PHYSICS (MS)

Master of Science in Physics
Unit: College of Arts and Sciences (https://louisville.edu/artsandsciences/) (GA)
Department: Physics & Astronomy (http://www.physics.louisville.edu)
Academic Plan Code(s): PHYSMS, PHYSMS_ACC

Program Information
Mission Statement
The Master of Science degree in Physics will prepare students for
PhD level graduate work in Physics or a related STEM discipline, or
for a science-related career in education or industry. Students in this
program develop strong analytical, quantitative, and problem solving
skills, including a deep appreciation for connections between physics
and scientific computing, physics and engineering, or physics and
mathematics, that serve to expand their career options in computer
hardware/software companies, large semiconductor industries and many
non-STEM job sectors such as finance, business and health care.

General Information
The MS is a two-year degree program available to qualified individuals
possessing a bachelor’s degree in Physics from an accredited college or
university. Students with a bachelor’s degree in other related subjects,
e.g., Mathematics, Chemistry, or Engineering, also will be considered.

Qualified students will be considered for Graduate Teaching
Assistantships (GTAs). As part of the educational experience, GTAs
perform certain undergraduate teaching responsibilities in exchange for a
stipend and full tuition remission.

The MS can be earned via a thesis or non-thesis option. The thesis option
requires at least six (6) credit hours of research leading to submission of
the thesis. Non-thesis students are also required to become involved in
research.

BS/MS Five-Year Accelerated Program
We also offer a five-year accelerated program leading to a Bachelor
of Science degree and Master of Science degree in Physics. This
program allows students to complete one semester [nine (9) credit
hours] of graduate coursework while enrolled as undergraduate
students. Students must apply for admission to the program no
later than the end of their junior year to be eligible enroll in graduate
coursework in their final year of the program. The student may take a
maximum of nine (9) credit hours for graduate credit, which will also
apply to the requirements for the baccalaureate degree. Those nine
(9) credit hours of graduate credit must be transferred to the student’s
graduate record after the student completes one semester as a graduate
student.

The general information described above is equally applicable to this
program. Specific admission requirements and programmatic details are
listed under the Admissions and Degree Requirements tabs.

MS Admission Requirements
Departmental requirements for admission are as follows:

- A baccalaureate degree with at least 24 credit hours in physics, or the
equivalent.
- A minimum quality-point standing of 3.0 (base 4.0) in physics
courses.
- Mathematics coursework through differential equations. (MATH 405
or equivalent).
- Submission of the (general) Graduate Record Examination scores.

For general information concerning admission to graduate programs at
the University of Louisville consult the application directions from the
Graduate School (http://louisville.edu/graduate/futurestudents/apply-
materials/application/).

Program Admission Procedure
Admission to the Physics MS program is competitive. The application
procedure is as follows:

- Submit a completed graduate application (http://louisville.edu/graduate/futurestudents/apply-materials/application/) to the
University of Louisville Graduate School, together with the required
application fee. Admitted students are most commonly accepted to
begin their program of studies in the Fall semester (which starts in
late August). However, programs beginning in the Spring semester
(which begins in early January) can be arranged. There is no formal
application deadline, but to ensure full consideration for Fall entry
applications should be received no later than February 1.
- Official transcripts from each university or college attended must be
submitted to the Graduate School.
- Take the general section of the Graduate Record Examination and
arrange for the official score to be sent to the Graduate School. The
Physics GRE is not required, but is preferred for PhD applicants.
- Arrange for at least two letters of recommendation to be sent to the
Graduate School. These letters should be written by persons familiar
with the applicant’s academic work. Please use the recommendation
form from the Graduate School (http://louisville.edu/graduate/
futurestudents/apply-materials/application/) or complete the relevant
section in the online application so that your letter writers will receive
an email request to submit their recommendation electronically.
- All applicants, whose native language is not English, are required to
achieve a TOEFL score greater than 79 on the internet-based test, a
composite score of at least 6.5 on the IELTS test or Duolingo score
of 105. Students holding a bachelor’s degree from an accredited
institution in the United States are exempt from this requirement.

In individual cases, the department may recommend conditional
admission of a student who does not satisfactorily meet the above
requirements. If admission is granted, that student will be subject to
those conditions specified by the Department of Physics and Astronomy,
the College of Arts and Sciences and the Graduate School as being
necessary to remedy the conditional admission.

BS/MS Five-Year Accelerated Program
Admission Requirements

- The applicant will apply for admission to the five-year accelerated
program no later than the end of their junior year to be eligible enroll
in graduate coursework in their final year of the program.
- The applicant will have completed at least 21 credit hours in Physics
before applying to the program.
• The applicant will have maintained at least a 3.0 GPA in Physics courses and a 3.35 GPA overall.

Program Admission Procedure
The procedure for admission is identical to admission to the two-year MS described above except that general GRE scores may be submitted any time prior to completion of the BS part of the program.

Once accepted, the student must meet (or have already met) the following requirements:

• Take at least nine (9) credit hours in 500-level physics courses for graduate credit. Two of the courses must be PHYS 542 and PHYS 556. Preferably these courses will be taken during the same semester in the student's senior year.
• Maintain a 3.0 GPA.

Program Requirements
Specific requirements for the MS degree in Physics are as follows:

### Thesis Option

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 605</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 611</td>
<td>Electromagnetic Theory I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 621</td>
<td>Quantum Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 622</td>
<td>Quantum Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>Physics Electives</td>
<td></td>
<td>6-9</td>
</tr>
<tr>
<td>Courses in one minor field</td>
<td></td>
<td>3-9</td>
</tr>
<tr>
<td>PHYS 699</td>
<td>Research</td>
<td>6</td>
</tr>
</tbody>
</table>

At least 21 credit hours must be at the 600 level or above

Minimum Total Credit Hours: 30

1 Courses numbered 500 or above. Courses at 500 level or above which are required for the BA/BS degree will not normally satisfy this requirement.

2 Mathematics is the usual minor, but another field may be chosen with the approval of the department.

### Non-Thesis Option

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
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<td>PHYS 605</td>
<td>Theoretical Mechanics</td>
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<tr>
<td>Courses in one minor field</td>
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<td>3-9</td>
</tr>
<tr>
<td>PHYS 699</td>
<td>Research</td>
<td>3</td>
</tr>
</tbody>
</table>

At least 17 credit hours must be at the 600 level or above

Minimum Total Credit Hours: 33

1 Courses numbered 500 or above. Courses at 500 level or above which are required for the BA/BS degree will not normally satisfy this requirement.

2 Mathematics is the usual minor, but another field may be chosen with the approval of the department.

### BS/MS Accelerated Program

The undergraduate Physics and non-physics requirements of this degree program are identical to the standard BS in Physics as listed here (https://catalog.louisville.edu/undergraduate/majors/physics-bs/#degreerequirementstext). However, students in this program must satisfy additional requirements. They must take three (3) of their 3 credit hour Physics 500 level courses for graduate credit. Two of these courses must be PHYS 542 and PHYS 556. The remaining course can be any of the other 500-level Physics courses counted towards their BS degree. All graduate requirements for the five-year BS/MS program are identical to the standard MS program (thesis or non-thesis option), where the 500-level courses taken for graduate credit will count as Physics electives.

For more information about the undergraduate requirements for the BS degree, please visit the Physics BS catalog page here (https://catalog.louisville.edu/undergraduate/majors/physics-bs/#degreerequirementstext).