Bachelor of Science in Physics

Why study physics and astronomy?
Because understanding the physical universe starts here.

Undergraduate Admission
Admission to KU
All students applying for admission must send high school and college transcripts to the Office of Admissions. Unless they are college transfer students with at least 24 hours of credit, prospective students must send ACT or SAT scores to the Office of Admissions. Prospective first-year students should be aware that KU has qualified admission requirements that all new first-year students must meet to be admitted. Consult the Office of Admissions (http://admissions.ku.edu) for application deadlines and specific admission requirements.

Visit the Office of International Student and Scholar Services (http://www.iss.ku.edu) for information about international admissions.

Students considering transferring to KU may see how their college-level course work will transfer on the Office of Admissions (http://credittransfer.ku.edu) website.

Admission to the College of Liberal Arts and Sciences
Admission to the College is a different process from admission to a major field. Some CLAS departments have admission requirements. See individual department/program sections for departmental admission requirements.

Requirements for the B.S. Degree in Physics

Physics Bachelor of Science (B.S.) General Education Requirements
All students pursuing the Bachelor of Science in Physics must complete the KU Core requirements in addition to the degree and major requirements. For details regarding the KU Core requirements, please see the KU Core section of the catalog.

Foundational Physics and Mathematics (8.5)
Majors must complete courses as specified in each of the following areas. Majors are advised to take honors courses when eligible.

Calculus I. Satisfied by:
MATH 125 Calculus I (or equivalent) 4
Calculus II. Satisfied by:
MATH 126 Calculus II (or equivalent) 4
Seminar in Physics, Astronomy, & Engineering Physics. Satisfied by:
PHSX 150 Seminar in Physics, Astronomy and Engineering Physics 0.5
General Physics I. Satisfied by one of the following:

<table>
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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>PHSX 211</td>
<td>General Physics I &amp; PHSX 216 General Physics I Laboratory</td>
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<tr>
<td>PHSX 213</td>
<td>General Physics I Honors</td>
</tr>
<tr>
<td>PHSX 212</td>
<td>General Physics II &amp; PHSX 236 General Physics II Laboratory</td>
</tr>
<tr>
<td>PHSX 214</td>
<td>General Physics II Honors</td>
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</tbody>
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General Science Requirements (8)
Foundations of Chemistry I. Satisfied by:
CHEM 130 General Chemistry I 5
Computing and Programming. Satisfied by:
EECS 138 Introduction to Computing: ____ excluding Fortran or C ++ 3
or EECS 168 Programming I

Advanced Mathematics (9)
Vector Calculus. Satisfied by:
MATH 127 Calculus III 4
Elementary Linear Algebra. Satisfied by:
MATH 290 Elementary Linear Algebra 2
Applied Differential Equations. Satisfied by:
MATH 320 Elementary Differential Equations 3

Math Elective. Satisfied by one of the following: (0)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PHSX 518</td>
<td>Mathematical Physics</td>
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<tr>
<td>PHSX 718</td>
<td>Mathematical Methods in Physical Sciences</td>
</tr>
<tr>
<td>MATH 526</td>
<td>Applied Mathematical Statistics I</td>
</tr>
<tr>
<td>MATH 530</td>
<td>Mathematical Models</td>
</tr>
<tr>
<td>MATH 558</td>
<td>Introductory Modern Algebra</td>
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<tr>
<td>MATH 581</td>
<td>Numerical Methods</td>
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<tr>
<td>MATH 590</td>
<td>Linear Algebra</td>
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<tr>
<td>MATH 628</td>
<td>Mathematical Theory of Statistics</td>
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<tr>
<td>MATH 646</td>
<td>Complex Variable and Applications</td>
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<tr>
<td>MATH 647</td>
<td>Applied Partial Differential Equations</td>
</tr>
<tr>
<td>MATH 648</td>
<td>Calculus of Variations and Integral Equations</td>
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<tr>
<td>MATH 660</td>
<td>Geometry I</td>
</tr>
<tr>
<td>MATH 661</td>
<td>Geometry II</td>
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<tr>
<td></td>
<td>any 700-level MATH lecture course course except MATH 701 and MATH 715</td>
</tr>
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Advanced Physics (24-27)
Majors must complete a course in each of the following areas:

General Physics III. Satisfied by:
PHSX 313 General Physics III 3
Intermediate Physics Lab. Satisfied by:
PHSX 316 Intermediate Physics Laboratory I 1
Introductory Quantum Mechanics. Satisfied by:
PHSX 511 Introductory Quantum Mechanics 3
Physical Measurements or Electronic Circuit Measurement and Design. Satisfied by:
PHSX 516 Physical Measurements 4
or PHSX 536 Electronic Circuit Measurement and Design
Mechanics I. Satisfied by:
PHSX 521 Mechanics I 3
Electricity and Magnetism. Satisfied by:
PHSX 531 Electricity and Magnetism 3
Thermal Physics. Satisfied by:
PHSX 671 Thermal Physics 3

Undergraduate Research or Honors Research. Satisfied by:
PHSX 503 Undergraduate Research 1-4
or PHSX 501 Honors Research

Physics Elective. Satisfied by any PHSX lecture or laboratory course numbered 500 or higher and not part of the other specific requirements for the major.

Physics Required Electives (13)
Majors must complete one of the following options: 13

Preprofessional Option
Majors choosing this option must complete 13 credit hours in advanced physics as follows:
Mechanics II. Satisfied by:
PHSX 621 Mechanics II

Electromagnetic Theory. Satisfied by:
PHSX 631 Electromagnetic Theory

Quantum Mechanics. Satisfied by:
PHSX 711 Quantum Mechanics I

Second Advanced Physics Lab. Satisfied by one of the following:
PHSX 516 Physical Measurements 1
or PHSX 536 Electronic Circuit Measurement and Design

Interdisciplinary Option
Majors choosing this option must complete 13 credit hours in satisfying both categories as follows:
Advanced Physics. Satisfied by two of the following:
PHSX 621 Mechanics II
PHSX 631 Electromagnetic Theory
PHSX 711 Quantum Mechanics I

PHSX 516 Physical Measurements 1

PHSX 536 Electronic Circuit Measurement and Design 1

Allied Science Field. Satisfied by the completion of 2 advanced courses in 1 allied science field chosen from the following:

Biology. Satisfied by two of the following:
BIOL 350 Principles of Genetics
BIOL 400 Fundamentals of Microbiology
BIOL 408 Physiology of Organisms
BIOL 412 Evolutionary Biology
BIOL 416 Cell Structure and Function
BIOL 600 Introductory Biochemistry, Lectures
BIOL 636 Biochemistry I
BIOL 638 Biochemistry II

Chemistry. Satisfied by two of the following:
CHEM 598 Research Methods (UKanTeach students only)
CHEM 310 Fundamentals of Organic Chemistry
CHEM 530 Physical Chemistry I

Geology. Satisfied by two of the following:
GEOL 360 Field Investigation
GEOL 562 Structural Geology
GEOL 572 Geophysics
GEOL 575 Seismic Exploration
GEOL 576 Potential Fields Exploration

GEOL 577 Environmental Geophysics

1 Course not used to satisfy Core Knowledge and Skills requirement above.

Physics Major Hours & Major GPA
While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours
Satisfied by 30 hours of major courses.

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior (300+) Hours
Satisfied by a minimum of 12 hours from junior/senior courses (300+) in the major.

Major Junior/Senior (300+) Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F’s and repeated courses. See the Semester/Cumulative GPA Calculator (http://clas.ku.edu/undergrad/tools/gpa).

Departmental Honors in Physics and Astronomy
Qualified students earning either a B.A. or a B.S. degree in the College of Liberal Arts and Sciences with a major in astronomy or physics may graduate with Honors in Physics & Astronomy by fulfilling the following requirements: (1) By the end of the candidate’s final semester, achieve a minimum GPA of 3.25 overall and 3.5 in the major, in all courses taken in residence and elsewhere; and (2) Complete at least 24 semester hours of astronomy and physics courses numbered 500 or above, including undergraduate research represented by two hours of credit in ASTR 597, ASTR 503, PHSX 501 or PHSX 503. A grade of B or better must be earned in one of the following: ASTR 597, ASTR 503, PHSX 501 or PHSX 503. In addition, all our all of our department’s honors requirements include student research, for which results shall be presented in at least one of the following forms: (1) a written research summary, read by 3 faculty members in physics and astronomy or related fields or authorship on a peer-reviewed manuscript; (2) a research-based oral presentation at an appropriate venue; (e.g., Undergraduate Research symposium, a presentation in an advanced department seminar class, a discipline specific meeting); or (3) presentation of a poster at an appropriate venue.

A student who plans to graduate with honors in physics and astronomy must file a Declaration of Intent Form with the Departmental Honors Coordinator, preferably during his/her junior year but in any case no later than enrollment for the final undergraduate semester.