

## Astronomy 101

---

<b>Grades:</b>	8 <sup>th</sup> – 12 <sup>th</sup>
<b>Day of Week:</b>	Thursday
<b>Time of Class:</b>	1:00 PM - 2:30 PM
<b>Length of Class:</b>	20 Weeks
<b>Semester:</b>	Fall 2023 - Winter 2024
<b>High School Credit:</b>	1.0

### Class Dates:

Week 1: September 14, 2023

Week 2: September 21, 2023

***No OTA classes from September 25 – October 6, 2023 – Jewish Holidays***

Week 3: October 12, 2023

Week 4: October 19, 2023

Week 5: October 23, 2023

Week 6: November 2, 2023

Week 7: November 9, 2023

Week 8: November 16, 2023

***No classes from November 20 – 24 – Thanksgiving Holidays***

Week 9: November 30, 2023

Week 10: December 7, 2023

*Make-Up Day (if needed): December 14, 2023*

***No classes from December 14, 2023 - January 7, 2024 - Winter Break***

Week 11: January 11, 2024

Week 12: January 18, 2024

Week 13: January 25, 2024

Week 14: February 1, 2024

Week 15: February 8, 2024

Week 16: February 15, 2024

Week 17: February 22, 2024

Week 18: February 29, 2024

Week 19: March 7, 2024

Week 20: March 14, 2024

*Make-Up Day (if needed): March 21, 2024*

<b>Instructor's Name:</b>	Jonathan Meola
<b>Instructor's Email:</b>	jonathan@opententacademy.com
<b>Instructor's Phone:</b>	703.982.0684

## Description of Class:

Learners who wish to study astronomy face challenges in a traditional classroom setting which prevent them from gaining a true appreciation of the subject. For starters, many courses lack engaging visual aids such as images, videos, or animations that can help learners to better their understanding of complex concepts. Additionally, some courses rely solely on textbooks which may not be updated frequently enough to reflect the latest scientific discoveries and research, which can make the information presented seem outdated. Furthermore, the terminology can be dense and technical, making it difficult for those learners with weaker reading skills to fully comprehend the material. This can make it harder for them to truly appreciate the subject, while engaging with the material and retaining the information presented.

Astronomy 101 is a 20-week high-school level course that provides learners with a comprehensive overview of the fundamental principles of astronomy. The course covers topics such as our solar system, stars, galaxies, the properties and behavior of light, as well as an history of astronomy and an introduction to cosmology, and how new technologies have made great strides in increasing our understanding of the universe as a whole. Furthermore, the course will introduce the learner to current topics and trends in astronomical research.

## Class Approach:

This is a wide-ranging introduction to the study of astronomy. Through a combination of lectures, discussions, and hands-on activities, learners will gain a deeper understanding of the universe and our place in it. Additionally, learners will learn about telescopes and other equipment which will assist them in making their own astronomical observations. They will be encouraged to think critically about the scientific method and the nature of scientific inquiry. Participants will also learn how to take 'mind-mapping notes' as we study in order to better develop an understanding and retention of key concepts.

## Goals:

This class seeks to foster greater familiarity with and appreciation for the efforts of those visionaries who revolutionized our understanding of not only our world and the solar system, but the universe as a whole, and how they did so while taking on immense risks and challenges, all in pursuit of never-before accomplished achievements.

## Textbook:

Astronomy 101 by Carol Collins Petersen, Adams Media (Simon & Schuster).  
ISBN-10: 1440563594

ISBN-13: 978-1440563591

Available on Amazon:

<https://www.amazon.com/Astronomy-101-Wormholes-Theories-Discoveries/dp/1440563594/>

All other materials (notes, presentations, links to video) will be supplied by the instructor as part of the course.

### Additional Supplies/Resources Needed:

- Computer
- Internet Access
  - At times, instructor will share an article or video to be viewed in preparation for class
- Sketchbook / Drawing Pad / Whiteboard
- Colored pens / markers / pencils
- Microphone (internal computer / smartphone is absolutely fine)
- Camera (smartphone camera is absolutely fine)
- (Optional) Access to either binoculars, monocular, or a telescope for nighttime observation of astronomical objects.
  - *Depending on one's location, the opportunity to view the night sky may be affected by nearby lighting from street and building lamps. Flexibility to take brief night-time "field trips" to local areas with minimal light pollution, in order to view planets, stars, and other phenomena would definitely be helpful to the learner's experience.*
  - *While many astronomical observations can be made with the human eye, there is something to be said for using either binoculars or a telescope to enhance the experience. Given the wide range of options available, it can be confusing to figure out the best choices. Space.com has some good information on which [monocular](#), [binoculars](#) or [telescope](#) may be best suited for use by children and teens.*

### Requirements:

Learners will be expected to participate and interact with the instructor and their peers in class. Learners will be required to complete assignments in a timely manner. Learners need to respect each other.

### Weekly Homework:

There will be weekly mind-mapping exercises assigned to learners in this course, which will serve to summarize session content. This technique will be demonstrated in our first session.

As noted above, there will be opportunities for students to observe astronomical phenomena throughout the course.

There will also be:

- a midterm exam
- a final exam
- a class project, to be completed and shared following the winter break

### **Homework Policy:**

Homework will be due prior to class for learners to receive full credit unless arrangements have been made in advance. Learners will receive partial credit for homework submitted within two class periods of due date. No credit will be given for homework turned in after two consecutive weeks/sessions. Additionally, any outstanding homework needs to be turned in prior to any unit test, even if that is sooner than the two weeks.

### **Additional Policies:**

- Honesty.
- Integrity.
- Respect.
- Enough said?

### **Evaluation:**

- |                                     |     |
|-------------------------------------|-----|
| ● Class Assignments & Participation | 25% |
| ● Class Presentation                | 25% |
| ● Class Midterm                     | 25% |
| ● Class Final                       | 25% |

### **Grading Scale:**

- 100-91: A
- 90-80: B
- 79-70:C
- 69-66: D
- 65 and below - No effort: F

## Anticipated Weekly Course Schedule:

Week	Topic
Week 1	INTRODUCTION & ORIGINS: WHAT IS ASTRONOMY & WHY IS IT IMPORTANT, ANYWAY?
Week 2	IF YOU CAN READ THIS, THANK OUR SUN (SOL)
Week 3	ALWAYS GOING THROUGH A PHASE: MEET THE MOON
Week 4	THE INNER PLANETS (MERCURY, VENUS, MARS)
Week 5	THE GAS GIANTS (JUPITER, SATURN)
Week 6	FROZEN DISTANT WORLDS (URANUS, NEPTUNE, & PLUTO)
Week 7	MORE DWARF PLANETS, ASTEROIDS, COMETS, & METEORS
Week 8	A STAR IS BORN (& DIES): STAR CLUSTERS, STARS, BLACK HOLES
Week 9	GALAXIES: NEAR, FAR, QUASARS & DARK MATTER
Week 10	MIDTERM
Week 11	CLASS PROJECT / PRESENTATIONS
Week 12	LIFE, THE UNIVERSE, & EVERYTHING: AN INTRODUCTION TO COSMOLOGY
Week 13	THE BIG BANG: THERMODYNAMICS, ENTROPY, & WHY IT'S STILL A "THEORY"
Week 14	ASTRONOMERS, COSMOLOGISTS, PHYSICISTS, AND THEORISTS - PART I
Week 15	ASTRONOMERS, COSMOLOGISTS, PHYSICISTS, AND THEORISTS - PART II
Week 16	ASTRONOMERS, COSMOLOGISTS, PHYSICISTS, AND THEORISTS - PART III
Week 17	LIGHTNING ROUND: AMAZING DISCOVERIES OF THE 20TH & 21ST CENTURIES
Week 18	WORMHOLES, PLOT HOLES & PARSECS: WHAT SCIENCE FICTION GETS RIGHT (& WRONG) ABOUT SPACE
Week 19	WHAT'S NEXT? THE FUTURE OF ASTRONOMY
Week 20	FINAL EXAM