial markets*)

Theater Elective

One of:

THEA 10: Introduction to Theater Design and Technology

THEA 18: Drafting for Theatrical Production

THEA 19: Design Studio: Lighting Studio

THEA 20: Introductory Studies in Acting

THEA 30: Introduction to Modern Dance Theory and Technique

THEA 40: Introduction to Directing

THEA 80E: Stand-Up Comedy

THEA 80L: Muppet Magic: Jim Henson's Art

Film Elective

One of:

FILM 20A: The Film Experience (intro. to basic elements of cinematic representation and expression)

FILM 20C: Introduction to Digital Media

FILM 20P: Introduction to Production Technique

BS COMPUTER SCIENCE: COMPUTER GAME DESIGN CURRICULUM

MATH & PHYSICS

MATH 19A	OR	MATH 20A
MATH 19B	OR	MATH 20B
MATH 21	OR	AMS 27/L
CMPE 16	OR	CMPE 16H
PHYS 5A/L	OR	PHYS 6A/L

25-27 Credits

COMPUTATIONAL FOUNDATIONS

CMPS 12A/L	OR	CMPS 13H/L
CMPS 12B/M		
CMPE 12/L		
CMPS 109		
CMPS 101		
Honors project lab (substitute for CS 12L/M)		

26-31 Credits

ART AND SOCIAL FOUNDATIONS

Ethics Requirement AND 3 of the following electives

Ethics Requirement

One of: CMPE 80E, PHIL 22, PHIL 24, PHIL 28, BME 80G

Art Elective

One of: ART 10G, ART 10H, ART 80A, ART 80F

Film Elective

One of: Film 20A, Film 20C, Film 20P

Music Elective

One of: MUSC 11A, MUSC 11B, MUSC 11C, MUSC 11D, MUSC 80C, MUSC 80L, MUSC 80M, MUSC 80R

Economics Elective

One of: ECON 1, ECON 2, ECON 80H

Theater Elective

One of: THEA 10, THEA 18, THEA 19, THEA 20, THEA 30, THEA 40, THEA 80E, THEA 80L

20 Credits

GAME DESIGN

◇ CS 20: Game Design Experience
(5 credits, lower division)

◇ CS 170: Game Design Studio I
(upper division)

◇ CS 171: Game Design Studio II
(upper division)

◇ CS172: Game Dsgn Studio III
(upper division)

20 Credits

GAME ENGINEERING ELECTIVES

CGE Elective I

CGE Elective II

CGE Elective III

CGE Elective IV

CGE Elective V

CGE Electives: CMPS 160, CMPS 161/L, ◇ CMPS 164/L, CMPS 105, CMPS 111, CMPE 110, CMPS 128, CMPS 140, CMPS 146, CMPE 163/L, CMPS 180, CMPS 181, CMPS 183, CMPS 102, CMPS 130, CMPE 150, CMPE 152, CMPE 113, CMPE 118/L, CMPE 117/L, AMS 131, AMS147, AMS 162

25-33 Credits

DIGITAL MEDIA ELECTIVES

DM Elective I

DM Elective II

DM Electives: Film 170A, Film 177, Film 171D, any DANM course (requires approval of instructor), Art 118, THEA 157

10 Credits