

# PHYSICS - B.A.

## College of Arts and Sciences

Department of Physics

www.kent.edu/physics

## About This Program

The Bachelor of Arts degree in Physics prepares students for such varied fields as secondary education, patent law, science journalism or interdisciplinary science careers. The core requirements permit a large number of elective courses, which allow students to complete a minor or second major in preparation for an interdisciplinary career. This program is well suited for those with a strong interest not only in science but also in a non-science field. Students completing the program may choose to continue their physics studies on a graduate level.

## Contact Information

- **Hamza Balci** | hbalci@kent.edu | 330-672-2577
- Speak with an Advisor
- Chat with an Admissions Counselor

## Program Delivery

- **Delivery:**
  - In person
- **Location:**
  - Kent Campus

## Admission Requirements

The university affirmatively strives to provide educational opportunities and access to students with varied backgrounds, those with special talents and adult students who graduated from high school three or more years ago.

**First-Year Students on the Kent Campus:** First-year admission policy on the Kent Campus is selective. Admission decisions are based upon cumulative grade point average, strength of high school college preparatory curriculum and grade trends. Students not admissible to the Kent Campus may be administratively referred to one of the seven regional campuses to begin their college coursework. For more information, visit the admissions website for first-year students.

**First-Year Students on the Regional Campuses:** First-year admission to Kent State's campuses at Ashtabula, East Liverpool, Geauga, Salem, Stark, Trumbull and Tuscarawas, as well as the Twinsburg Academic Center, is open to anyone with a high school diploma or its equivalent. For more information on admissions, contact the Regional Campuses admissions offices.

**International Students:** All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 525 TOEFL score (71 on the Internet-based version), minimum 75 MELAB score, minimum 6.0 IELTS score or minimum 48 PTE Academic score, or by completing the ELS level 112 Intensive Program. For more information, visit the admissions website for international students.

**Transfer Students:** Students who have attended any other educational institution after graduating from high school must apply as undergraduate transfer students. For more information, visit the admissions website for transfer students.

**Former Students:** Former Kent State students or graduates who have not attended another college or university since Kent State may complete the reenrollment or reinstatement form on the University Registrar's website.

Admission policies for undergraduate students may be found in the University Catalog's Academic Policies.

Some programs may require that students meet certain requirements before progressing through the program. For programs with progression requirements, the information is shown on the program's Coursework tab.

## Program Requirements

### Major Requirements

Code	Title	Credit Hours
<b>Major Requirements (courses count in major GPA)</b>		
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
MATH 32052	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES II	4
PHY 12000	INTRODUCTORY PHYSICS SEMINAR (ELR)	1
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB) <sup>1</sup>	5
PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB) <sup>1</sup>	5
PHY 30020	INTERMEDIATE PHYSICS LABORATORY (WIC) <sup>2</sup>	2
PHY 35101	CLASSICAL MECHANICS	4
PHY 36001	INTRODUCTORY MODERN PHYSICS	3
PHY 36002	APPLICATIONS OF MODERN PHYSICS	3
PHY 40020	ADVANCED PHYSICS LABORATORY (WIC) <sup>2</sup>	2
PHY 45201	ELECTROMAGNETIC THEORY	4
Physics (PHY) Upper-Division Electives (30000 or 40000 level) <sup>3,4</sup>		8
<b>Additional Requirements (courses do not count in major GPA)</b>		
UC 10001	FLASHES 101	1
Foreign Language (see Foreign Language College Requirement below)		14-16
Kent Core Composition		6
Kent Core Humanities and Fine Arts (minimum one course from each)		9
Kent Core Social Sciences (must be from two disciplines)		6
Kent Core Additional		6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours)		23

**Minimum Total Credit Hours:** 120

<sup>1</sup> Credit is not granted for both the PHY 13001/PHY 13002 and the PHY 23101/PHY 23102 series.

<sup>2</sup> A minimum C grade must be earned to fulfill the writing-intensive requirement.

<sup>3</sup> With advisor's permission, students may replace 3 credit hours of physics electives with ENG 20002 or PHIL 41035.

<sup>4</sup> Maximum 6 credit hours of PHY 40096 may be applied toward the major.

## Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
2.000	2.000

- The following courses may not count towards the Physics major requirements:

Code	Title	Credit Hours
PHY 11030	SEVEN IDEAS THAT SHOOK THE UNIVERSE (KBS)	3
PHY 21040	PHYSICS IN ENTERTAINMENT AND THE ARTS (KBS)	3
PHY 21041	PHYSICS IN ENTERTAINMENT AND THE ARTS LABORATORY (KBS) (KLAB)	1
PHY 21430	FRONTIERS IN ASTRONOMY (KBS)	3
PHY 21431	FRONTIERS IN ASTRONOMY LABORATORY (KBS) (KLAB)	1

### Foreign Language College Requirement, B.A.

Students pursuing the Bachelor of Arts degree in the College of Arts and Sciences must complete 14-16 credit hours of foreign language.<sup>1</sup>

To complete the requirement, students need the equivalent of Elementary I and II in any language, plus one of the following options<sup>2</sup>:

- Intermediate I and II of the same language
- Elementary I and II of a second language
- Any combination of two courses from the following list:
  - Intermediate I of the same language
  - ARAB 21401
  - ASL 19401
  - CHIN 25421
  - MCLS 10001
  - MCLS 20001
  - MCLS 20091
  - MCLS 21417
  - MCLS 21420
  - MCLS 22217
  - MCLS 28403
  - MCLS 28404

<sup>1</sup> All students with prior foreign language experience should take the foreign language placement test to determine the appropriate level at which to start. Some students may start beyond the Elementary I level and will complete the requirement with fewer credit hours and fewer courses. This may be accomplished by (1) passing a course beyond Elementary I through Intermediate II level; (2) receiving credit through one of the alternative credit programs offered by Kent State University; or (3) demonstrating language proficiency comparable to Elementary II of a foreign language. When students complete the requirement with fewer than 14 credit hours and four courses, they will complete remaining credit hours with general electives.

<sup>2</sup> Certain majors, concentrations and minors may require specific languages, limit the languages from which a student may choose or require coursework through Intermediate II. Students who plan to pursue graduate study may need particular language coursework.

## Roadmap

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

Semester One			Credits
!	MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
!	PHY 12000	INTRODUCTORY PHYSICS SEMINAR (ELR)	1
	UC 10001	FLASHES 101	1
	Foreign Language		4
	Kent Core Requirement		3
<b>Credit Hours</b>			<b>14</b>
Semester Two			Credits
!	MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
!	PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Foreign Language		4
<b>Credit Hours</b>			<b>14</b>
Semester Three			Credits
!	MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
!	PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
	Foreign Language		3
	Kent Core Requirement		3
<b>Credit Hours</b>			<b>15</b>
Semester Four			Credits
!	MATH 32052	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES II	4
!	PHY 36001	INTRODUCTORY MODERN PHYSICS	3
	Foreign Language		3
	Kent Core Requirement		3
	Kent Core Requirement		3
<b>Credit Hours</b>			<b>16</b>
Semester Five			Credits
!	PHY 30020	INTERMEDIATE PHYSICS LABORATORY (WIC)	2
!	PHY 35101	CLASSICAL MECHANICS	4
!	PHY 36002	APPLICATIONS OF MODERN PHYSICS	3
	Kent Core Requirement		3
	Kent Core Requirement		3
<b>Credit Hours</b>			<b>15</b>
Semester Six			Credits
	Physics (PHY) Upper-Division Elective (30000 or 40000 level)		3
	Kent Core Requirement		3
	Kent Core Requirement		3
	Kent Core Requirement		3
	General Elective		3
<b>Credit Hours</b>			<b>15</b>
Semester Seven			Credits
!	PHY 40020	ADVANCED PHYSICS LABORATORY (WIC)	2
!	PHY 45201	ELECTROMAGNETIC THEORY	4
	General Electives		9
<b>Credit Hours</b>			<b>15</b>
Semester Eight			Credits
	Physics (PHY) Upper-Division Electives (30000 or 40000 level)		5
	General Electives		11
<b>Credit Hours</b>			<b>16</b>
<b>Minimum Total Credit Hours:</b>			<b>120</b>

## University Requirements

All students in a bachelor's degree program at Kent State University must complete the following university requirements for graduation.

**NOTE:** University requirements may be fulfilled in this program by specific course requirements. Please see Program Requirements for details.

Flashes 101 (UC 10001)	1 credit hour
Course is not required for students with 30+ transfer credits (excluding College Credit Plus) or age 21+ at time of admission.	
Diversity Domestic/Global (DIVD/DIVG)	2 courses
Students must successfully complete one domestic and one global course, of which one must be from the Kent Core.	
Experiential Learning Requirement (ELR)	varies
Students must successfully complete one course or approved experience.	
Kent Core (see table below)	36-37 credit hours
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39 credit hours
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate.	
Total Credit Hour Requirement	120 credit hours

## Kent Core Requirements

Kent Core Composition (KCOMP)	6
Kent Core Mathematics and Critical Reasoning (KMCR)	3
Kent Core Humanities and Fine Arts (KHUM/KFA) (min one course each)	9
Kent Core Social Sciences (KSS) (must be from two disciplines)	6
Kent Core Basic Sciences (KBS/KLAB) (must include one laboratory)	6-7
Kent Core Additional (KADL)	6
<b>Total Credit Hours:</b>	<b>36-37</b>

## Program Learning Outcomes

Graduates of this program will be able to:

1. Demonstrate the technical and cognitive skills important in a good physicist, including the following:
  - a. Think critically and analytically.
  - b. Define a problem and how to solve problems.
  - c. Understand advanced mathematics (e.g., calculus and differential equations) and computer skills.
  - d. Use, design and even build lab equipment.
2. Demonstrate the traits important in a good scientist, namely, hard working, creative, meticulous, persistence, tenacious and self confidence.
3. Communicate results of their work to peers, to their instructors or supervisors, to various target groups within the physics community and to people outside the discipline.