



Astrophysics II: Galaxies & Cosmology (ASTRO 122)



BALL STATE
UNIVERSITY

Spring 2025
SCI 04404/L

Instructor



(Myself & husband in the back. My two nieces with SIL and her husband)

Dr. Krista Hook

Email: Krista.Hook@bsu.edu

Office: Elliot Hall – B009B

Indiana Academy for Science,
Mathematics, and Humanities,
Ball State University
Muncie, IN 47306

Office Hours:

Monday:	4pm – 6pm
Tuesday:	By Appointment
Wednesday:	4pm – 6pm
Thursday:	11am – 4pm
Friday:	4pm – 6pm

Email me for alternative meeting arrangements.

Required Materials

- Astronomy – OpenStax (Online Text)
 - <https://openstax.org/details/books/astronomy>
- Computer Access w/ Internet and Microsoft Excel (or equivalent)
- Scientific Calculator (example: TI-30)

Meeting Times

MWF: 2pm – 2:50pm (Class)
R: 9am – 10:50am (Lab)

BSU Credits

Ball State University:
College of Science and Humanities: Department of Physics and Astronomy
Course Credits: 3
Course Name: ASTRO 122
ONLY available if you have also taken AstroPhysics 1 (Astro 120) with a passing grade.

Course Requirements and Specifications

Prerequisite: Algebra I
Co-requisite: Astrophysics II Lab (SCI 04404L)

Credit: 1.5 credits
Offered: Spring

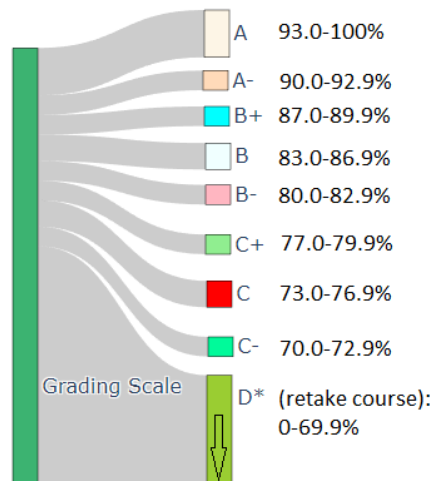
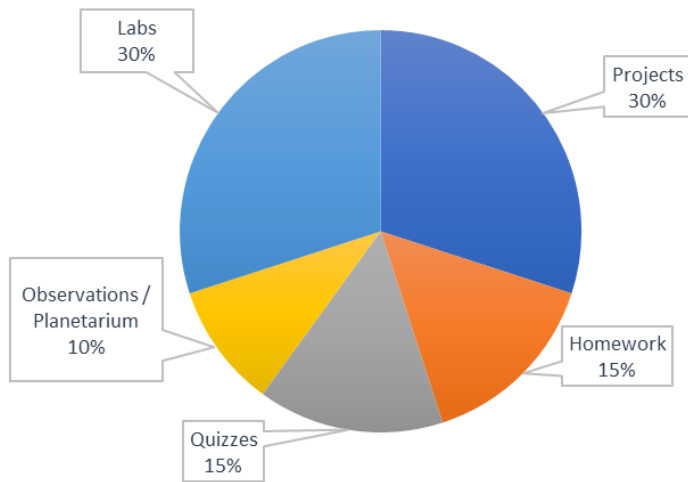
Course Content Overview

In this course, students will be introduced to the physical processes that govern the structure and evolution of galaxies and the universe. The course will take students on a journey through the history of the cosmos as we currently understand it and the amazing super-structures that shape the known universe. The evolution of the universe and the formation of galaxies, including the hypothetical blackhole star, will allow students to dive further into the many facets of galactic classification, the mystery behind active galactic nuclei (AGN), and current models of the end of the universe.

The course also includes a lab experience, capitalizing on the observational and experimental data that are used in modern galactic astronomy and cosmology research to reveal natural physical laws that provide information about remote objects in space. There will also be the occasional required late evening sky observation (as weather permits) and the occasional field trip to the Ball State Planetarium (as scheduling permits).

* Ball State University offers 3 college credit hours to students in ASTRO 122 to students who complete this course. Refer to the Dual Credit section for details on enrollment and fees.

Grade Calculation & Scale



Course Content & Mastery Goals for Exams

There are no Exams in this course.

There are categories listed below for content covered this semester. Throughout the semester, these different contents will be covered and assessed. 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 Photometry) via projects and labs but not assessing students through stressful, singular exams. A final grade should reflect what a student KNOWS, independent of their journey to get there.

Therefore, it is essential that students:

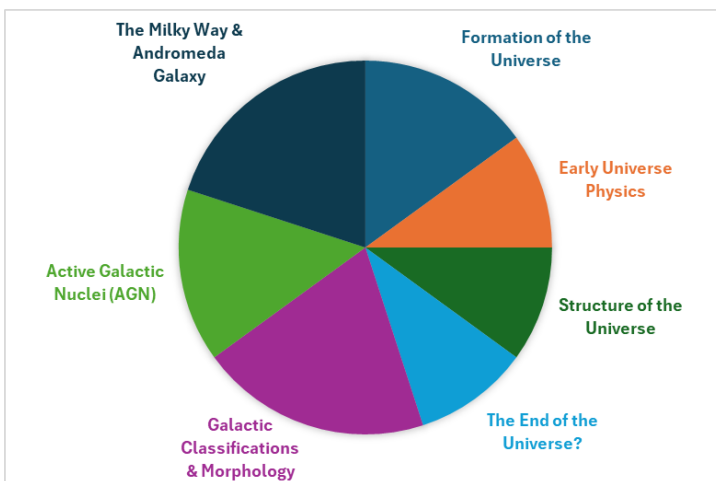
1. Complete assignments and use time given in class to work on them
2. Collaborate (but not copy or split assignments) with other students
 - a. Please review the collaboration section of this syllabus to better understand the expectations
 - b. Please review Academic Dishonesty in the Student Handbook
 - c. All work must be completed (in whole) by every student as their individual and independent work and not created in part or as a whole by more than one student.

The final exam will be a series of final projects (that can be completed before Finals Week).

Planetarium Visits do not include times when we, as a class, visit. These are visits you make to weekly shows the planetarium performs outside of class. Announcements will be made to remind you to go and instructions on how to provide reflections when needed.

Concepts & Time Dedication

Formation of the Universe	15%
Early Universe Physics	10%
Structure of the Universe	10%
The End of the Universe?	10%
Galactic Classifications & Morphology	20%
Active Galactic Nuclei (AGN)	15%
The Milky Way & Andromeda Galaxy	20%
	100%



Spring 2025 Tentative Semester Schedule*

*When Telescope Astronomy (Weather Permitting) Lab Times are not permitted by weather, the class will still meet in usual room

Week	Events	Lecture	Lab
1 Jan 6 – 10		Unit 1: Formation of the Universe: Big Bang	The Universe's Timeline Project: Part #1
2 Jan 13 – 17		Unit 2: Early Universe Physics: Quantum & Macroscopic (Four Fundamental Forces, particles, CBR, Age)	Elementary Particles Lab
3 Jan 20 – 24	Jan 20 – MLK Day (No Class)	Unit 3: Structure of the Universe (Early Galaxies, Local Group, Supergroups, Filaments)	The Universe's Timeline Project: Part #2
4 Jan 27 – 31		Unit 4: Expansion of the Universe & Stellar Motion (Dark Matter, Dark Energy, Hubble's Law)	Standard Candles #2 Lab
5 Feb 3 – Feb 7	Feb. 1 – 3 – Extended Weekend	Unit 5: The End? (Density of Universe, Isotropy, Flatness, Endings)	Hubble's Law Lab
6 Feb 10 – 14		Work Week	Work Week
7 Feb 17 – 21		Unit 5: Light & Spectra (Lyman, Balmer, Paschen, and Brackett Series)	Spectra & Galaxies Lab
8 Feb 24 – 28	Feb 28 – End of Q3 Parent/Teacher Conferences	Unit 6: Galactic Classifications & Morphology (Morphology, Profiles, Kinematics)	Galaxy Classification lab
9 Mar 1 – Mar 9	Spring Break	Spring Break	Spring Break
10 Mar 10 – 14		Unit 6: Galactic Classifications & Morphology (Star Burst Galaxies, Interactions, Mergers)	SciServer Lab - TBA
11 Mar 17 – 21		Unit 7: Active Galactic Nuclei (AGN) (Supermassive Blackholes, Quasars, Blazars, Seyfert Galaxies)	SciServer Lab - TBA
12 Mar 24 – 28		Work Week	Work Week
13 Mar 31 – Apr 4		Unit 8: The Milky Way & Andromeda Galaxy (Structure, Metallicity, Population I, II, III stars)	SciServer Lab - TBA
14 Apr 7 – 11		Unit 8: The Milky Way & Andromeda Galaxy	Cluster Lab

		(Open Clusters, Globular Clusters, Nebulas)	
15 Apr 14 – 18		Unit 8: The Milky Way & Andromeda Galaxy (Dust, Voids, JuMBOs, Satellite Galaxies)	SciServer Lab - TBA
16 April 21 – 25	Apr. 19 – 21 – Extended Weekend	Unit 9: Life in the Universe (Habitability Zones, Exoplanets, Observable Universe)	
17 Apr 28 – May 2		Work Week	Extra Credit Due ALL assignments & makeups DUE
19 May 5 – 9	FINALS WEEK	FINALS WEEK	FINALS WEEK

Spring 2025 *Tentative* Planetarium Schedule

Visit 5 different Planetarium Shows & provide reflection for credit

Follow the link to view the schedule:

<https://www.bsu.edu/calendar/calendars/academics/planetarium>

Any shows that are for children or do not cover astronomical topics will not count.

Astronomical Events Visible with the Naked Eye – Spring 2025*

*This will be updated frequently as needed

Event Date	Event
January 3 – 4 (peak)	Quadrantids Meteors. The first major meteor shower of 2024, the Quadrantids, peaks on the night of January 3 and the early morning hours of January 4.
January 10	Venus at Greatest Eastern Elongation. The planet Venus reaches greatest eastern elongation of 47.2 degrees from the Sun. This is the best time to view Venus since it will be at its highest point above the horizon in the evening sky. Look for the bright planet in the western sky after sunset.
January 13	Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 22:28 UTC. This full moon was known by early Native American tribes as the Wolf Moon because this was the time of year when hungry wolf packs howled outside their camps. This moon has also been known as the Old Moon and the Moon After Yule.
January 16	Mars at Opposition. The red planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view and photograph Mars. A medium-sized telescope will allow you to see some of the dark details on the planet's orange surface.
January 29	New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 12:37 UTC. This is the best time

	of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.
February 12	Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 13:55 UTC. This full moon was known by early Native American tribes as the Snow Moon because the heaviest snows usually fell during this time of the year. Since hunting is difficult, this moon has also been known by some tribes as the Hunger Moon, since the harsh weather made hunting difficult.
February 28	New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 00:46 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.
March 8	Mercury at Greatest Eastern Elongation. The planet Mercury reaches greatest eastern elongation of 18.2 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.
March 14	Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 06:56 UTC. This full moon was known by early Native American tribes as the Worm Moon because this was the time of year when the ground would begin to soften and the earthworms would reappear. This moon has also been known as the Crow Moon, the Crust Moon, the Sap Moon, and the Lenten Moon.
March 14	Total Lunar Eclipse. A total lunar eclipse occurs when the Moon passes completely through the Earth's dark shadow, or umbra. During this type of eclipse, the Moon will gradually get darker and then take on a rusty or blood red color. The eclipse will be visible throughout all of North America, Mexico, Central America, and South America. (NASA Map and Eclipse Information)
March 20	March Equinox or Vernal Equinox. The March equinox is the first day of spring in the Northern Hemisphere and the start of fall in the Southern Hemisphere, by astronomical definitions.
March 29	New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 11:00 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.
March 29	Partial Solar Eclipse. A partial solar eclipse occurs when the Moon covers only a part of the Sun, sometimes resembling a bite taken out of a cookie. A partial solar eclipse can only be safely observed with a special solar filter or by looking at the Sun's reflection. This partial eclipse will be visible throughout Greenland and most of northern Europe and northern Russia. It will be best seen from Canada with 93% coverage. (NASA Map and Eclipse Information)
April 13	Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 00:24 UTC. This full moon was known by early Native American tribes as the Pink Moon because it marked the appearance of the moss pink, or wild ground phlox, which is one of the first spring flowers. This moon has also been known as the Sprouting Grass Moon, the Growing Moon, and the Egg Moon. Many coastal tribes called it the Fish Moon because this was the time that the shad swam upstream to spawn.
April 21	Mercury at Greatest Western Elongation. The planet Mercury reaches greatest western elongation of 27.4 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the morning sky. Look for the planet low in the eastern sky just before sunrise.

	<p>Lyrid Meteor Shower. The Lyrids is an average shower, usually producing about 20 meteors per hour at its peak. It is produced by dust particles left behind by comet C/1861 G1 Thatcher, which was discovered in 1861.</p>
April 27	<p>New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 19:32 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.</p>
May 6 – 7	<p>Eta Aquarids Meteor Shower. The Eta Aquarids is an above average shower, capable of producing up to 60 meteors per hour at its peak. Most of the activity is seen in the Southern Hemisphere. In the Northern Hemisphere, the rate can reach about 30 meteors per hour. It is produced by dust particles left behind by comet Halley, which has been observed since ancient times. The shower runs annually from April 19 to May 28. It peaks this year on the night of May 6 and the morning of the May 7. The waxing gibbous moon will block out some of the fainter meteors this year. But if you are patient, you should still be able to catch a some of the brighter ones. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Aquarius, but can appear anywhere in the sky.</p>
May 12	<p>Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 16:57 UTC. This full moon was known by early Native American tribes as the Flower Moon because this was the time of year when spring flowers appeared in abundance. This moon has also been known as the Corn Planting Moon and the Milk Moon.</p>

Classroom Policies*

*Subject to change as the need arises.

IA Wireless Device Policy:

Pursuant to Indiana Code 20-26-5-40.7, The Indiana Academy for Science, Mathematics and Humanities prohibits student use of wireless communication devices for non-instructional purposes in the classroom. As such, any and all portable wireless devices, that have the capability to provide voice, messaging, or other data communication between two or more parties, must only be used for academic purposes directly tied to the classroom activity or related educational task. Exceptions to this wireless device policy are eligible through academic accommodations, individualized education programs, or with instructor approval permitting the use of a wireless device for justification related to health, safety, and/or well-being. The improper use of a wireless device in an active classroom setting is subject to disciplinary action including but not limited to; a verbal warning, temporary seizure of said device by a school official, an unexcused absence for the class in question, written communication to parent/guardian, among other elevated consequences for repeated improper use.

Laptops or tablets are required for lab sessions.

Laptops or tablets are also required for some homework, quizzes, and other activities, including during class for note-taking or other class-related needs.

No game-playing, movie-watching, e-mail, or IM'ing allowed in class -- doing so will result in a recorded absence for that day. Laptops/iPads, if available, should be brought to class during laboratory sessions. This is so you can record, graph, and analyze your data in real-time, both to save you time AND to catch errors as they happen! Use of electronic devices for any other use during lecture is forbidden without prior agreement with the instructor. (And I will give permission if the use is "reasonable"!)

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

Assignments must be submitted digitally on Canvas as a PDF or .DOCX file and data as .JPEG, .PNG, or .XLSX. Data analysis must be submitted as a .XLSX (other formats do not open in Canvas). Google sheets or other links to external sources of your submissions will not be accepted.

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

Inclusive Excellence Statement:

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. As a reflection of Ball State's commitment to respect, civil discourse, and the Beneficence Pledge, Inclusive Excellence at the Indiana Academy emerges as one of the priorities of our living and learning community. We strive to exist together respectfully and compassionately, creating an environment where every member can thrive. Unfortunately, there might be occasions when something occurs that disrupts our progress toward meeting these objectives. In this case, we encourage any member of the Academy community to file a Campus Climate Report (CCR) https://bsu.qualtrics.com/jfe/form/SV_6mbRbL5acAntUTI. All reports will be taken seriously, and appropriate responses will be carried out by Academy administration.

I truly believe in this policy, and endeavor to go above and beyond in our classroom setting. If you see any behavior that goes against the above policy (even if it's mine!), please bring it to my attention (or have someone you trust do so if you are hesitant). Alternatively, you can find the appropriate form at academy.bsu.edu/forms to report the incident directly to your DEI Coordinator.

Withdrawal Deadlines

If you wish to drop your class(es), you must do so by the deadline.

The withdrawal deadline 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

You have made a commitment toward academic achievement by attending the Academy – both attendance and integrity are essential components to that success. Class and lab attendance is **mandatory**.

It is the policy of the Indiana Academy that any absence from class is unexcused, except for illness, death in the family, college or school-related activities, and extenuating circumstances. When a student is absent from a class, the instructor reports the student absence to the Faculty Attendance Coordinator in the Office of Academic Affairs. Unless the absence is excused by a school official, it is considered unexcused. The decision as to whether an absence is excused is not determined by the instructor. Four or more unexcused absences in any particular class a student takes will lead to academic and residential consequences to be determined by the Office of Academic Affairs and the Office of Residential Life that may include detention, residential groundings, parent/principal conference, among others.

Students who are absent unexcused from class (two or more each semester) are subject to detention during non-class hours, restrictions, suspension, removal from class, or other consequences deemed appropriate by the Director of Academic Affairs or designee. Classes that meet for consecutive periods of more than 50 minutes at a time will be subject to greater penalties. Parents/guardians are notified of all unexcused absences.

Due to the intense, rigorous nature of Indiana Academy classes it is important that students be present during all class meetings. If a student's total number of absences (both excused and unexcused) reaches at least 20 percent of the number of scheduled class meetings during a semester, the student's case may be reviewed for possible submission to the Intervention and Retention Committee. The Intervention and Retention Committee may recommend removing the student from the class, dismissal from the Academy, probationary conditions, or other actions most appropriate to the particular case.

Being present, providing effort, and offering kindness in pursuit of academic excellence are foundational expectations of each and every student at the Indiana Academy.

Attendance is mandatory. Students may receive excused absences at the professional discretion of the school nurse, the associate director of mental health services, the associate director of college counseling and student engagement, the director of academic affairs, and the executive director of the Indiana Academy. Unexcused absences occur when students miss class without prior approval from the aforementioned designated school officials. Continued absences (both excused and unexcused) from Academy classes increase the likelihood of unsuccessful completion.

Class attendance is mandatory. An unexcused absence on the day of a lab or test will result in an automatic zero for that lab or test. Missing homework, quizzes and/or tests during an excused absence must be made up as soon as possible. It is the student's responsibility to make arrangements with the teacher.

- Homework: Homework is graded by completion (attempting all of them and failing is far more important than only trying half of them and succeeding). Homework assignments turned in on time will automatically be counted as an A (100%) in the course. Late work will be accepted at any time, but will be counted as a D* (40%) in the course.

- Labs & Projects: *Most* labs and projects are also graded on completion (in part or in whole). Most will be graded on accuracy on a case-by-base basis. If you miss a lab due to an excused absence, we will make up the lab at a later date. Contact me ASAP to schedule this.

· **Quizzes:** As mentioned elsewhere in this document, quizzes are intended as a secondary check of conceptual comprehension. Some of it will be practical, others more conceptual. Take these seriously as they are also part of your total grade.

It is also important that your brain be here as well as your body. Students who fall asleep in class (I'm not *that* boring!) will receive either a 'tardy' or an 'absent' mark from the instructor, depending on circumstances. Make sure you avoid this by getting enough sleep the night before!

Late arrivals after 15 minutes into class-time will result in an absence for that day. No exceptions. Excused absences must be arranged before class starts, the paperwork must be filed with Ms. Drumm, Attendance Coordinator.

Students arriving after the start of class may receive a Tardy.

Student is responsible for all information missed due to not being present.

Behavioral Norms

Alongside steady attendance, students are expected to maintain consistent healthy habits of decorum, respect, and kindness towards their classmates, instructors, and teaching assistants. When students fail to meet these classroom behavioral standards and academic habits, it is the expectation faculty engage appropriately to bring quick and immediate resolution. When students consistently fail to meet these behavioral standards and academic habits in the classroom, an administrative consequence ladder will be adopted, and recorded, in attempt to administratively address, engage, and rectify ongoing challenges.

To encourage continued attendance, discourage chronic absenteeism, and to increase the likelihood of successful course completion, students who are absent...

1. Unexcused from three or more class periods for courses that meet three times a week;
2. Unexcused from two or more class periods for courses that meet twice per week;
3. Unexcused from one or more class periods for courses that meet once per week;
4. From courses where the total of excused and unexcused absences reaches at least 20% of the number of scheduled class meetings during a semester;
5. By consistently leaving class early or coming in late without adequate justification or academic affairs pre-approval;

...are subject to penalties along the consequence ladder including but not limited to, residential groundings, non-residential lounge restrictions, structured supervision during non-class hours, extracurricular and athletic restrictions, suspension, administrative grade reductions, removal from class, among other appropriate actions recommended by the Director of Academic Affairs or designee. Parents/guardians are notified of all unexcused absences.

Similarly, to encourage healthy habits, vibrant classrooms, and respectful interactions among members of our community, students found to be in violation of our behavioral norms and classroom standards are subject to penalties along the consequence ladder including but not limited to, residential groundings, non-residential lounge restrictions, structured supervision during non-class hours, extracurricular and athletic restrictions, suspension, administrative grade reductions, removal from class, among other appropriate actions recommended by the Director of Academic Affairs or designee. The consequence ladder below represents the stair stepped approach administrators within academic affairs use to address and engage students that find themselves in violation of our academic, community, and norm standards. On occasion, penalties and consequences for violating academic excellence standards will reflect the specifics of a particular situation and thus be handled on a case by case basis.

TIER 1: WARNING

- For students referred to academic affairs administration in violation of our community and academic behavioral standards.

- For students with 6 or more total unexcused absences

Grounding to building, 3 nights (not weekend). NECP: Letter sent to family.

TIER 2: ENGAGEMENT

- For students referred to academic affairs administration in multiple violations of our community and academic behavioral standards.

- For students with 12 or more total unexcused absences
 - For students found to be in violation of Academy academic integrity policies
- Grounding to floor, 3 nights (not weekend). Meeting with family and Associate Director of College Counseling and Student Engagement. Loss of leadership role (if applicable). NECP: No lounge privileges, structured supervision if on premises after 4pm.

TIER 3: PROBATION

- For students consistently in violation of our community and academic behavioral standards.
 - For students with 18 or more total unexcused absences
 - For students with two violations of Academy academic integrity policies.
- Structured supervision for 3 school days. Meeting with family and Director of Academic Affairs. No longer eligible for athletics or school clubs. NECP: Structured supervision until pick-up by guardian.

TIER 4: VIOLATION OF PROBATION

- For students that have exhibited inability to reside within our academic community.
 - For students with 24 or more total unexcused absences
 - For students with three, or more, violations of Academy academic integrity policies.
- Recommendation for dismissal sent to executive director of Indiana Academy.

TIER 5: DISMISSAL

Student is dismissed from the Academy, effective immediately.

Late Work Policy

Late work is defined as work that is submitted more than 24 hrs past the deadline outlined by myself or on Canvas. Any work not submitted automatically is scored as a zero until submitted within 24 hours after the deadline (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.

All work not submitted will receive a zero.

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.

Student Accommodation Policy

Students possessing an educational 504 or IEP should contact the instructor as soon as possible to arrange for any accommodations that may be needed. Likewise, if you feel that you could benefit from an educational 504 or IEP, feel free to contact the instructor to this regard.

I am willing to help students succeed, so feel free to request accommodations with or without the above criteria.

Collaboration Policy

There will be moments in this course that I encourage everyone to collaborate, or work together, to achieve success. These may include grouping students during difficult assignments, labs, or a general encouragement to seek each other for assistance in my course.

Collaboration does not mean: copying or otherwise plagiarizing work from others (or A.I. generated content), dividing work amongst two or more individuals, or sending/providing completed work for others to review.

Collaboration is a form of actively helping each other in ways that allow all individuals to complete their own work but in a way that allows them to ask questions, get feedback, and improve performance.

All work submitted in my course (including work meant to be completed as a group) must be solely the work of the individual submitting it. This means you are writing your own report, for example, but you are free to discuss and compare each other's work before submission. Collaborations are consultations only.

Please refer to the handbook concerning Academic Dishonesty and the policies concerning consequences.

There are also student groups, such as the National Honor Society (NHS), and other student orientated parts of the Indiana Academy that have their own consequences concerning Academic Dishonesty. Be aware that many of these consequences begin with immediate expulsion due to infringement of Academy Dishonesty policies.

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.

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.

Inclusion Policy

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 and through university resources found at [cms.bsu.edu / campus life / multicultural center](http://cms.bsu.edu/campus-life/multicultural-center).

I truly believe in this policy, and endeavor to go above and beyond in our classroom setting. If you see any behavior that goes against the above policy (even if it's mine!), please bring it to my attention (or have someone you trust do so if you are hesitant). Alternatively, you can find the Bias-Incident form at academy.bsu.edu/forms to report the incident directly to your DEI Coordinator.

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.

Academic Dishonesty Policy

It is imperative to your continued success that you exhibit academic integrity at all times. This entails:

- never submitting another person's work as your own; this includes LLM and other AI generated information (see: LLM and other AI Fair-Use Policy, below)
- never engage in "drylabing." (artificially manufacturing lab data and submitting it as part of a lab report)
- never cheating on quizzes and/or tests.
- following all ethical standards as described in your student handbook (see "Academic Dishonesty")

IMPORTANT: If you feel you have been unfairly accused of failing an academic integrity standard, you have the option and right to appeal to the Indiana Academy Academic Integrity board.

Please refer to the "Academic Dishonesty" portion of your student handbook. In particular, please read the "Academic Integrity Board". Remember that you always have the right to refute any accusation (or ramification dictated by your instructor) of academic dishonesty by having your case brought before the AIB. Note that if the AIB is used, its decisions are final.

For my class specifically, academic dishonesty is defined as the following:

- never submitting another person's work as your own; this includes LLM and other AI generated information (see: LLM and other AI Fair-Use Policy, below)
- never engage in "drylabing." (artificially manufacturing lab data and submitting it as part of a lab report)
- never cheating on quizzes and/or tests.
- following all ethical standards as described in your student handbook (see "Academic Dishonesty")

LLM and other AI Fair-Use Policy

Basic AI tools (spell-check, word-count, grammar, etc.) that assist with correcting errors and gathering information about your own work is not only accepted, but also encouraged!

More advanced AI tools such as LLMs (ChatGPT, LLaMa, Phi-1, etc.) that generate information or code may be used as a starting point for research or creative projects, but generated material should not (for several reasons!) be turned in as your own work. Using these LLMs can be very useful in helping you create a project and/or learn complex topics, but diligence is required to:

- ***Completely*** verify that all information provided by the LLM is accurate (this is a major problem, especially in the sciences!). Remember that these models pull non-vetted information from the internet, which will include non-expert, and sometimes malicious, sources.
 - You (and your grades) are responsible for any and all errors gathered in this manner.
- resist turning in LLM produced material as your own work. The point of being at the Academy is to use provided information as a Fall-board for your own intellect and creativity. Using these tools to help you gather ideas, or to find alternate ways to express your ideas, is both welcomed and encouraged. But make sure that you are not falling for temptation to use likely-erroneous data or logic that LLMs often provide. In other words, treat LLM generated material as you would other non-expert sources of material.
 - Presenting AI-generated material as your own will count as plagiarism, and will be dealt with accordingly (see Academic Dishonesty Policy, above)

Mask Policy

There is currently no campus wide mask-mandate, but if the CDC declares another health-emergency, and BSU puts a mask-mandate in place, this policy may change. If and when masks are required by BSU campus, the Indiana Academy will then follow the same procedure.

In case of extreme COVID-19, break glass for online policy

As it is possible that we may have to re-face pandemic conditions this year, there may be periods when some (or all) of us return to masks and/or are moved to online learning due to necessity or mandate. All of the below rules apply during e-learning, but some information may be useful:

Zoom Link: <https://bsu.zoom.us/j/7784148468>, if a password is required, please use “CptHook1”.

Lectures: Classes will be provided on Canvas with the same frequency and schedule of the normal school year. It is your responsibility to view these videos w/o 24hours of their posting. It is vitally important to watch them *in order*.

Homework: Homework can easily be scanned or photographed and submitted on Canvas by the due-date required.

Laboratory: Labs will be designed to be done either in a discussion format on Zoom or using simulators (PocketLabs). Any documentation (journals, reports, etc) expected can be returned to me using the same procedure as HW.

Testing: Tests will be “given” and “collected” at very specific times (TBA). Future circumstances may require different methods, but currently the procedure is as follows:

- The test will be released on Canvas at a very specific day/time that will be announced several days in advance.
- You will have a set amount of time to complete your exam (will be announced on test day, and is tied to the length of that particular test).
- Returning your test to me will be as simple as scanning or photographing your exam and emailing it back to me before the given time has expired. 504/IEP accommodations (see below) will be honored.

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.