GAME PROGRAMMING (MS)

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
Students will be able to:

• 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

Advanced Courses
Course Title Quarter Hours
GPH 469 COMPUTER GRAPHICS DEVELOPMENT 4
or GAM 470 RENDERING AND GRAPHICS PROGRAMMING 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 4
CSC 443 INTRODUCTION TO OPERATING SYSTEMS 4
CSC 447 CONCEPTS OF PROGRAMMING LANGUAGES 4
CSC 448 COMPILER DESIGN 4
CSC 562 OPTIMIZED C++ MULTITHREADING 4
IS 451 DATABASE DESIGN FOR INFORMATION SYSTEMS (FORMERLY CSC 451) 4

Artificial Intelligence Electives
Course Title Quarter Hours
GAM 476 ARTIFICIAL INTELLIGENCE FOR COMPUTER GAMES 4
CSC 480 ARTIFICIAL INTELLIGENCE I 4
CSC 578 NEURAL NETWORKS AND DEEP LEARNING 4
CSC 580 ARTIFICIAL INTELLIGENCE II 4

Networking Electives
Course Title Quarter Hours
CSC 435 DISTRIBUTED SYSTEMS I 4
CSC 536 DISTRIBUTED SYSTEMS II 4

Project Management Electives
Course Title Quarter Hours
SE 433 SOFTWARE TESTING AND QUALITY ASSURANCE 4
SE 459 AGILE SOFTWARE DEVELOPMENT 4
### Graphics Electives

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<tr>
<th>Course</th>
<th>Title</th>
<th>Quarter</th>
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<tbody>
<tr>
<td>GPH 438</td>
<td>COMPUTER ANIMATION SURVEY</td>
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<td>GPH 448</td>
<td>COMPUTER GRAPHICS SCRIPTING</td>
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<td>GPH 539</td>
<td>ADVANCED RENDERING TECHNIQUES</td>
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<td>GPH 570</td>
<td>VISUALIZATION</td>
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<td>GPH 572</td>
<td>PRINCIPLES OF COMPUTER ANIMATION</td>
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<td>GPH 580</td>
<td>HARDWARE SHADING TECHNIQUES</td>
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<td>GPH 436</td>
<td>FUNDAMENTALS OF COMPUTER GRAPHICS</td>
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<td>DSC 465</td>
<td>DATA VISUALIZATION</td>
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### Object Oriented Design Electives

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<th>Title</th>
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<tbody>
<tr>
<td>SE 430</td>
<td>OBJECT ORIENTED MODELING</td>
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<tr>
<td>SE 433</td>
<td>SOFTWARE TESTING AND QUALITY ASSURANCE</td>
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<tr>
<td>SE 450</td>
<td>OBJECT-ORIENTED SOFTWARE DEVELOPMENT</td>
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<tr>
<td>CSC 552</td>
<td>CONCURRENT SOFTWARE DEVELOPMENT</td>
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### Game Specialties Electives

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<th>Course</th>
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<tr>
<td>GAM 450</td>
<td>PHYSICS FOR GAME DEVELOPERS</td>
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<td>GAM 453</td>
<td>TOOL PROGRAMMING FOR GAME DEVELOPMENT</td>
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### Mobile Game Electives

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<th>Course</th>
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<tr>
<td>CSC 471</td>
<td>MOBILE APPLICATION DEVELOPMENT FOR IOS</td>
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<td>CSC 472</td>
<td>MOBILE APPLICATION DEVELOPMENT FOR ANDROID</td>
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<tr>
<td>CSC 491</td>
<td>MOBILE APPLICATION DEVELOPMENT FOR IOS II</td>
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<tr>
<td>CSC 492</td>
<td>MOBILE APPLICATION DEVELOPMENT FOR ANDROID II</td>
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<td>GAM 486</td>
<td>GAME PROGRAMMING FOR MOBILE DEVICES</td>
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### Project Electives

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<th>Course</th>
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<tr>
<td>GAM 690</td>
<td>GAME DEVELOPMENT STUDIO I</td>
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<td>GAM 691</td>
<td>GAME DEVELOPMENT STUDIO II</td>
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<td>GAM 695</td>
<td>MASTER'S GAME RESEARCH STUDY</td>
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1. Students who take GAM 690 GAME DEVELOPMENT STUDIO I to fulfill their Major Elective Requirements MUST take GAM 691 GAME DEVELOPMENT STUDIO II.

### Degree Requirements

Students in this degree program must meet the following requirements:

- Complete a minimum of 48 graduate credit hours in addition to any required introductory courses of the designated degree program.
- Complete all graduate courses and requirements listed in the designated degree program.
- Earn a grade of C- or better in all courses of the designated degree program.
- Maintain a cumulative GPA of 2.5 or higher.
- Students pursuing a second (or more) graduate degree may not double count or retake any course that applied toward the completion of a prior graduate degree. If a required course in the second degree was already completed and applied toward a previous degree, the student must meet with a faculty advisor to discuss a new course to be completed and substituted in the new degree. This rule also applies to cross-listed courses, which are considered to be the same course but offered under different subjects.
- Students pursuing a second master’s degree must complete a minimum of 48 graduate credit hours beyond their first designated degree program in addition to any required introductory courses in their second designated degree program.

Students with a GPA of 3.9 or higher will graduate with distinction. For DePaul’s policy on repeat graduate courses and a complete list of academic policies, see the DePaul Graduate Handbook.