MATHEMATICAL SCIENCES (BS)

The Department of Mathematical Sciences offers courses in pure and applied mathematics to help students reach a wide variety of intellectual, academic, and career goals.

Many students come to the department to obtain the mathematical background needed to be successful in programs in the natural sciences, computer science, social sciences, and business. Such students may choose to supplement their major in their home department by obtaining a minor in mathematics.

Other students come to the department seeking a program leading to an undergraduate or graduate degree in one of the mathematical sciences. Undergraduate students majoring in mathematical sciences may choose one of seven areas of concentration:

- Actuarial Science
- Applied and Computational Mathematics
- Financial Mathematics
- Pure Mathematics
- Quantitative Analysis and Operations Research
- Statistics
- In consultation with a mathematics faculty advisor, undergraduate students may also create an individualized program of courses leading to a degree in mathematical sciences.

A thesis option is available to mathematics majors who wish to pursue an extended independent project related to a theoretical or applied focus of the program. Students would work under the guidance of a faculty mentor. At least 4 credits must be completed over one or two quarters prior to the thesis submission. Interested students are strongly encouraged to enroll in MAT 390 during their junior year.

A thesis option is available to mathematics majors who wish to pursue an extended independent project related to a theoretical or applied focus of the program. Students would work under the guidance of a faculty mentor. At least 4 credits must be completed over one or two quarters prior to the thesis submission. Interested students are strongly encouraged to enroll in MAT 390 during their junior year.

<table>
<thead>
<tr>
<th>Program Requirements</th>
<th>Quarter Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberal Studies Requirements</td>
<td>80</td>
</tr>
<tr>
<td>Major Requirements</td>
<td>32-36</td>
</tr>
<tr>
<td>Major Concentration Requirements</td>
<td>24-28</td>
</tr>
<tr>
<td>Open Electives</td>
<td>48-56</td>
</tr>
<tr>
<td>Total hours required</td>
<td>192</td>
</tr>
</tbody>
</table>

Learning Outcomes

Students will be able to:

- Construct valid logical arguments and analyze the reasoning of others.
- Implement a variety of mathematical structures to model and analyze complex problems.
- Apply general mathematical theory to solve problems in mathematics and in the sciences.
- Communicate mathematical ideas clearly, in verbal and visual form, by using appropriate mathematical terminology and notation.

<table>
<thead>
<tr>
<th>Major Declaration Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who complete an Inter-College Transfer (ICT) to the College of Science and Health will abide by the College of Science and Health Modern Language Requirement in place on the effective date of the ICT.</td>
</tr>
</tbody>
</table>

College Core Requirements

Modern Language Requirements

Students who intend to graduate with the Bachelor of Arts (BA) degree will be required to demonstrate competence in a modern language equivalent to the proficiency attained from one year of college-level language study. Such competence may be demonstrated in one of several ways:

- completing the last course in the fourth-year high school sequence of any language
- completing the last course in the first-year college sequence of any language
- completing a college course beyond the first-year level in any language
- achieving a satisfactory score on any of the Modern Language placement examinations administered at DePaul
- achieving a satisfactory rating in a proficiency examination accepted by DePaul
- achieving a score of 3 or higher on the Advance Placement (AP) test for any language
- achieving a score of 5 or higher in the Language B assessment from a Standard or Higher Level International Baccalaureate (IB) program
- achieving a satisfactory score on the CLEP examination

Please note: Modern Languages courses with an E-designation are taught in English and may not be applied to the Modern Language Requirement.

For further information regarding satisfactory scores and possible credit from the DePaul placement, AP, CLEP, or IB examinations, please contact Student Records.

Students who complete an Inter-College Transfer (ICT) to the College of Science and Health will abide by the College of Science and Health Modern Language Requirement in place on the effective date of the ICT.

BA students who meet College requirements and wish to pursue further work in the language may elect the "Modern Language Option" of the Liberal Studies Program. While Bachelor of Science (BS) students are not required to demonstrate competency in a modern language, the "Modern Language Option" is available to them for language study at any level. Modern Languages courses with an E-designation are taught in English and may not be applied to the Modern Language Option.
**Liberal Studies Requirements**

Honors program requirements can be found in the individual Colleges & Schools section of the University Catalog. Select the appropriate college or school, followed by Undergraduate Academics and scroll down.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year Program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chicago Quarter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSP 110</td>
<td>DISCOVER CHICAGO or LSP 111 or EXPLORE CHICAGO</td>
<td>4</td>
</tr>
<tr>
<td><strong>Focal Point</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSP 112</td>
<td>FOCAL POINT SEMINAR</td>
<td>4</td>
</tr>
<tr>
<td><strong>Writing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRD 103</td>
<td>COMPOSITION AND RHETORIC I ¹</td>
<td>4</td>
</tr>
<tr>
<td>WRD 104</td>
<td>COMPOSITION AND RHETORIC II ¹</td>
<td>4</td>
</tr>
<tr>
<td><strong>Quantitative Reasoning &amp; Technological Literacy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sophomore Year</strong></td>
<td></td>
<td></td>
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<tr>
<td>LSP 200</td>
<td>SEMINAR ON MULTICULTURALISM IN THE UNITED STATES</td>
<td>4</td>
</tr>
<tr>
<td><strong>Junior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Experiential Learning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 398</td>
<td>SENIOR CAPSTONE SEMINAR ¹ ²</td>
<td>4</td>
</tr>
</tbody>
</table>

¹ Students must earn a C- or better in this course.
² Students with a primary major in Mathematics are required to complete the Capstone offered by the Mathematics department. Students double majoring or pursuing dual degrees with the primary major or primary degree in Mathematics are required to complete the Capstone offered by the Mathematics department. Mathematics students in the University Honors Program shall take the University Honors Capstone. They are not expected to take both the Honors Capstone and the primary major or primary degree Capstone.

**Learning Domains**

- **Arts and Literature (AL)** ([https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/))
  - 3 Courses Required
- **Historical Inquiry (HI)** ([https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/))
  - 2 Courses Required
- **Philosophical Inquiry (PI)** ([https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/))
  - 2 Courses Required

**Notes**

Courses offered in the student’s primary major cannot be taken to fulfill LSP Domain requirements. If students double major, LSP Domain courses may double count for both LSP credit and the second major. Students who choose to take an experiential learning course offered by the major may count it either as a general elective or the Experiential Learning requirement. In meeting learning domain requirements, no more than one course that is outside the student’s major and is cross-listed with a course within the student’s major, can be applied to count for LSP domain credit. This policy does not apply to those who are pursuing a double major or earning BFA or BM degrees.

**Major Requirements**

**Course Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Quarter Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following three-course Calculus sequences:</td>
<td>12-18</td>
<td></td>
</tr>
<tr>
<td><strong>Sequence One</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 150</td>
<td>CALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 151</td>
<td>CALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>MAT 152</td>
<td>CALCULUS III</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sequence Two</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 147</td>
<td>CALCULUS WITH INTEGRATED PRECALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 148</td>
<td>CALCULUS WITH INTEGRATED PRECALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>MAT 149</td>
<td>CALCULUS WITH INTEGRATED PRECALCULUS III</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sequence Three</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 160</td>
<td>CALCULUS FOR MATHEMATICS AND SCIENCE MAJORS I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 161</td>
<td>CALCULUS FOR MATHEMATICS AND SCIENCE MAJORS II</td>
<td>3</td>
</tr>
<tr>
<td>MAT 162</td>
<td>CALCULUS FOR MATHEMATICS AND SCIENCE MAJORS III</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sequence Four</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 170</td>
<td>CALCULUS FOR LIFE SCIENCES I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 171</td>
<td>CALCULUS FOR LIFE SCIENCES II</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:
Data Analysis Requirement, which can be satisfied via one of the following:

- MAT 398
- CSC 241
- MAT 262
- MAT 260

Sequence Five

- MAT 155 SUMMER CALCULUS I
- MAT 156 SUMMER CALCULUS II
- MAT 260 MULTIVARIABLE CALCULUS I
- MAT 261 MULTIVARIABLE CALCULUS II
- MAT 262 LINEAR ALGEBRA
- MAT 215 INTRODUCTION TO MATHEMATICAL REASONING
  or MAT 140 & MAT 141 DISCRETE MATHEMATICS I and DISCRETE MATHEMATICS II
- CSC 241 INTRODUCTION TO COMPUTER SCIENCE I (or a more advanced course in any programming language)
- MAT 398 SENIOR CAPSTONE SEMINAR (Liberal Studies Program Capstone)

Select four courses from any of the following: 16

- Natural Sciences
  - Computer Sciences: All CSC courses may apply
  - Data Science: All DSC courses may apply
  - Game Development: GAM 244 GAME DEVELOPMENT I
  - GAM 245 GAME DEVELOPMENT II
  - GAM 350 PHYSICS FOR GAME DEVELOPERS
  - GAM 353 TOOL PROGRAMMING FOR GAME DEVELOPMENT
  - GAM 368 through GAM 391 2
  - GAM 394 through GAM 398 3
  - Information Technology: IT 223 DATA ANALYSIS
  - IT 278 COMMUNITY-BASED TECHNOLOGY PROJECTS
  - IT 231 through IT 240
  - IT 263 APPLIED NETWORKS AND SECURITY
  - IT 313 through IT 373
  - IT topics courses may only be accepted with advanced approval from the chair
  - Software Engineering: All SE courses may apply
  - Select one of the following:
    - GEO 141 GEOGRAPHIC INFORMATION SYSTEMS I: DIGITAL MAPPING
    - GEO 243 REMOTE SENSING
    - GEO 345 PROGRAMMING IN PYTHON FOR GIS

Data Analysis Requirement, which can be satisfied via one of the following:

- AP Statistics credit (score of 3 or better)

An applied statistics or data analysis course taken as one of the four Natural or Computer Science courses required for the BS

One of the following electives: MAT 137, MAT 242, MAT 341, MAT 348, IT 223, PSY 240, BIO 240, ENV 260, OR SOC 279

Courses from a concentration. The following concentration areas will automatically satisfy the data analysis requirement:

- *Actuarial Science
- *Financial Math
- *Quantitative Analysis and Operations Research
- *Statistics

1 This Calculus sequence is offered only during the summer, in two 6-credit hour courses. Students successfully completing MAT 131, MAT 147, MAT 150 or MAT 160 should enroll in MAT 155; students who successfully complete MAT 148, MAT 151 or MAT 161 should enroll in MAT 156. Students who successfully complete MAT 155 may enroll in either MAT 151 or MAT 156.

2 Except CSC 382.

3 Courses may only be accepted with advanced approval from the chair.

Concentration Requirements

Students must also complete the requirements from one of the following concentrations: Pure Mathematics; Statistics; Actuarial Science; Financial Mathematics; Quantitative Analysis and Operations Research; Applied and Computational Mathematics; or Individualized.

If the student chooses to declare more than one Mathematical Sciences concentration, then the student must complete the requirements for each concentration, and take at least three additional 300-level courses overall. For example, a student earning two concentrations would have taken at least nine 300-level courses, and a student earning three concentrations would have taken at least twelve 300-level courses.

Concentrations, tracks and specializations provide focus to the major. In addition to any college core requirements, liberal studies requirements and major requirements, students are required to choose one of the following:

- Actuarial Science Concentration, Mathematical Sciences (BS) (https://catalog.depaul.edu/programs/mathematical-sciences-bs/actuarial-science-concentration-mathematical-sciences-bs/)
- Individualized Concentration, Mathematical Sciences (BS) (https://catalog.depaul.edu/programs/mathematical-sciences-bs/individualized-concentration-mathematical-sciences-bs/)
- Quantitative Analysis and Operations Research Concentration, Mathematical Sciences (BS) (https://catalog.depaul.edu/programs/...
Mathematical Sciences (BS)