

# Physics - B.A.

College of  
Arts and Sciences

The Department of Physics and Astronomy helps many students acquire a general understanding and appreciation of physics and astronomy. In the liberal arts tradition, the undergraduate curriculum is complete and flexible enough to allow a graduate with a major in physics to pursue a variety of careers.

## 120 hours (minimum)

Any student earning a Bachelor of Arts (BA) degree must complete a minimum of 39 hours at the 300+ level. These hours are generally completed by the major requirements. However, keep this hour requirement in mind as you choose your course work for the requirements in the major. See the complete description of College requirements for a Bachelor of Arts degree in the *Arts and Sciences* section of the 2015-2016 *Undergraduate Bulletin*.

## UK Core Requirements

See the *UK Core* section of the 2015-2016 *Undergraduate Bulletin* for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

### I. Intellectual Inquiry in Arts and Creativity

Choose one course from approved list ..... 3

### II. Intellectual Inquiry in the Humanities

Choose one course from approved list ..... 3

### III. Intellectual Inquiry in the Social Sciences

Choose one course from approved list ..... 3

### IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

Choose one course from approved list ..... 3

### V. Composition and Communication I

CIS/WRD 110 Composition and Communication I ..... 3

### VI. Composition and Communication II

CIS/WRD 111 Composition and Communication II ..... 3

### VII. Quantitative Foundations

Choose one course from approved list ..... 3

### VIII. Statistical Inferential Reasoning

Choose one course from approved list ..... 3

### IX. Community, Culture and Citizenship in the USA

Choose one course from approved list ..... 3

### X. Global Dynamics

Choose one course from approved list ..... 3

**UK Core hours** ..... **30**

## Graduation Composition and Communication Requirement (GCCR)

PHY 435 Intermediate Physics Laboratory ..... 3

## Graduation Composition and Communication Requirement hours (GCCR)

..... **3**

## College Requirements

I. Foreign Language (*placement exam recommended*) ..... 0-14

### II. Disciplinary Requirements

a. Natural Science (*completed by Premajor Requirements*) ..... 6

b. Social Science ..... 6

c. Humanities ..... 6

### III. Laboratory or Field Work (*completed by Premajor Requirement*)

IV. Electives ..... 6

**College Requirement hours:** ..... **18-32**

## Premajor Requirements

\*PHY 231/232/241/242 General University Physics and Laboratory ..... 10

### or with permission of the Director of Undergraduate Studies:

\*PHY 211/213 General Physics ..... (10)

PHY 228 Optics, Relativity and Thermal Physics ..... 3

CHE 105 General College Chemistry I ..... 4

CHE 107 General College Chemistry II ..... 3

\*MA 113 Calculus I ..... 4

MA 114 Calculus II ..... 4

**Premajor hours:** ..... **28**

## Major Requirements

### Major Core Requirements

PHY 306 Theoretical Methods of Physics ..... 3

PHY 335 Data Analysis for Physicists ..... 1

PHY 361 Principles of Modern Physics ..... 3

Any 3-hour 300-level PHY course ..... 3

Any 3-hour 400-level PHY course ..... 3

PHY 435 Intermediate Physics Laboratory ..... 3

MA 213 Calculus III ..... 4

**Major Core hours:** ..... **20**

## Other Course Work Required for the Major

### From Outside the Major Department

Choose 13-16 hours outside Physics at the 300+ level. Courses are generally chosen from biology, chemistry, computer science, education, engineering, mathematics, philosophy, or statistics. 200+ level courses used to satisfy College requirements can also be counted here ..... 13-16

**Other Major hours:** ..... **13-16**

### Total Minimum hours

**Required for Degree** ..... **121**

*\*Course used towards completion of a UK Core Requirement.*

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University of Kentucky is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award associate, baccalaureate, masters, and doctorate degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097, call 404-679-4500, or online at [www.sacscoc.org](http://www.sacscoc.org) for questions about the accreditation of University of Kentucky.

# Physics (B.A.) • 2

## Suggested Curriculum for B.A. in Physics

As you plan your physics studies, please note that upper division physics courses, PHY 3XX and all higher numbered courses, are offered once per year in the semester indicated on the suggested curricula. For example, PHY 306 and PHY 361 are offered in the spring semester only. This suggested curriculum minimally meets the requirements for the B.A. in Physics.

### Freshman Year

First Semester	Hours
MA 113 Calculus I .....	4
CIS/WRD 110 Composition and Communication I .....	3
UK Core .....	3
UK Core .....	3
<b>Second Semester</b>	
MA 114 Calculus II .....	4
PHY 231 General University Physics .....	4
PHY 241 General University Physics Laboratory .....	1
UK Core .....	3
UK Core .....	3

### Sophomore Year

First Semester	Hours
*MA 213 Calculus III .....	4
PHY 232 General University Physics .....	4
PHY 242 General University Physics Laboratory .....	1
Foreign Language .....	4
*CS 115 Introduction to Computer Programming or	
Major Related Electives .....	3
<b>Second Semester</b>	
*MA 214 Calculus IV or	
Major Related Electives .....	3
PHY 306 Theoretical Methods of Physics .....	3
PHY 228 Optics, Relativity and Thermal Physics .....	3
Foreign Language .....	4
Electives .....	3

### Junior Year

First Semester	Hours
CHE 105 General College Chemistry I .....	4
PHY 335 Data Analysis for Physicists .....	1
Foreign Language .....	3
*MA 322 Matrix Algebra and Its Applications or	
Major Related Electives .....	3
PHI 300+ .....	3
Electives .....	3
<b>Second Semester</b>	
CHE 107 General College Chemistry II .....	3
PHY 361 Principles of Modern Physics .....	3
Foreign Language .....	3
**Social Sciences 300+ .....	3
Major Related Electives .....	3

### Senior Year

First Semester	Hours
PHY 3XX .....	3
PHY 4XX .....	3
**Social Sciences 300+ .....	3
Major Related Electives .....	3
Electives .....	3
<b>Second Semester</b>	
PHY 435 Intermediate Physics Laboratory .....	3
PHY 4XX (suggested) .....	3
PHY 5XX (suggested) .....	3
Electives .....	5

\*A total of 14 credit hours in math, computer science, chemistry, engineering or other areas related to physics but outside the department must be completed to satisfy the college requirement. A total of 42 hours in physics and related areas must be taken to satisfy the major requirement.

\*\*The Bachelor of Arts requires the completion of six hours in humanities and social sciences as a college requirement. It also requires the completion of 39 hours at or above the 300 level.

# Physics - B.S.

College of  
Arts and Sciences

The Department of Physics and Astronomy helps many students acquire a general understanding and appreciation of physics and astronomy. In the liberal arts tradition, the undergraduate curriculum is complete and flexible enough to allow a graduate with a major in physics to pursue a variety of careers.

## 120 hours (minimum)

Any student earning a Bachelor of Science (BS) degree must complete a minimum of 60 hours in natural, physical, mathematical, and computer science. A complete description of College requirements for a Bachelor of Science degree, including a specific listing of courses applicable to the 60-hour requirement, can be found in the *Arts and Sciences* section of the 2015-2016 *Undergraduate Bulletin*.

### UK Core Requirements

See the *UK Core* section of the 2015-2016 *Undergraduate Bulletin* for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

#### I. Intellectual Inquiry in Arts and Creativity

Choose one course from approved list ..... 3

#### II. Intellectual Inquiry in the Humanities

Choose one course from approved list ..... 3

#### III. Intellectual Inquiry in the Social Sciences

Choose one course from approved list ..... 3

#### IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

Choose one course from approved list ..... 3

#### V. Composition and Communication I

CIS/WRD 110 Composition and Communication I ..... 3

#### VI. Composition and Communication II

CIS/WRD 111 Composition and Communication II ..... 3

#### VII. Quantitative Foundations

Choose one course from approved list ..... 3

#### VIII. Statistical Inferential Reasoning

Choose one course from approved list ..... 3

#### IX. Community, Culture and Citizenship in the USA

Choose one course from approved list ..... 3

#### X. Global Dynamics

Choose one course from approved list ..... 3

**UK Core hours** ..... **30**

### Graduation Composition and Communication Requirement (GCCR)

PHY 535 Advanced Physics Laboratory ..... 3

### Graduation Composition and Communication Requirement hours (GCCR)

..... **3**

### College Requirements

I. Foreign Language (*placement exam recommended*) ..... 0-14

#### II. Disciplinary Requirements

a. Natural Science (*completed by Premajor Requirements*) ..... 3

b. Social Science ..... 3

c. Humanities ..... 3

#### III. Laboratory or Field Work (*completed by Premajor Requirement*)

IV. Electives ..... 6

**College Requirement hours:** ..... **12-26**

### Premajor Requirements

\*PHY 231/232/241/242 General University Physics and Laboratory ..... 10

**or with permission of the Director of Undergraduate Studies:**

\*PHY 211/213 General Physics ..... (10)

PHY 228 Optics, Relativity and Thermal Physics ..... 3

CHE 105 General College Chemistry I ..... 4

CHE 107 General College Chemistry II ..... 3

\*MA 113 Calculus I ..... 4

MA 114 Calculus II ..... 4

**Premajor hours:** ..... **28**

### Major Requirements

#### Major Core Requirements

PHY 306 Theoretical Methods of Physics ..... 3

PHY 335 Data Analysis for Physicists ..... 1

PHY 361 Principles of Modern Physics ..... 3

PHY 404G Mechanics ..... 3

PHY 416G/417G Electricity and Magnetism ..... 6

PHY 520 Introduction to Quantum Mechanics I ..... 3

PHY 521 Introduction to Quantum Mechanics II ..... 3

PHY 535 Advanced Physics Laboratory ..... 3

MA 213 Calculus III ..... 4

MA 214 Calculus IV ..... 3

**plus two different courses from the following:**

AST/PHY 395 Independent Work in Astronomy/Physics ..... 3

PHY 402G Electronic Instrumentation and Measurements ..... 3

PHY 435 Intermediate Physics Laboratory ..... 3

PHY 508 Computational Physics ..... 3

**Major Core hours:** ..... **38**

### Other Course Work Required for the Major

#### From Outside the Major Department

Choose 6 hours outside Physics at the 200+ level. Courses are generally chosen from biology, chemistry, computer science, education, engineering, mathematics, philosophy, or statistics. 200+ level courses used to satisfy College requirements can also be counted here ..... 6

**Other Major hours:** ..... **6**

#### Total Minimum hours

**Required for Degree** ..... **120**

*\*Course used towards completion of a UK Core Requirement.*

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# Physics (B.S.) • 2

## Suggested Curriculum for B.S. in Physics

(NOTE: Students who have completed calculus or chemistry should visit our Web site at: [www.pa.uky.edu/undergrad/curricula.html](http://www.pa.uky.edu/undergrad/curricula.html) for suggested curriculum.)

As you plan your physics studies, please note that upper division physics courses, PHY 3XX and all higher numbered courses, are offered once per year in the semester indicated on the suggested curricula. For example, PHY 306 and PHY 361 are offered in the spring semester only. This suggested curriculum minimally meets the requirements for the B.S. in Physics.

### Freshman Year

First Semester	Hours
MA 113 Calculus I .....	4
PHY 231 General University Physics .....	4
PHY 241 General University Physics Laboratory .....	1
CHE 105 General College Chemistry I .....	4
CIS/WRD 110 Composition and Communication I .....	3

Second Semester	
MA 114 Calculus II .....	4
PHY 228 Optics, Relativity and Thermal Physics .....	3
CHE 107 General College Chemistry II .....	3
*CS 115 Introduction to Computer Programming or Major Related Electives .....	3
CIS/WRD 111 Composition and Communication II .....	3

### Sophomore Year

First Semester	Hours
MA 213 Calculus III .....	4
PHY 232 General University Physics .....	4
PHY 242 General University Physics Laboratory .....	1
PHY 335 Data Analysis for Physicists .....	1
Foreign Language .....	4

Second Semester	
MA 214 Calculus IV .....	3
PHY 306 Theoretical Methods of Physics .....	3
PHY 361 Principles of Modern Physics .....	3
Foreign Language .....	4
UK Core .....	3

### Junior Year

First Semester	Hours
PHY 404G Mechanics .....	3
PHY 416G Electricity and Magnetism .....	3
UK Core .....	3
Foreign Language .....	3
*MA 322 Matrix Algebra and Its Applications or Major Related Electives .....	3

Second Semester	
PHY 417G Electricity and Magnetism .....	3
Foreign Language .....	3
UK Core .....	3
Major Related Electives .....	3
Elective .....	3

### Senior Year

First Semester	Hours
PHY 402G Electronic Instrumentation and Measurements .....	3
PHY 520 Introduction to Quantum Mechanics I .....	3
PHY 522 Thermodynamics and Statistical Physics (suggested) .....	3
PHI 300+ course .....	3
Elective .....	3

Second Semester	
PHY 521 Introduction to Quantum Mechanics II .....	3
PHY 535 Advanced Physics Laboratory .....	3
Social Sciences 300+ .....	3
Elective .....	4

\*A total of 14 credit hours in math, computer science, chemistry, engineering or other areas related to physics but outside the department must be completed to satisfy the college requirement. A total of 42 hours in physics and related areas must be taken to satisfy the major requirement.

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