MPCS 12-Course MS in CS Program Requirements

High Performance Computing Specialization

THE UNIVERSITY OF CHICAGO | MASTERS PROGRAM IN COMPUTER SCIENCE

Placement Exams & Immersion Courses

Choose 1:

- ☐ **MPCS Programming Placement Exam** or
- ☐ **MPCS 50101 Concepts of Programming (Immersion Programming)**

Choose 1:

- ☐ **Discrete Math Placement Exam** or
- ☐ **MPCS 50103 Discrete Math (Immersion Math)**

Immersion classes are in addition to the 12 degree required courses. Students have the choice to take immersion classes or take the placement exams.

Core Courses

Programming Choose 1

- ☐ **Java Programming***
- ☐ **Python Programming***

*Students taking MPCS 50101 Concepts of Programming (Immersion Programming) must enroll in Java or Python.

- ☐ **Advanced Programming****
- ☐ **C Programming****
- ☐ **Intermediate Python Programming****

**Advanced programming classes are only available through the MPCS Programming Placement Exams.

Only one core programming class is allowed. Additional programming classes cannot be taken as an elective or 6th core class.

All core programming classes are offered in the Autumn quarter. Only Python Programming is offered in the Winter quarter.

Theory Choose 1

- ☐ **Algorithms**
- ☐ **Intermediate Algorithms**
- ☐ **Advanced Algorithms**
- ☐ **Topics in Algorithmic Game Theory**

Intermediate Algorithms requires a previous algorithms class.

Advanced Algorithms and Topics in Algorithmic Game Theory can be taken as an elective or 6th core class after the core theory requirement is fulfilled.

Systems Choose 3

- ☐ **Advanced Computer Architecture**
- ☐ **Advanced Computer Systems**
- ☐ **Compilers**
- ☐ **Databases**
- ☐ **Distributed Systems**
- ☐ **Functional Programming**
- ☐ **GPU Programming**
- ☐ **Intro to Computer Security**
- ☐ **Intro to Computer Systems**
- ☐ **Intro to Unix Systems**
- ☐ **Networks**
- ☐ **Operating Systems**
- ☐ **Parallel Programming**

Additional core systems classes can be taken as an elective, specialization or 6th core class after the core systems requirementis fulfilled.

High Performance Computing Specialization

Requirement HPC-1: Core Course Students must complete the following class:

- ☐ **MPCS 51087 – High Performance Computing**

Requirement HPC-2: Advanced Courses Choose 2

- ☐ **MPCS 56420 – Bioinformatics for Computer Scientists**
- ☐ **MPCS 56430 – Introduction to Scientific Computing**
- ☐ **MPCS 58001 – Numerical Methods**
- ☐ **MPCS 52060 – Parallel Programming**
- ☐ **MPCS 58020 – Time Series Analysis and Stochastic Processes**
- ☐ **MPCS 53111 – Machine Learning or MPCS 53120 – Applied Data Analysis, or an approved Machine Learning class**
- ☐ **MPCS 52018 – Advanced Computer Architecture**

12th Course Requirement: Choose 1

- ☐ **Additional Core Theory or Core Systems class (6 core total)**
- ☐ **Practicum Course**
- ☐ **Additional Specialization Course (4 Specialization total)**

High Performance Computing Specialization Requirements (Continued)

Elective Courses

Choose 3

- ☐ **Advanced C++**
- ☐ **Advanced Data Analytics**
- ☐ **Advanced iOS**
- ☐ **Advanced Topics in Cloud Computing**
- ☐ **Advanced UI/UX**
- ☐ **Android Application Development**
- ☐ **App Development Capstone**
- ☐ **Applied Data Analysis**
- ☐ **Applied Financial Technology**
- ☐ **Applied Software Engineering**
- ☐ **Big Data App Architecture**
- ☐ **C++ for Advanced Programmers**
- ☐ **Cloud Computing**
- ☐ **Entrepreneurship in Technology**
- ☐ **Foundations of Computational Data Analysis**
- ☐ **Full Stack Software Engineering**
- ☐ **Generative AI**
- ☐ **High Performance Computing**
- ☐ **Human-Computer Interaction**
- ☐ **Intro to Blockchain**
- ☐ **Intro to Scientific Computing**
- ☐ **Intro to Software Engineering**
- ☐ **iOS Application Development**
- ☐ **Machine Learning**
- ☐ **MPCS Practicum**
- ☐ **Natural Language Processing**
- ☐ **OO Architecture**
- ☐ **OO Programming**
- ☐ **Product Management**
- ☐ **Software Quality Assurance**
- ☐ **Time Series Analysis and Stochastic Processes**
- ☐ **Topics/Software Engineering**
- ☐ **Topics/Software: Making an Impact**
- ☐ **UI/UX Design**
- ☐ **Web Development**

Elective classes can be taken after three core classes are completed or concurrent with the third core class.

Check course prerequisites for eligibility.

12-Course Internship Requirement

This requirement is usually fulfilled by doing a technology-oriented summer internship. This internship qualifies for degree based CPT.

☐ **Internship: Company** _____ **Dates** _____

Sample Course Plan: **Pass both placement exams or elect to take summer immersion courses.**

Academic Year	Summer	Autumn	Winter	Spring
1	Immersion Programming Discrete Math (or Placement Exams)	Core Programming Algorithms Core Systems	Core Systems Specialization Elective	Core Systems Specialization Elective
2	Internship	Specialization Additional Core/ Specialization Elective		

Sample Course Plan: **Pass programming placement exam, Discrete Math needed, autumn start.**

Academic Year	Summer	Autumn	Winter	Spring
1	Pass Programming Placement Exams	Core Programming Core Systems Discrete Math	Core Systems Algorithms Elective	Core Systems Specialization Elective
2	Internship	Specialization Specialization Elective	Elective*	

*Can take a class in the summer quarter or take four classes in the spring or autumn to graduate at the end of the autumn quarter.

See course schedule for current offerings and course details:
mpcs-courses.cs.uchicago.edu