

4-3-2018

## AST 215: Exploring the Solar System w/Laboratory (for "L" designation)

The College at Brockport, College Senate

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The College at  
**BROCKPORT**  
STATE UNIVERSITY OF NEW YORK

**Office of the Chief Diversity Officer**

TO: Dr. Stanley Radford  
Physics

FROM: Kandie Gay  
Office of the Vice Provost - Academic Affairs

Date: August 7, 2018

RE: General Education Codes

The courses your department submitted to the General Education Committee have been reviewed and the Committee's action follows:

<b>COURSES</b>	<b>CODES APPROVED</b>	<b>CODES NOT APPROVED</b>
AST 215: Exploring the Solar System w/Lab AST 220: Stars, Galaxies and the Universe w/Lab	Add: Natural Science w/Lab (L)	

If you wish further clarification of the Committee's decisions, you may contact

**James Zollweg, Chair of the General Education Committee**  
**Department of Earth Science**  
**Email: [jzollweg@brockport.edu](mailto:jzollweg@brockport.edu)**

Copy: Jose Maliekal, Dean  
Arts & Sciences

Monica Brasted, Associate Dean  
Arts and Sciences

James Zollweg, Chair  
General Education Committee

Tameciah Browne  
College Senate

Peter Dowe  
Registration and Records

Janice Stewart  
Registration and Records





350 New Campus Drive  
Brockport, New York 14420  
585-395-2586 \* 585-395-2006 (fax)  
senate@brockport.edu  
brockport.edu/collegesenate

# Resolution 2017-18 #35 College Senate

Supersedes Res #: \_\_\_\_\_

TO: Dr. Heidi Macpherson, College President

FROM: The College Senate:

- RE: → I. Formal Resolution (*Act of Determination*)  
 II. Recommendation (*Urging the Fitness of*)  
 III. Other, For Your Information (*Notice, Request, Report, etc.*)



SUBJ: *AST215 Exploring the Solar System with Laboratory (for L designation) (#50\_17-18GE)*

Implementation Effective Date\*\*: 8/20/18

Signed:  Date: 4/3/18  
(Sandeep Singh, 2017-18 College Senate President)

Signed:  Date: 4/3/18  
(Dr. Eileen Daniel, Vice Provost, The College at Brockport)

**\*\*Implementation of resolution requires final approval from SUNY- State Education Department.**  
 YES  NO

Please fill out the bottom portion and follow the distribution instructions at the end of this page.

TO: Dr. Sandeep Singh, College Senate President

FROM: Dr. Heidi Macpherson, College President

RE: → I. Decision and Action Taken on Formal Resolution (circle choice)

- a. Accepted
- b. Deferred for discussion with the Faculty Senate on \_\_\_/\_\_\_/\_\_\_
- c. Unacceptable for the reasons contained in the attached explanation.
- d. Comments:

Signed:  Date: 6/15/2018  
(Dr. Heidi Macpherson, President, The College at Brockport)

**DISTRIBUTION:**  
The College Senate will forward the resolution signed by the College Senate President to the Vice Provost for determination as to whether the implementation of the resolution requires final approval from SUNY-State Education Dept. The Vice Provost will then forward the resolution with that designation to the College President. Upon approval, the College President will forward copies of resolutions to his/her staff who will, in turn, forward copies to their staff and to the College Senate. The College Senate Office will post resolutions to the College Senate Web at <http://www.brockport.edu/collegesenate/resolutions>.

*Need to go to SUNY*

**COLLEGE SENATE OFFICE  
RESOLUTION PROPOSAL COVER PAGE  
DEADLINE FOR SUBMISSIONS:  
JANUARY 31**

Incomplete proposals will be returned and proposals received after the deadline may not be reviewed until next semester.

<b>Routing Number</b> <i>Routing # assigned by Senate Office</i> 2017-2018	50_17-18UCGE <i>Use routing number and title in all reference to this proposal.</i>
<b>This Proposal Replaces Resolution</b>	

**INSTRUCTIONS**

- Use committee guidelines available at [brockport.edu/collegesenate/proposal.html](http://brockport.edu/collegesenate/proposal.html).
- Prepare ONE complete document in **Word format or PDF**: include this proposal cover page, the detailed proposal, and any relevant supporting data or documentation, including letters of support from your department chair and dean, if applicable, as well as letters of support or dissent (or evidence that such letters were sought) from all affected programs, departments, or units at the College.
- **Locate the Resolution # and date this proposal will replace at our "Approved Resolutions" page on our Web site.**
- Email completed proposal to [senate@brockport.edu](mailto:senate@brockport.edu). (General Education Proposals and questions go to [kgay@brockport.edu](mailto:kgay@brockport.edu) in the Vice Provost's Office first.)
- Make revisions on the paperwork emailed to you from the Senate office that shows the assigned routing number on top. Submit updated document to [senate@brockport.edu](mailto:senate@brockport.edu).
- Questions? Call the Senate office at 395-2586 or the appropriate committee chairperson.

1. **PROPOSAL TITLE:** Please be somewhat descriptive, i.e. *Use a course number and/or title, indicate if for GED code, etc.*

AST 215: Exploring the Solar System w/Laboratory (for "L" designation)

2. **BRIEF DESCRIPTION OF PROPOSAL:**

Create a new Astronomy course with GenEd Natural Science code "L"

3. **WILL ADDITIONAL RESOURCES AFFECTING BUDGET BE NEEDED?**  NO  YES EXPLAIN YES

4. **DESCRIBE ANY DATA RELATED TO STUDENT LEARNING OUTCOMES ASSESSMENT USED AS PART OF THE RATIONALE FOR THE REQUESTED SENATE ACTION.**

5. **DESCRIBE THE IMPACT, IF ANY, THAT THESE CHANGES WILL HAVE ON STUDENT ELIGIBILITY FOR THE EXCELSIOR SCHOLARSHIP.**

6. **DESCRIBE THE IMPACT, IF ANY, THAT THESE CHANGES WILL HAVE ON TRANSFER STUDENTS AND THEIR ABILITY TO TRANSFER SEAMLESSLY AS MANDATED BY SUNY POLICY.**

No effect

7. **ANTICIPATED EFFECTIVE DATE:**

Fall 2018

8. **SUBMISSION & REVISION DATES:** PLEASE DATE ALL REVISED DOCUMENTS TO AVOID CONFUSION.

First Submission	Updated on	Updated on	Updated on
2/27/2018			

9. **SUBMITTED BY:** (contact person)

Name	Department	Phone	Email
Eric Monier	Physics	5589	emonier@brockport.edu

10. **COMMITTEES:** (Senate office use only)

Standing Committee	Forwarded To	Dates Forwarded
<input type="checkbox"/> Executive Committee	Standing Committee	2/27/2018
<input type="checkbox"/> Enrollment Planning & Policies	Executive Committee	
<input type="checkbox"/> Faculty & Professional Staff Policies	Senate	
<input checked="" type="checkbox"/> General Education & Curriculum Policies	Passed GED's go to Vice Provost	
<input type="checkbox"/> Graduate Curriculum & Policies	College President	
<input type="checkbox"/> Student Policies	OTHER	
<input checked="" type="checkbox"/> Undergraduate Curriculum & Policies	REJECTED -WITHDRAWN	

NOTES:

**The College at Brockport  
Course Registration Form**

1. Discipline  Course No.  (To be assigned by Registrar for new courses)

Official Title

Abbreviated course title (limit to 18 Characters)

New Course

Current Content Revised

Title Change (Previous Title)

Number Change (Previous Number)

Inactivation of course (course will not be offered in the near future) Effective Term

Topics Course (If checked, complete item 2)

Other (describe)

2. Topics Course Only

a. Generic Course Number: Discipline  Course No.

b. Generic Course Title:

c. Topics course Title

d. Topics course offered: Semester  Year

3. Semester Hours of credit assigned to course (Invariable):

Variable Credit Range  to  credit hours

Is this course repeatable for credit?

4. Grading (Check any that apply)

a. Letter Grade  Pass/Fail (S/U Only)  Approved for a PR (In-Progress) grade

b. Course requires a minimum grade of  for General Education/major/minor/certification.

5. Is this a Liberal Arts Course?

6. General Education Information: (Complete only for General Education courses) \*See last item.

a. General Education Knowledge Area (choose one if applicable):

b. Additional student learning outcomes: (check all that are currently approved)

Contemporary Issues (I)  Scholarship on Women (W)

Diversity (D)  Other World Civilization (Non-Western) (O)

7. Cross listed Course: Discipline  Course No.

8. Prerequisites: Discipline  Course No.

9. Corequisites: Discipline  Course No.

Submitted by: *Eric M. Munn* Date: 2/23/2018

Chairperson's Approval: *Shirley P. Radford* Date: Feb 29 2018

Dean's Approval: *W. Buxton* Date: 2-27-18

Vice Provost's Approval: \_\_\_\_\_ Date: \_\_\_\_\_

(Only required for General Education Courses)

10. Swing Course Number:  Only for courses offered in the same discipline at both the undergraduate and graduate levels, please give number (i.e. 428/528)

Note: If this is a Swing course, list additional requirements required for the graduate level.

11. Frequency (Check only one)

- Every Semester
- Every Fall
- Every Spring
- Every Summer
- Every Other Year
- Irregularly
- By Special Arrangement

12. Relationship to Degrees/Programs: Required  Elective

13. For all courses please attach the following

- a. Objectives
- b. Outline of course
- c. Methods of Assessing Student Performance
- d. Material Required (Films, Readings, etc...)
- e. Additional work required of graduate level students if course is a "swing course"

14. If this course requires any additional scheduling arrangements with regard to time or room/space, please explain below.

Lecture 5:00-6:15 pm Tues/Thurs in Lennon 140  
Lab will use the College planetarium (Lennon 134) and Smith 104

15. Write a brief course description for the College Catalog. Reflect content as accurately as possible using 65 words or less (about 500 characters). Use Action verbs and omit "This course covers..." or similar phrases.

Traces our understanding of the Sun and its family of planets from ancient times to the present day, starting with early interpretations of celestial motions to modern discoveries made with robotic probes. Topics include the sky as seen from Earth; the Copernican revolution; light and telescopes; properties of terrestrial and jovian planets; history of the solar system; exoplanets; and the possibilities for life beyond Earth. Lab section will use the College planetarium to illustrate some concepts, and provides for observation with telescopes. Not open to students with credit for AST 203 or 205.

\*For General Education courses only, attach:

Supplemental General Education Course Registration Form/Student Learning Outcomes Checklist (for specific codes requested).

# GENERAL EDUCATION PROGRAM SUPPLEMENTAL COURSE REGISTRATION FORM

REVISED EFFECTIVE FALL 2016

COURSE NUMBER: AST 215 COURSE TITLE: Exploring the Solar System w/Laboratory

COURSE NUMBERS FOR ANY CROSSLISTINGS: \_\_\_\_\_

SUBMITTED BY: Eric Monier DEPARTMENT/PROGRAM: Physics

DATE: 2/23/2018 ESTIMATED SEATS/SEMESTER? 18

NEW COURSE?  YES  NO HYBRID OR ONLINE?  YES  NO

RE-REGISTRATION OF EXISTING COURSE?  YES  NO

UPPER-DIVISION KNOWLEDGE AREA EXCEPTION FOR TRANSFERS  YES  NO

DEPARTMENT CHAIR'S APPROVAL \_\_\_\_\_

Required before General Education Committee Action

SCHOOL DEAN'S ACKNOWLEDGEMENT \_\_\_\_\_

Required before General Education Committee Action. Signature from this office indicates that the proposal is complete and ready to be reviewed by the College Senate General Education Committee.

DATE: 2/27/2018

DATE: 2/27/18

GENERAL EDUCATION COMMITTEE APPROVAL \_\_\_\_\_

Required after General Education Committee Approval

ACADEMIC AFFAIRS ACKNOWLEDGEMENT \_\_\_\_\_

Required after General Education Committee Approval

DATE: / /

DATE: / /

- All items listed below must be received in order for the committee to act on the proposed course. All materials submitted must be typed or printed. Submissions that are incomplete or incorrect will be returned without being evaluated by the committee.

A copy of the standard College *Course Registration Form* signed by the chair and dean.

The Student Learning Outcomes Checklist(s) as appropriate for requested code(s).

A course syllabus that includes a list of the student learning outcomes for the course and provides a topical outline. [This is required by SUNY General Education.]

A list of textbooks to be used and a current course bibliography, all with full bibliographic citations.

- Check below the General Education code(s) being requested and attach a completed Student Learning Outcomes Checklist(s) for each:

\_\_\_\_\_ Fine Arts ("F")

\_\_\_\_\_ Fine Arts Performance ("P")

\_\_\_\_\_ Humanities ("H")

\_\_\_\_\_ Natural Sciences ("N")

Natural Sciences Laboratory ("L")

\_\_\_\_\_ Social Sciences ("S")

\_\_\_\_\_ Contemporary Issues ("I")

\_\_\_\_\_ Perspectives on Gender ("W")

\_\_\_\_\_ World Civilization (Non-Western) ("O")

\_\_\_\_\_ Diversity ("D")

\_\_\_\_\_ Oral Communication ("Y")

## Committee Action:

Approved as requested. Course will be filed with Registrar's Office.

Not approved. If not approved for inclusion in General Education Program at this time, please see comments below:



## NATURAL SCIENCES AND NATURAL SCIENCES WITH LABORATORY – CODED “N” OR “L” KNOWLEDGE AREA STUDENT LEARNING OUTCOMES CHECKLIST, MARCH 2012 VERSION

Please check all student learning outcomes that apply to this course. In the space provided below that/those checked outcome(s), describe how course instruction will be designed to achieve these outcomes. Also, state briefly how you will assess that particular student learning outcome in your course. Natural Sciences courses may carry the “W,” “WY,” “O” and/or “D” codes (Complete checklist for these codes and attach.)

### The following are general requirements for all Knowledge Area courses—

- Knowledge Area courses for native Brockport students are lower division courses.
- Knowledge Area courses may not require prerequisites.
- Knowledge Area courses that transfer students may use to complete the SUNY General Education requirements may receive exception as an upper-division course.

### All Knowledge Area courses must satisfy the following student learning outcomes:

- Students will write a short paper or report reflecting the writing conventions of the disciplinary area, with at least one opportunity for feedback and revision or multiple opportunities for feedback. *Note: A short paper is defined as 2000 words or an equivalent amount in several shorter assignments (FS Res. n their own and others' work.*

One paper with revision will be assigned. Please see the course syllabus for a more detailed description.

### Natural Sciences Non-lab and Laboratory Courses must satisfy all of the following student learning outcomes:

- Students will demonstrate understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.

This is an astronomy course focusing on the solar system. It will cover the origins of science, the development of models describing the motions of the Sun and planets, the evidence that the Earth itself is moving, and Newton's synthesis culminating in the quantitative and universal laws of motion and gravity. Modern data collection, experiment, and analysis will be presented as we describe what is known about the content of our (and other) solar system(s), and the observations leading to those conclusions.

Assessment will be achieved through evaluation of performance on in-class activities (ranking tasks, predicting the outcome of an experiment, etc.) and exam questions

- Students will explore nature and natural phenomena in the context of a science discipline dealing with at least one of the following; matter, motion, and energy; the behavior of materials and interaction between substances; the formulation, evolution, and behavior of celestial objects; the formation and evolution of Earth's environment; biophysical and biochemical principles of life; the relationship of living things to each other and their environment.

The course will cover this outcome in many ways, including but not limited to: Newton's laws of motion and gravity; the interaction of light and matter; the formation of the solar system from a cold cloud of gas; the motions of the planets; a comparison of the atmospheres and geology of the terrestrial planets, and how the jovian planets are fundamentally different, and how thousands of newly discovered planets orbiting other stars are changing our perspective of our own solar system.

- Students will show competence in at least two of the mathematical skills identified in MTH 112.

Students will use a variety of algebraic, statistical, and graphing skills to gain an understanding of the mathematical basis of astronomy. Of particular importance will be topics including the strength of gravity as a function of distance, the 'half-life' of radioactive nuclides used to establish the ages of meteorites, graphs of energy emitted as a function of wavelength by a blackbody, and the measurement of radial velocities through an analysis of Doppler shifts.

Assessment will be achieved through evaluation of performance on exam questions requiring calculations, familiarity with graphs, and the ability to draw conclusions based on data.

- Students will demonstrate application of scientific data, concepts, and models in one of the natural sciences.

The course will span the history of our understanding of the solar system and the objects in it. Students will be presented with observations (data), models that were developed to explain those observations, and the experiments performed to test predictions made by those models. They will step through the scientific process followed by early astronomers, and they will be challenged to interpret observations acquired by modern telescopes and spacecraft.

Assessment will be achieved through evaluation of performance on in-class activities (ranking tasks, assessing the implications of a data set, etc.) and quantitative and conceptual exam questions

### **Natural Sciences Laboratory Courses (L) must also include the following student learning outcome**

- Students will acquire and analyze scientific data through laboratory experiences in one of the natural sciences.

The laboratory component of the course will use a variety of hands-on experiments and computer-based activities. Students will gather their own data, or download publicly available astronomical data, to analyze in order to develop these skills.

Assessment will be achieved through evaluation of performance on sub-sections of several labs.

# AST 213/215 – Exploring the Solar System

## Lecture, Fall 20xx

Tuesday & Thursday 5:00 - 6:15 pm Lennon 140

**Instructor:** Prof. Eric Monier

**Office:** 118 Smith Hall

**Office Hours:** Wednesday 2:30 – 3:20pm; Tuesday Thursday 3:00 – 4:00pm; or by appointment

**Phone:** 395-5589

**email:** [emonier@brockport.edu](mailto:emonier@brockport.edu)

**Description:** From the earliest times, the night sky has inspired people to ask questions about the Universe and their place in it. This course will focus on our small corner of it, the solar system, as we trace the development of the scientific method and see how it has led to the modern understanding of the Sun and its family of planets. In particular, we will cover

- I. Practical Astronomy: How the Earth, Sun, Moon, stars, and planets appear to move, and the geocentric model ancient people adopted to explain these motions
- II. The Copernican Revolution: The heliocentric model of Copernicus and the achievements of Brahe, Kepler, Galileo, and Newton are our introduction to the basic physics of astronomy: motion, gravity, and light
- III. The Solar System: The origin, evolution, and properties of the solar system, with an emphasis on recent discoveries by modern space probes
- IV. Exoplanets: Thousands of planets have now been discovered orbiting other stars. How have they changed our understanding of our own solar system?

Throughout the course we will see how ideas have arisen and how they've been tested by observations. We'll examine not just what we know but also *how* we know it.

**Purpose:** As a General Education course satisfying the Natural Science (or Natural Science w/Lab) requirement, the goals of the course are for students to understand the principles, theories, and methods of modern science; the process and implications of scientific discoveries; and the potential of science and technology to address problems of the contemporary world.

**Student Learning Outcomes:** Students completing this course should successfully be able to:

- Demonstrate understanding of the methods astronomers use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.
- Explore nature and natural phenomena through the study of matter, motion, and energy; and the formation, evolution, and behavior of celestial objects.
- Demonstrate application of scientific data, concepts, and models in astronomy.
- Show competence in at least two of the mathematical skills identified in MTH 112.

### Required Materials:

1. Textbook: This course will use the free *OpenStax Astronomy* textbook by the primary authors A. Fraknoi, D. Morrison, and S. Wolff (<https://openstax.org/details/books/astronomy>)
2. *iClicker*

**Lectures:** In the lectures I will use notes, demonstrations, animations, and the in-class activities to explain and discuss the material assigned in the readings. This is an excellent time to ask questions;

your participation will make the lectures more effective for everyone. Be sure to complete the assigned readings and come to lecture prepared to discuss them.

**Blackboard:** Course information and resources will be posted on Blackboard, including this syllabus, worksheets, reading schedule, reading quizzes, study guides, practice exams, animations, etc. I will also post PowerPoint slides after lecture. Use these to review your understanding and to fill in any gaps.

**Attendance/Participation:** We will be using the iClicker system to keep the lectures interactive. You will bring your clicker to each class and respond to questions during the lecture. A correct response will be worth 10 points, an incorrect response will be worth 5 points and a non-response will receive no credit. If you are present but have forgotten your clicker I'll assign you 50% of the possible points. Your participation grade will be largely based on your total points at the end of the semester.

Your attendance is required at all lectures. You should notify me of any excused absences before lecture if possible, or immediately afterward in the event of an emergency. If you are not feeling well, please be considerate of your fellow students and stay home. For all absences, students are responsible for the announcements and material presented in the lectures or on Blackboard. This course covers a lot of ground, so don't fall behind!

**Electronics Policy:** Studies show that laptops are a distraction to other students. Therefore, laptops will only be permitted in the back two rows of the lecture hall, and only one window on the laptop may be open. Students violating this policy will receive no participation credit for that day. Similarly, studies show that students who use their cell phones in class will receive lower overall grades. Please leave your phone in your bag and focus on the task at hand.

**Homework:** There will be several assignments (e.g. completing a survey, writing 1-2 page paper) that will count toward the participation portion of your grade. I will also post worksheets that you can complete to get some practice with the concepts covered in lecture. The worksheets will primarily be in the form of ranking tasks, and I will post solutions so that you can evaluate your understanding.

**Exams:** Three exams will take place in class on **September 21, October 26, and November 28**. The exams will consist of multiple choice, true-false, and possibly some short answer questions. Make-up exams will only be given in the event of excused absences. You must call or email me by **10 am** the morning after an exam to explain your absence and schedule a make-up exam. Note that make-up exams, depending on when they are taken, may consist entirely of essay questions.

I will drop the lowest of your three regular exam grades. If you know in advance that you are going to miss an exam, please contact me at least one week before the scheduled exam date and you may be able to take it early.

**Term Paper:** General Education courses at Brockport require a writing component. You will write a 'short paper' (2000 words, or about 7-8 double-spaced pages) on some topic in astronomy. This assignment is an opportunity for you to learn about something related to astronomy in depth. You may write about anything that interests you, though you may find more sources are available on current issues in astronomy (within the last 3-5 years). In choosing a topic and writing your paper, keep in mind that your emphasis should be on the scientific process and the science involved. Your paper must include at least **three** sources from books or periodicals (print or online) such as *Scientific American*, *Astronomy*, *Sky and Telescope*, *Science*, *New Scientist*, *Mercury*, *Nature*, etc. The Drake Library gives you access to all of these through Academic Search Complete; the library itself has an extensive collection

of astronomy books. Please note that non-periodical internet sources may not be used as primary sources, though you can use the internet to choose a topic and find suitable sources.

Choose a topic specific enough that you can learn something about it in a few weeks. Your textbook and *teachastronomy.com* are good starting places for ideas. **I will post possible topics and additional paper details on Blackboard.**

The paper should be six to eight (numbered) double-spaced pages of text (2000 words), plus an abstract and bibliography (which do not count toward your word total). The important dates are

- September 27:** Select a topic and hand in an outline of your term paper.
- October 25:** Hand in your term paper.
- November 15:** Get back your submission with comments for revision.
- December 1:** Hand in revised version.

You will submit the outline as a hard copy in class. You will submit the initial and revised papers to a drop box on Blackboard. Late submissions will be penalized, and very late submissions may not be accepted.

**Final Exam:** The final exam will be comprehensive. **The final is scheduled for 5:20 – 7:20 pm on Thursday, December 14<sup>th</sup> in Lennon 140** (the usual lecture room).

**Reading Quizzes:** To encourage you to do the readings before lectures, you can receive bonus points by completing the 'Reading Quiz' for that day on Angel. Quizzes will typically be posted over the weekend for material to be covered the following week. These quizzes are **optional** but can net you Bonus Points.

**Bonus Points:** As mentioned above, opportunities will arise throughout the semester to supplement your grade with bonus points obtained through the optional Reading Quizzes. Bonus points can provide a modest boost to your grade (B- to a B, for example). They will not turn a C into an A.

**About math:** Galileo's observation that "math is the language of science" is as true today as it was in the 17<sup>th</sup> century. We use math to state precisely the "laws" of nature. Specific math skills used in this course are:

- arithmetic skills, including scientific notation and an understanding of fractions and decimals;
- graph skills including interpreting linear graphs; and
- algebra skills, including understanding proportions and simple manipulation of equations.

These skills are essential for successful completion of the course. The exams will not require calculators, but may include questions related to the interpretation of graphs, as well as the use of proportions and simple calculations involving powers and roots.

**Grading policy:** Your grade in this class will be based on your performance in the following areas:

	AST 213	AST 215
Participation	10%	7.5%
Exam	20%	15%
Exam	20%	15%
Term Paper	20%	15%
Comprehensive Final Exam	30%	22.5%
Laboratory	N/A	25%

**Grading Scale:** Your final grade in the lecture will be based on your average as calculated from the factors above. The minimum average required for a given letter grade will be as follows:

Average	92	87.5	82	77.5	73	68.5	64	59.5	55	50.5	45
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-

**Academic Integrity:**

Please be aware of *The College at Brockport Policy on Student Academic Dishonesty*:

*"Academic dishonesty, "cheating," and other forms of misrepresenting others' work as your own, such as plagiarism, are considered serious breaches of academic integrity and are major violations of the standards of ethical behavior that the College expects from all its students."*

Academic dishonesty will result in a zero for an exam, and may result in dismissal from the course.

**Disability statement:** *"Students with documented disabilities may be entitled to specific accommodations. SUNY Brockport's Office for Students with Disabilities makes this determination. Please contact the Office for Students with Disabilities at 395-5409 or [osdoffic@brockport.edu](mailto:osdoffic@brockport.edu) to inquire about obtaining an official letter to the course instructor detailing any approved accommodations. The student is responsible for providing the course instructor with an official letter. Faculty work as a team with the Office of Students with Disabilities to meet the needs of students with disabilities."*

**Title IX Compliance statement:** *"Gender discrimination and sexual harassment are prohibited in class. Title IX legislation requires the College to provide gender equity in all areas of campus life. If you or someone you know has experienced gender discrimination, sexual harassment, or sexual assault, we encourage you to seek assistance and to report the incident through resources available at [www.brockport.edu/titleix/index.html](http://www.brockport.edu/titleix/index.html). Confidential assistance is available at Hazen Center for Integrated Care. For these and other regulations governing campus life, please see all of our Student Polices at [www.brockport.edu/policies/index.php](http://www.brockport.edu/policies/index.php)."*

**Emergency Preparedness Statement:** *"In case of emergency, the Emergency Alert System at The College at Brockport will be activated. Students are encouraged to maintain updated contact information using the link on the College's Emergency Information website, <https://www.brockport.edu/support/emergency>. Included on the website is detailed information about the College's emergency operations plan, classroom emergency preparedness, evacuation procedures, emergency numbers, and safety videos. In addition, students are encouraged to familiarize themselves with the Emergency Procedures posted in classrooms, halls, and buildings and all college facilities."*

**Tentative Course Outline and Exam Schedule – AST 213/215 Fall 20xx**  
(see the online schedule for readings and any revisions)

**Unit 1: Earth & Sky**

August 29:	Introduction, Astronomical Numbers
August 31:	Celestial Sphere & Motions
September 5:	The Seasons, Time and Calendars
September 7:	Phases of the Moon, Eclipses
September 12:	Planetary Motions
September 14:	Ancient Greek Astronomy
September 19:	Rebirth of Astronomy
<b>September 21:</b>	<b>** EXAM 1 (Unit 1) **</b>

**Unit 2: Tools of Astronomy**

September 26:	Rotation and Revolution of the Earth
September 28:	Newton's Laws of Motion and Gravity
October 3:	Orbits
October 5:	The Electromagnetic Spectrum
October 10:	Atoms and Light
October 12:	Telescopes and Space Astronomy
<b>October 17:</b>	<b>NO CLASS – MID-SEMESTER BREAK</b>
October 19:	Overview and Origin of the Solar System
October 24:	Earth as a Planet: Geology & Atmosphere
<b>October 26:</b>	<b>** EXAM #2 (Unit 2)**</b>

**Unit 3: The Solar System**

October 31:	The Moon & Mercury
November 2:	Earth's Planetary Neighbors: Venus & Mars
November 7:	Giant Planets
November 9:	Rings, Moons, and Pluto
November 14:	Asteroids and Impacts
November 16:	Comets and the Outer Solar System
November 21:	Formation of the Solar System
<b>November 23:</b>	<b>NO CLASS – THANKSGIVING BREAK</b>
<b>November 28:</b>	<b>** EXAM 3 (Unit 3) **</b>

**Unit 4: Exoplanets and Life Elsewhere**

November 30:	Other Planetary Systems
December 5:	Life in the Solar System
December 7:	Interplanetary Travel
<b>December 14:</b>	<b>** FINAL EXAM (Units 1-4) 5:20-7:20pm, 140 Lennon**</b>

**AST 215 Exploring the Solar System Laboratory – Fall 20xx**  
**(Mondays 6:30 – 9:30 pm)**

**INSTRUCTOR:**

**OFFICE:**

**EMAIL:**

**PHONE:**

**OVERVIEW:** The exercises and experiments you do in this lab section will give you practice with some of the concepts we're covering in lecture. In addition, our planetarium time will give you some familiarity with the constellations of the autumn and winter skies.

**LABS:** Labs will meet in the planetarium (Lennon 134). After reviewing the constellations or concepts of the celestial sphere we'll proceed to either a tabletop lab (in Smith 104) or a computer-based lab session. If the weather cooperates, we'll travel out to the campus observatory on Redman Rd. There you will use binoculars and telescopes and practice your knowledge of the constellations. *How will you know if lab is going to be outside?* Brockport's changeable weather can make this a last minute decision, so come prepared.

**MATERIALS:** To be prepared for each lab bring

- a scientific calculator,
- either a *low power* flashlight for the planetarium (I'll supply red tape to make it suitable for dark-adapted vision), or a red light app for your phone (the NightVision Light by Vixen Co. is free and available for iPhones. Others apps are available for Android).
- a planisphere, available from the bookstore
- a pen and pencil

**GRADING:** You should be able to finish the labs in the time available; therefore, labs are generally due at the end of class. Students leaving early without a legal excuse and without turning in their lab will receive no credit for the lab. Your lab grade will be assigned based on your performance on the labs and on two planetarium quizzes, as follows:

Labs	80%
Planetarium Quiz #1	10%
Planetarium Quiz #2	10%

The planetarium quizzes will test your familiarity with the nighttime sky and concepts on the celestial sphere, based on the time we spend in the planetarium. They will take place at the beginning of class on **October 10** and **November 28**. They will have 20 fill-in-the-blank questions on the stars, constellations, and celestial sphere concepts we have covered to that point. *Note: spelling counts on these quizzes.* There is no lab final.

Lab is worth 25% of your overall Astronomy 205 grade. As per campus policy, **students must pass the lab portion in order to pass the class.** Grades for the lab portion will follow a straight percentage: **A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, E < 60%.**



**ATTENDANCE & EFFORT:** Attendance is required at all lab sessions. Exceptions will only be granted with a documented excuse per Brockport policy. Unexcused absences will result in a zero for that night. An excused absence can be made up in the last lab session (April 30).

Avoid external distractions and focus on the task at hand, particularly during the computer-based labs. Answer all questions with complete sentences. When working in pairs, work collaboratively and make a meaningful contribution.

**MATH:** You will use some algebra in the labs, but you should recognize the math you encounter (although it may be a while since you last used it). Please see me as soon as possible if you find you need help with the math.

**ACADEMIC INTEGRITY:** You will work some of these labs alone, while in others you will work with a partner. You may discuss the lab with others during an individual lab, but copying answers is obviously not permitted; individual lab write-ups must be your own work.

**LEARNING OUTCOMES:** Students completing this course should successfully be able to:

- Demonstrate understanding of the methods astronomers use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.
- Explore nature and natural phenomena through the study of matter, motion, and energy; and the formation, evolution, and behavior of celestial objects.
- Demonstrate application of scientific data, concepts, and models in astronomy.
- Show competence in at least two of the mathematical skills identified in MTH 112.
- Demonstrate the application of scientific data, concepts, and models in astronomy.
- Acquire and analyze scientific data through laboratory experiences in astronomy.

#### Tentative Lab Schedule

<b>Week 1:</b>	Math for Astronomy	<b>Week 1:</b>	The Hydrogen Atom
<b>Week 2:</b>	Celestial Sphere and Motions	<b>Week 2:</b>	Telescopes
<b>Week 3:</b>	Seasons & Path of the Sun	<b>Week 3:</b>	Mars Meteorology
<b>Week 4:</b>	Lunar Phases	<b>Week 4:</b>	Atmospheric Retention
<b>Week 5:</b>	Solar System Models	<b>Week 5:</b>	Extrasolar Planets
<b>Week 6:</b>	Kepler's Laws	<b>Week 6:</b>	Habitable Zones
<b>Week 7:</b>	Blackbody Radiation	<b>Week 7:</b>	Make-up

#### DISABILITY STATEMENT, TITLE IX COMPLIANCE STATEMENT, and EMERGENCY

**PREPAREDNESS STATEMENT:** Please refer to the main course syllabus handed out in class and posted to Blackboard.