



General Physics (PHYS 100/100L)

Fall 2023 – Spring 2024

SCI 03101/L – SCI 03102/L



BALL STATE
UNIVERSITY

Instructor



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Office Hours:

Monday:	2pm – 5pm
Tuesday:	By Appointment
Wednesday:	2pm – 5pm
Thursday:	12pm – 3pm
Friday:	2pm – 5pm

Email me for alternative times.

Required Materials

- Conceptual Physics by Paul G Hewitt
- College Physics – OpenStax (Online Text)
 - <https://openstax.org/details/books/college-physics>
- Computer Access w/ Internet
- Scientific Calculator (example: TI-30)

Meeting Times

MWF: 11:00am – 11:50pm (Class)
T: 2:00pm – 3:50pm (Lab)

BSU Credits

Ball State University:
College of Science and Humanities: Department of Physics and Astronomy
Course Credits: 3
Course Name: PHYS 100/100L
Core Transfer Library: Survey of Physical Science

Course Requirements and Specifications

Prerequisite: Fall: Algebra II
Spring Enrollment:
Successful completion of first semester General Physics or permission of Science Division Chair.

Co-requisites: Precalculus 1, 2 (MAT03101/03102) or higher and Physics I: General Physics Lab (SCI3101L/3102L)
Credit: 1.5 credits per semester
Offered: Fall/Spring Sequence

Course Content Overview

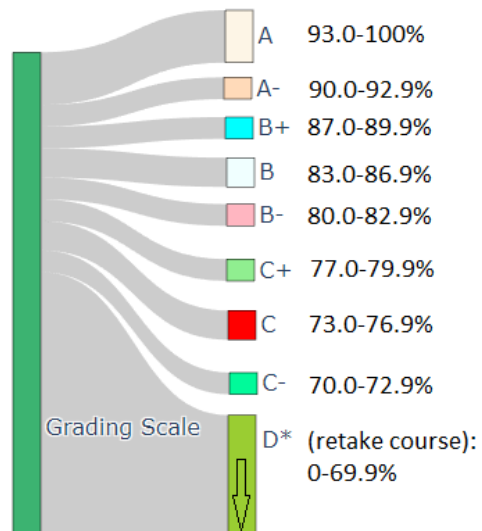
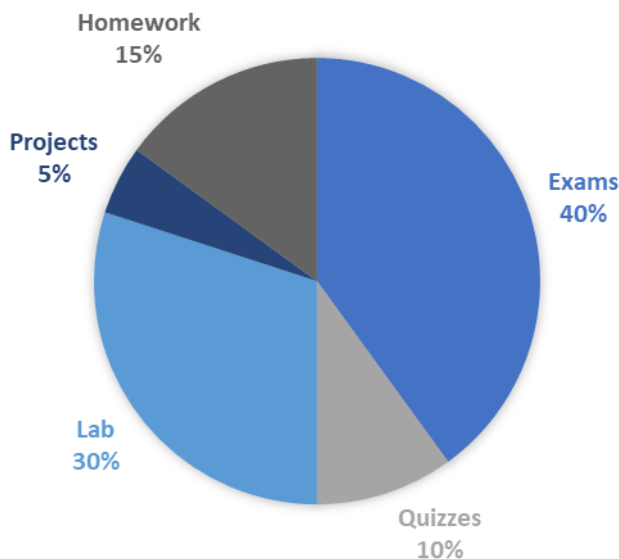
Welcome to General Physics!

This syllabus contains information about the **SCI03101/03102** and co-requisite lab SCI03101L/03102L courses.

General Physics I-II is a high school-level course which provides an introduction to the basic principles of physics. Topics include motion, force, energy, heat and thermodynamics, wave motion, sound, light, electricity and magnetism and, as time allows, topics in modern physics. A basic knowledge of algebra and geometry is required for this course. Mathematics in the course serves as a tool to define and describe physical relationships and the logical progression of ideas. The lab portion of the course models the scientific process, and gives students hands on experience in dealing with many of the concepts covered in the course.

* Ball State University offers 3 college credit hours in PHYC 100 to students who complete this Academy course. Refer to the Dual Credit section for details on enrollment and fees.

Grade Calculation & Scale

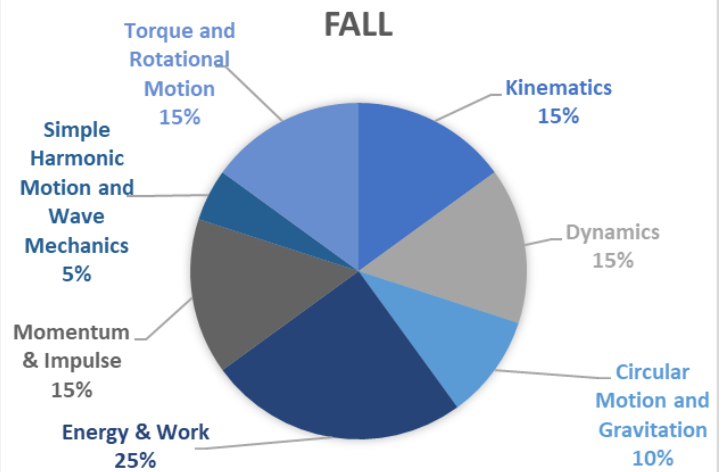


Course Content & Mastery Goals for Exams

Exams, including the final exam, will be parsed into mastery goals for grade calculations. These parsed categories are listed below for the fall and spring semesters, respectively. The benefit of assessing and grading in this way is to afford students the opportunity to provide evidence of learning of a concept (such as Kinematics) multiple times and not allow previous, less successful attempts to haunt their final grade for the course. A final grade should reflect what a student KNOWS, independent of their journey to get there.

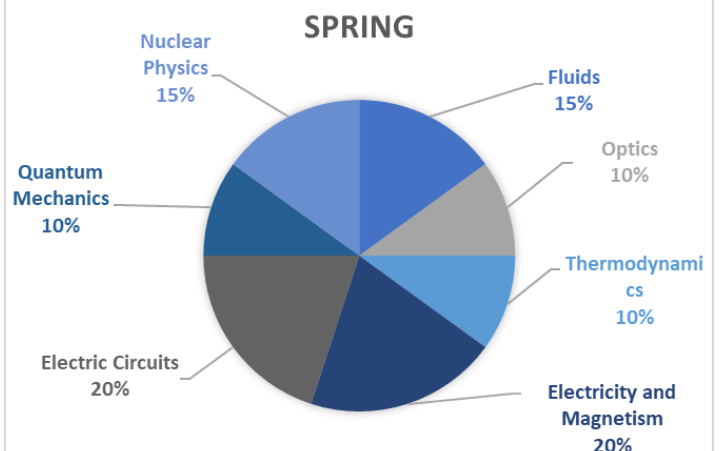
Fall Semester Concepts

Kinematics	15%
Dynamics	15%
Circular Motion and Gravitation	10%
Energy & Work	25%
Momentum & Impulse	15%
Simple Harmonic Motion	5%
Torque and Rotational Motion	15%
	100%



Spring Semester Concepts

Fluids	15%
Optics	10%
Thermodynamics	10%
Electricity and Magnetism	20%
Electric Circuits	20%
Quantum Mechanics	10%
Nuclear Physics	15%
	100%



Fall 2023 Tentative Semester Schedule

Week	Lecture	Lab
1 Aug 14 – 18	PB&Js and The Scientific Process	Measure Twice, Cut Once Lab (Measurement Uncertainty Lab)
2 Aug 21 – 25	Distance, Displacement, Speed, Velocity, and 1-D/2-D Acceleration	A Day in Your Shoes Lab (Measuring distance/displacement and time to calculate speed/velocity)
3 Aug 28 – Sept 1	Kinematic Equations	Gravity – By any other Name (Deriving Kinematic Equations)
4 Sept 6 – 8	REVIEW: Unit 1: KINEMATICS	No TUESDAY Lab (LABOR DAY) No TUESDAY Class (LABOR DAY)
5 Sept 11 – 15		Exam 1: Kinematics
6 Sept 18 – 22	Forces: Constant, Contact, & Net Forces	Projectile Motion Lab (Day 1) – Planning / Assembly
7 Sept 25 – 29	Newton's Laws	Projectile Motion Lab (Day 2) – Planning / Assembly
8 Oct 2 – 6	Projectile Motion & Forces	Projectile Motion Lab (Day 3) – Launch Day
9 Oct 9 – 13	REVIEW: Unit 2: DYNAMICS Mastery Exam Available for Exam 1	No Classes - Monday & Tuesday 10/09 – 10/2023 (FALL BREAK) - Wednesday 10/11/2023 (PSATs) Thursday 10/12/2023 is scheduled as a Tuesday (Thursday / Tuesday Swap Day)
10 Oct 16 – 20		Exam 2: Kinematics & Dynamics
11 Oct 23 – 27	Momentum & Impulse	Billiard Ball Lab
12 Oct 30 – Nov 3	Conservation of Momentum	Momentum PocketLab
13 Nov 6 – 10	REVIEW: Unit 3: LINEAR MOMENTUM & IMPULSE Mastery Exam Available for Exam 1 – 2	Exam 3: Kinematics, Dynamics, Linear Momentum, & Impulse
14 Nov 13 – 17	Energy & Work	Balloon & Friction Lab
15 Nov 20 – 24	THANKSGIVING BREAK	No Lab (T-DAY BREAK) No Class (T-DAY BREAK)
16 Nov 27 – Dec 1	Conservation of Energy	Energy PocketLab
17 Dec 4 – 8	REVIEW: Unit 4: ENERGY & WORK Mastery Exam Available for Exam 1 – 3	Exam 4: Kinematics, Dynamics, Linear Momentum, Impulse, Energy, & Work
18 Dec 11 – 14	Momentum & Energy – Replacing Kinematics Mastery Exam Available for Exam 1 – 4	REVIEW FOR FINAL
19 Dec 15, 18 – 20	FINALS WEEK	Extra Credit Due ALL assignments & makeups DUE

Spring 2024 Tentative Semester Schedule

Week	Lecture	Lab
1 Jan 8 – 12	Unit 1: Waves & Motion	Slinky Lab
2 Jan 15 – 16	Unit 2: Sound & Light Motion	No Class Monday 01/15/2024 (MLK Jr Day) Light Color Theory Lab
3 Jan 22 – 26	Unit 3: Optics Reflecting, Refracting, & Math (Oh my!)	Optics Lab
4 Jan 29 – Feb 2	REVIEW Units 1 – 3	EXAM 1: Waves & Optics
5 Feb 5 – 9	Unit 4: Quantum Mechanics	No Class Monday 02/05/2024 (Extended Weekend) Quantum Particles Lab
6 Feb 12 – 16	Unit 5: Nuclear Physics	Nuclear Radiation, Fission, & Fusion Lab
7 Feb 19 – 23	REVIEW Units 4 – 5 Mastery Exam Available for Exam 1	EXAM 2: Quantum & Nuclear Physics
8 Feb 26 – Mar 1	Unit 6: Charges & Moving Charges	Coulomb's Force Lab
9 Mar 4 – 8	Unit 7: Charges & Magnetic Fields (B)	Magnetic Field Lab
10 Mar 11 – 15	NO SCHOOL – SPRING BREAK	No Lab (SPRING BREAK) No Class (SPRING BREAK)
11 Mar 18 – 22	Unit 8: Charges & Electric Fields (E) & Induction	Electric Field Lab
12 Mar 25 – 29	REVIEW Units 6 – 8 Mastery Exam Available for Exam 1 & 2	EXAM 3: Charges & E/B Fields
13 Apr 1 – 5	Unit 9: Ohm's Law & Kirchhoff's Laws	No Class Monday 04/01/2024 (Extended Weekend) No Class Friday 04/05/2024 (Solar Eclipse) Circuit Lab – Part 1
14 Apr 8 – 12	Circuits: Parallel, Series, & Mixed	Circuit Lab – Part 2
15 April 15 – 19	REVIEW Unit 9 Unit 10: Thermodynamics Mastery Exam Available for Exam 1 – 3	EXAM 4: Circuits
16 Apr 22 – 25	Unit 11: Fluids	No Class Friday 04/26/2024 (Extended Weekend) Thermo PocketLab
17 Apr 29 – May 3	REVIEW Units 10 – 11 REVIEW FOR FINALS Mastery Exam Available for Exam 1 – 4	EXAM 5: Thermo & Fluids
18 May 6 – 10	FINALS WEEK Mastery Exam Available for Exam 1 – 5	Extra Credit Due ALL assignments & makeups DUE

Classroom Policies*

*Subject to change as the need arises.

Laptop Policy

While in class or lab, please keep computer use restricted to classroom-relevant tasks.

Laptops or tablets are required for lab sessions.

Laptops or tablets are also required for some homework, quizzes, and other activities.

Laptops or tablets are permitted but not required during class for note-taking or other class-related needs.

Withdrawal Deadlines

If you wish to drop your class(es), you must do so by August 27, 2023.

The withdrawal deadline is October 2023 and will be announced once published by the University Registrar.

Dropping/Withdrawing from a class at your high school does not drop/withdraw you from your BSU Dual Credit class. Instructions for dropping/withdrawing can be found in the Dual Credit Student and Parent Handbook.

Attendance Policy

Students arriving after the start of class may receive a Tardy. Students arriving after 20 minutes (or not at all!) may receive an Absence. Student is responsible for all information missed due to not being present.

Late Work Policy

Late work is defined as work that is submitted more than 24 hrs late. Any work not submitted automatically is scored as a zero (0 pts.).

If work is submitted but it has been more than 24 hrs since it was due, the work will be graded with a 50% deduction of points in the gradebook, regardless of delay or reason.

Last day to submit late work will be the Friday BEFORE finals week. After this time, all zeroes (0 pts.) will remain and cannot be made-up or submitted for points.

Make-up Policies

Make-up exams may only be taken if the student received an excused absence for the missed test.

There are no make-ups for Labs. The lowest Lab grade will be exempted at the end of the semester

Additional Points

Email me one, school-appropriate, cute photo of a pet (if pet is not your pet, please acquire permission to photograph and submit before doing so). These photos will be presented to the class during the in-class final exam review.

Deadline: The Friday BEFORE finals week each semester. Worth: +1% on any mastery exam category of the student's choice at the end of each semester.

Lab Reports

Data collection will be done during class only and no make-up labs will be permitted.

Labs will be conducted as a small group, 2 – 3 people per group.

Lab Reports are due each week by each member of the group. Each report is to be written separately but collaboratively discussed.

This means you are writing your own report, but you are free to discuss and compare each other's work before submission.

(Be careful to not plagiarize. Discussions should be consultations only.)

Lab Reports will have the following sections (at minimum) and must be submitted digitally on Canvas as a PDF or .DOCX file.*

*subject to change as needed

Element of the Report	Criteria
1. Brief statements of the following: <ol style="list-style-type: none"> a. Concepts used b. Equations used (if any) c. Purpose of the lab (What are you measuring or testing?) 	<p>This section should be brief (about 1 to 2 paragraphs long)</p> <p>It should be less about listing things off and more about explaining what is happening</p>
2. <u>Detailed</u> Procedure & Equipment Used	Explain it as if someone else's grade depended on repeating your procedure.
3. Your Data and Error Analysis (if applicable) & Sample Calculations	<p><u>This should not be RAW data.</u></p> <p>This should be a data summary (such as graphs or averages) with errors. Sample calculations should include <u>brief outlines</u> of how your data summary information was calculated, not all calculations.</p>
4. Results and conclusions	What are the results of your experiment? What did the lab ask you to determine? Did you determine this?
5. <u>Detailed</u> Discussion of results	<p>What do your results <u>mean</u>?</p> <p>This section should be more than 2 paragraphs detailing what your results mean by reflecting on concepts used, data collected, and what was measured.</p>
6. What would you or think you should have done differently?	<p>Think of ways in which you could have either improved data collection or learned more about the phenomena investigated.</p> <p>Consider alternative methods or concepts that could have been used instead.</p>
7. Raw Data	This is ALL raw data, including any pictures taken during lab, numbers, tables, and unused graphs.

Labs will focus on providing skill development in the following scientific practices.

Scientific Practices	
Modeling	Use representations and models to communicate scientific phenomena and solve scientific problems
Mathematical Routines	Use mathematics appropriately
Scientific Questioning	Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course
Experimental Methods	Plan and implement data-collection strategies in relation to a particular scientific question
Data Analysis	Perform data analysis and evaluation of evidence
Argumentation	Work with scientific explanations and theories
Making Connections	Connect and relate knowledge across various scales, concepts, and representations in and across domains

Lab reports focus on writing skills, an essential aspect of any professional skillset.

Resources Available to You

The Writing Center

All writers improve with practice and feedback, so as a student in this course, you are encouraged to use the Writing Center (in Robert Bell 295, Bracken Library, or online) to get additional feedback on your writing. To schedule a free appointment to discuss your writing, go to www.bsu.edu/writingcenter.

Online and in-person appointments are available seven days a week; however, plan ahead because appointments book quickly!

The Learning Center

The Learning Center offers free Tutoring and Academic Coaching for many courses at Ball State. Students can make appointments for online (Zoom) or in-person (NQ 350) appointments. Unvaccinated students are required to wear masks and practice physical distancing in the Learning Center.

To make an appointment, visit my.bsu.edu and click on “TutorTrac” in the Additional Tools section, or just go directly to <https://ballstate.go-redrock.com>.

Testing accommodations for students with disabilities are available for students who have received the appropriate documentation from Disability Services. Tests may be administered in the Learning Center.

Supplemental Instruction is available in select courses. If you have an SI leader for your course, that person will provide students with information the first week of school regarding weekly study sessions.

For more information about all of our programming, visit <https://bsu.edu/learningcenter> or call (765) 285-1006.

Important Information You May Need to Know

Dual Credit-High School Credit Policy Statement

Students may choose to enroll in Ball State’s Dual Credit Program to earn college credit for ASTR 120, the Sun and Stars, from Ball State at a reduced rate of tuition (\$250 flat rate). Students who are eligible for free or reduced lunch this academic year may enroll at no charge if verified by the school.

To enroll in Ball State’s Dual Credit Program, students should have a 3.0 GPA on a 4.0 scale and complete the application & registration process before the given deadline. Ball State will bill students via postal mail; no money should be submitted to the high school. College credit can only be earned during the semester (or, in the case of year-long classes, during the academic year) in which the student is enrolled. Late enrollments are not permitted.

Whether college credit earned through dual credit courses will be accepted by another institution of higher education is determined by the college or university to which a student is seeking admission. Before enrolling through Ball State’s Dual Credit Program, students should check directly with that institution to determine if a course will be accepted and how it will be counted toward graduation requirements. Refunds will not be issued if Ball State credits are not able to be transferred. In most cases, students will need to earn a C or better to transfer credit from Ball State to another institution. Grades of D or lower earned in Ball State Dual Credit courses are recorded on a student’s Ball State transcript but may not be able to transfer.

The rigor of this course will be periodically reviewed by Ball State University faculty in an effort to maintain the high quality of education that each student receives. To learn more about Ball State’s Dual Credit Program, visit bsu.edu/dualcredit, call 765-285-1581 or email dualcredit@bsu.edu.

Indiana Academy Diversity Statement

The Indiana Academy for Science, Mathematics, and Humanities is committed to being an inclusive educational community that values diversity in policy and practice. We aim to foster an educational environment where students, faculty, and staff exchange ideas freely, engage in critical thinking, and reexamine their personal perspectives. To create an environment where this respectful and productive dialogue is possible, we do not allow discrimination on the basis of race, ethnicity, sex, geographic origin, gender, gender identity, sexual orientation, disability, religion, age, or nationality. The affirmation, appreciation, and inclusion of multiple cultures ensures that all students, faculty, staff, and the wider Indiana Academy community will be able to thrive in our multicultural academic and residential environment.

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff and student body. We are committed to ensuring that all members of the community are welcome through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our Beneficence Pledge. For Bias Incident Response information or to report a bias-based incident, please click [here](#) or e-mail reportbias@bsu.edu.

BSU Student Rights and Responsibilities

While enrolled in Ball State's Dual Credit Program, you are expected to abide by the academic rules of behavior befitting a university student. You should read the Dual Credit Student and Parent Handbook, located at <https://bsu.edu/dualcredit>

In particular, review the Code of Student Rights and Responsibilities, focusing on the policies regarding student rights and responsibilities, behavior, academic integrity, and related procedures.

The Dual Credit Student and Parent Handbook includes information regarding student qualifications, prerequisites, available courses, responsibilities, financial aid stipulations, transferability, withdrawal, refund and billing policies and more. It is important that you review the information contained in it.

Policy on the Americans with Disabilities Act (ADA)

If you need course adaptations or accommodations because of a disability, please contact the Office of Disability Services. The Office of Disability Services coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability services can be contacted at 765-285-5293 or dsd@bsu.edu.

Title IX – Sexual Misconduct

Ball State University is committed to establishing and maintaining an effective, safe, and nondiscriminatory educational environment in which all individuals are treated with respect and dignity. For information about Ball State University's Interim Title IX Policy and Procedures, please visit our website. Please note that the University's policy and procedures have undergone significant revisions starting with the 2020-21 school year and ongoing.

Consistent with the University's Notice of Nondiscrimination and in accordance with the U.S. Department of Education's implementing regulations for Title IX of the Education Amendments of 1972 ("Title IX"), Ball State University prohibits sexual harassment that occurs within its education programs and activities.

This prohibition extends to all applicants for admission or employment and to all students (any status) and all employees (any status). An individual who is found to have committed sexual harassment in violation of this policy is subject to the full range of University discipline, up to and including termination of employment or expulsion. The University will provide persons who have experienced sexual harassment with ongoing remedies as reasonably necessary to restore or preserve access to the University's education program and activities.

Inquiries concerning the specific application of Title IX at Ball State should be directed to Ms. Katie Slabaugh, Associate Dean of Students/Title IX Coordinator in the Frank A. Bracken Administration Building, room 238, 765-285-1545, kslabaugh@bsu.edu. Persons can also contact the U.S. Department of Education Office for Civil Rights, Washington, D.C. 20202-1328, 1-800-421-3481, ocr@ed.gov.

Student Academic Ethics Policy

Actions which include but are not limited to cheating, plagiarism, falsely claiming to have completed work, cooperating with another person in academic dishonesty, knowingly destroying or altering another student's work, or attempting to commit an act of academic dishonesty that violates the Student Academic Ethics Policy (<http://www.bsu.edu/associateprovost/academicethics>).

The consequences of academic dishonesty are determined on a case-by-case basis by each instructor and may include but are not limited to one or more of the following academic sanctions: informal meeting, removal from dual credit course, dismissal from the university, or other appropriate consequence.

Syllabus Change Policy

This syllabus is a guide to the course and may be subject to change with reasonable advanced notice as course needs arise.