

GAME PROGRAMMING (MS) ONLINE

The MS in Game Programming is designed for those interested in game development programming at the highest level, including computer science and computer graphics professionals retooling for the game industry.

Program Requirements	Quarter Hours
Introductory Courses	0-24
Degree Requirements	48
Total hours required	48-72

Learning Outcomes

- Demonstrate mastery of the C++ programming language.
- Use design patterns to create and design large-scale real-time software systems.
- Architect and implement real-time Game Engine.
- Implement and apply advanced rendering techniques for real-time graphics simulation.
- Create and manage a development schedule of a complex software projects.

Degree Requirements

Course Requirements

No Introductory Course may be substituted for any other course at any level.

Introductory Courses

Course	Title	Quarter Hours
CSC 400	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	4
CSC 401	INTRODUCTION TO PROGRAMMING	4
CSC 402	DATA STRUCTURES I	4
CSC 403	DATA STRUCTURES II	4
CSC 406	SYSTEMS I	4
CSC 407	SYSTEMS II	4

Introductory courses may be waived for any of the following conditions:

- The student has the appropriate course work to satisfy an Introductory Course.
- The student has appropriate and verified professional experience to satisfy an Introductory Course.
- If an exam is available, the student passes a Graduate Assessment Examination (GAE) in the Introductory Course area.

Foundation Courses

Course	Title	Quarter Hours
GAM 425	APPLIED 3D GEOMETRY	4
CSC 461	OPTIMIZED C++	4
SE 456	ARCHITECTURE OF REAL-TIME SYSTEMS	4

GPH 469	COMPUTER GRAPHICS DEVELOPMENT	4
or GAM 470	RENDERING AND GRAPHICS PROGRAMMING	

Advanced Courses

Course	Title	Quarter Hours
CSC 486	REAL-TIME NETWORKING (FORMERLY GAM 490)	4
GAM 475	REAL - TIME SOFTWARE DEVELOPMENT	4
CSC 588	REAL-TIME MULTITHREADED ARCHITECTURE	4
GAM 575	REAL-TIME SOFTWARE DEVELOPMENT II	4
GAM 476	ARTIFICIAL INTELLIGENCE FOR COMPUTER GAMES	4
or GAM 450	PHYSICS FOR GAME DEVELOPERS	
GAM 576	GPU ARCHITECTURE	4

Major Elective Courses

Students must complete a total of 8 credit hours of graduate level elective courses. Students must choose four (4) credit hours (typically one course) from the list below. The remaining four (4) credit hours can be from the list below or any GAM courses in the 421-699 range.

Computer Science Systems Electives

Course	Title	Quarter Hours
CSC 421	APPLIED ALGORITHMS AND STRUCTURES	
CSC 443	INTRODUCTION TO OPERATING SYSTEMS	
CSC 447	CONCEPTS OF PROGRAMMING LANGUAGES	
CSC 448	COMPILER DESIGN	
CSC 562	OPTIMIZED C++ MULTITHREADING	
IS 451	DATABASE DESIGN FOR INFORMATION SYSTEMS (FORMERLY CSC 451)	

Artificial Intelligence Electives

Course	Title	Quarter Hours
GAM 476	ARTIFICIAL INTELLIGENCE FOR COMPUTER GAMES	
CSC 480	ARTIFICIAL INTELLIGENCE I	
CSC 578	NEURAL NETWORKS AND DEEP LEARNING	
CSC 580	ARTIFICIAL INTELLIGENCE II	

Networking Electives

Course	Title	Quarter Hours
CSC 435	DISTRIBUTED SYSTEMS I	
CSC 536	DISTRIBUTED SYSTEMS II	

Project Management Electives

Course	Title	Quarter Hours
SE 433	SOFTWARE TESTING AND QUALITY ASSURANCE	
SE 459	AGILE SOFTWARE DEVELOPMENT	

SE 475	MANAGING GLOBALLY DISTRIBUTED SOFTWARE DEVELOPMENT
SE 477	SOFTWARE AND SYSTEMS PROJECT MANAGEMENT

¹ Students who take GAM 690 GAME DEVELOPMENT STUDIO I to fulfill their Major Elective Requirements MUST take GAM 691 GAME DEVELOPMENT STUDIO II.

Graphics Electives

Course	Title	Quarter Hours
GPH 438	COMPUTER ANIMATION SURVEY	
GPH 448	COMPUTER GRAPHICS SCRIPTING	
GPH 539	ADVANCED RENDERING TECHNIQUES	
GPH 570	VISUALIZATION	
GPH 572	PRINCIPLES OF COMPUTER ANIMATION	
GPH 580	HARDWARE SHADING TECHNIQUES	
GPH 436	FUNDAMENTALS OF COMPUTER GRAPHICS	
DSC 465	DATA VISUALIZATION	

Object Oriented Design Electives

Course	Title	Quarter Hours
SE 430	OBJECT ORIENTED MODELING	
SE 433	SOFTWARE TESTING AND QUALITY ASSURANCE	
SE 450	OBJECT-ORIENTED SOFTWARE DEVELOPMENT	
CSC 552	CONCURRENT SOFTWARE DEVELOPMENT	

Game Specialties Electives

Course	Title	Quarter Hours
GAM 450	PHYSICS FOR GAME DEVELOPERS	
GAM 453	TOOL PROGRAMMING FOR GAME DEVELOPMENT	

Mobile Game Electives

Course	Title	Quarter Hours
CSC 471	MOBILE APPLICATION DEVELOPMENT FOR IOS	
CSC 472	MOBILE APPLICATION DEVELOPMENT FOR ANDROID	
CSC 491	MOBILE APPLICATION DEVELOPMENT FOR IOS II	
CSC 492	MOBILE APPLICATION DEVELOPMENT FOR ANDROID II	
GAM 486	GAME PROGRAMMING FOR MOBILE DEVICES	

Project Electives

Course	Title	Quarter Hours
GAM 690	GAME DEVELOPMENT STUDIO I ¹	
GAM 691	GAME DEVELOPMENT STUDIO II	
GAM 695	MASTER'S GAME RESEARCH STUDY	