

Astronomy 9: Concepts of the Cosmos (Spring 2016)

Lectures:

Monday and Wednesday from 1:30 PM to 2:45 PM in Cabot Auditorium, 3rd floor, Cabot Intercultural Center, Medford Campus

<http://cosmos.phy.tufts.edu/~danilo/AST9/AST9.html>

Professor:

Danilo Marchesini, Collaborative Learning and Innovation Complex (CLIC), 574 Boston Avenue, Room 312-E; Office Telephone: (617) 627-2756; Internet Address:

Danilo.Marchesini@tufts.edu; <http://cosmos.phy.tufts.edu/~danilo/Home.html>

Office Hours:

Prof. Marchesini: after class each Monday, 3:15 pm to 4:15 pm in his office in the Collaborative Learning and Innovation Complex (CLIC) @ 574 Boston Avenue; alternatively, email me to set up a time/place to meet.

Teaching Assistant:

Eric Roebuck (eric.roebuck@tufts.edu)

Office hours: Wednesdays, 3-4 pm, open space on the 4th floor of the Collaborative Learning and Innovation Complex (CLIC) @ 574 Boston Avenue. Alternatively, email him to set up a time/place to meet.

Prerequisites:

An understanding of algebra and plane trigonometry. Willingness to actively participate in class.

Requirements:

To attend this course, you are required to sign a document stating that you are familiar with the Rules of Academic Integrity and promise to exercise the highest standards of academic honesty in this course. This document will be handed out on the first day of class. If you join late, please see one of the instructors to sign this document.

Course Objectives:

Astronomy-9 is a general introduction to the cosmos and modern astronomy for students not intending to major in the sciences. The overarching goals of this course are for you to understand the nature of science through the eyes of astronomy; to understand the big ideas in astronomy;

and to develop a lifelong interest in astronomy and current events surrounding astronomy. To meet these three goals, the course instructor have carefully designed a sequence of learning tasks and assessment procedures. You will be expected to develop your critical thinking skills in order to understand and apply the scientific method. In terms of mathematics, we will use only arithmetic and a bit of simple algebra. There will NOT be a strong emphasis on math in this course. The main topics covered are: stars, galaxies, distance scales, structures of galaxies and their growth, expansion and fate of the universe, the Big Bang, and inflation.

Active engagement with group activities occurring daily: only a limited amount of information can be learned from lecture alone, no matter how clear or entertaining. Therefore, this course is composed of a series of mini-lectures that will be augmented by collaborative classroom activities called Lecture Tutorials (LT) and Ranking Tasks (RT). The LT and RT activities target specific ideas presented in lecture and are designed to be completed in small groups of 2-3 people during class by talking through the questions and writing a detailed, consensus response. **Just before the mid-term exams, you will have to submit the LT and RT activities covered in class until then.** Submission of the LT and RT activities counts for **5% of the final grade**. LT and RT activities will be returned to you within a few days. Note that they will not be graded, and they will be used only to correlate the mid-term exam scores with the effort put into the activities. The questions on the LT and RT activities are quite similar to the questions you will find on the course exams and you are therefore strongly encouraged to consider these activities as a critical component to your success in the course. The LT can be bought at the bookstore, and it must be brought to class each day. The RT will be provided by the professor in class.

ATTENDANCE is not required, but STRONGLY SUGGESTED: Since this course is built around daily activities to accompany the lecture, your attendance and full participation at each class period will be an essential component of your success in the course, therefore attendance is strongly suggested. **To stimulate attendance**, I am introducing a **bonus of 2%**. In order to get the bonus, you need to attend ALL LECTURES. You will be allowed to miss two lectures (10%), excluding Lecture 3 (pre-course test), Lecture 13 (1st midterm exam), Lecture 21 (2nd midterm exam), and Lecture 26 (post-course test). These four lectures are mandatory: if missed, you will not get the attendance bonus unless for legitimate, documented emergencies. To collect attendance, you will need to write down your name on a piece of paper, along with the answer to one of the question asked in class. Before leaving you will have to give the piece of paper to the professor. It is your responsibility to make sure your paper is collected.

Additional 1% bonus will be gained if you will attend the special lecture by O'Shaughnessy on Thursday, April 14th. Details to follow...

Carefully studying the text is REQUIRED: The course mini-lectures are designed to focus on the really difficult aspects of astronomy or to provide structure for your out-of-class study. You are accountable for all material, concepts, and interrelationships presented in the mini-lectures, the text, and, most importantly, the Lecture Tutorials and Ranking Tasks. Therefore, **it is imperative to your success in this course that you complete the assigned readings PRIOR to coming to class**. Reading Quizzes have to be completed **BEFORE** the date listed. Otherwise, the mini-lectures, tutorials, and ranking tasks will be less useful in helping you develop a deep understanding of the course topics. It is important to remember that the exams will cover

material from the text readings that may or may not be discussed in class. The Reading Quizzes only take a few minutes each.

The objectives of this course will be addressed through all of the following activities: lectures, Lecture Tutorials, Ranking Tasks, in-class discussions and participation, on-line homework sets, and Impress-me project. Quizzes and exams will also be administered. You are required and expected to read the textbook ahead of the class and participate in the in-class activities and discussion.

Textbook

- **THE ESSENTIAL COSMIC PERSPECTIVE**, 7th Edition by Bennett, Donahue, Schneider, & Voit. The 4th, 5th, or 6th editions are also fine. The book is NOT sold at the bookstore - feel free to find the cheapest possible book available out there. Ten copies of the book will be placed on reserve (3 hours) at the Tisch Library.
- **LECTURE-TUTORIALS FOR INTRODUCTORY ASTRONOMY** by Prather, Slater, Adams, and Brissenden, 3rd edition. Sold at the Tufts Bookstore, bundled with the access code to MasteringAstronomy (**ISBN 9781323056769**).
- **MASTERING ASTRONOMY**, online access kit by Pearson/Addison-Wesley. To use Mastering Astronomy, go to the web site: http://www.pearsoncustom.com/ma/tufts_astronomy , and follow the instructions provided on Trunk. There is a help desk available (see access kit) if you are having technical issues. To register, you will need the COURSE ID = MAMARCHESINI2016AST9ED7 ; when asked for your STUDENT ID, use your TUFTS USERNAME (e.g., jsmith11).
- **FLASHCARD**. It will be distributed in class. You **MUST** bring it to each and every class to participate in the activities.
- Other **REQUIRED lectures**: February 1st and May 2nd (pre- and post-course test);

Course Website

We will use the **TRUNK** website (<https://trunk.tufts.edu>) to post messages, course schedule, lectures, grades, etc. You should check this site regularly.

Recommended Tools

- Fun and recommended websites:
 1. Astronomy Picture of the Day: <http://antwrp.gsfc.nasa.gov/apod/astropix.html>
 2. NASA website: <http://www.nasa.gov/multimedia/imagegallery>
 3. New York Times Science Section: <http://www.nytimes.com/pages/science/>
 4. Space Telescope Public Information: <http://opposite.stsci.edu/>
 5. Sky and Telescope: Weekly News Bulletin: <http://www.skyandtelescope.com/>
 6. Black Holes and Neutron Stars: http://antwrp.gsfc.nasa.gov/htmltest/rjn_bht.html

7. Finding planets around other stars: <http://exoplanets.org/>
8. Space Weather (aurorae, meteors, etc.): <http://spaceweather.com>

Course Format

Lectures are on Monday and Wednesday, 1:30 pm to 2:45 pm, in Cabot Auditorium. You **MUST** bring the Lecture Tutorial, Ranking Tasks, and Flashcard to each and every class. Classes will follow the following general format. The instructor will be lecturing for 20 min. Lecture will be followed by Think-Pair-Share questions, Lecture-Tutorials, and/or Ranking Tasks, which will be debriefed after completion through discussion in the classroom. The initial lecturing will assume that the assigned reading has been done ahead of time, and will only highlight the major concepts. That means that you need to **DO THE REQUIRED READING AHEAD OF TIME**. For this format to work, it is **VERY IMPORTANT** that each of you come prepared, willing and ready to participate in the activities and discussions. **NO PARTICIPATION WILL NOT BE TOLERATED**.

Grading policy

Your final grade will be weighted as follows (you can list your own score too):

	Your score
Reading Quizzes (5 points each, 20 quizzes) (to be submitted on MA by 10 am on the day they are due)	100 points (5%)
Homework sets (6 total; 50 points each homework set):	300 points (15%)
Lecture Tutorials submission (30 points each):	60 points (3%)
"Impress me" Project	240 points (12%)
Two midterm exams (350 points each, multiple choice):	700 points (35%)
Final exam (multiple choice):	600 points (30%)
Maximum achievable number of points:	2000 points (100%)

Each item is explained in more detail below. **TO PASS THIS CLASS YOU NEED A MINIMUM OF 1200 POINTS (60%)**. The grades will be distributed as follows:

A: $\geq 94\%$ (1880), B: $\geq 84\%$ (1680), C: $\geq 74\%$ (1480), D: $\geq 64\%$ (1280)

IF NEEDED, THE ABOVE PERCENTILES MAY BE LOWERED, BUT NOT RAISED

WARNING: All grades are final 72 hours (3 days) after they have been posted and/or returned. Please make sure if you have any grading dispute that you contact me **BEFORE** this 72 hours period is over.

Homework sets:

There will be six (6) homework sets on problems that are representative of the class lectures. Homework sets are done online at MasteringAstronomy (www.masteringastronomy.com). Homework sets must be completed online by Sunday 11:59 pm before the Mondays they are due. Each homework set is worth 50 points. The course ID is MAMARCHESINI2016AST9. When asked for the student ID, use your TUFTS USERNAME.

Reading quizzes:

The purpose of the Reading quizzes is to ensure the required reading is done before each lecture. Reading quizzes are performed on MasteringAstronomy (MA) and are due by 10 am on the day they are due (nearly every lecture). There will be 20 reading quizzes throughout the course, each counting 5 points, for a total of 100 points (5%).

Submission of Lecture Tutorials & Ranking Tasks:

Before the two mid-term exams, all students are required to submit the Lecture Tutorials and the Ranking Tasks completed until the date of the exam. Each submission is worth 30 points (1.5%), totally 3% of the final grade. The LTs and RTs will not be graded. The only purpose of this is to allow the professor to correlated the level of effort on the LTs and RTs with the grade on the mid-term exams. Submission will be done right before class on the day the mid-term exams are schedule. On the day of the mid-term exam, bring the clipped LTs/RTs with your full name and student ID number clearly written on. The LTs/RTs will be returned the following class, before lecture starts.

“Impress me” Project:

The subject of this project is (almost) completely free. The only constraint on the project is its subject, which has to be related to Astronomy, and the goal of the project is to impress me, your instructor. **UNLEASH YOUR CREATIVITY, AND FULLY EXPLOIT YOUR TALENTS!!** (Almost) anything goes: create a painting, write a poem, make a videoclip on a topic covered in class (limited to 10 min), compose a song (it has to play on any computers), remix songs which are astronomy related, observe some astronomical object or event this spring and describe it in 1-2 pages including drawing (<http://www.skyandtelescope.com> for targets), do a web-research project on any astronomy-related topic that appears in the news during this semester (and write a 2-3 page report including multiple references and potentially figures - use your own works), etc. The sky is the limit, literally. If your project requires some monetary support, please contact the instructor no later than March 1st (in case monetary support is granted by the instructor, all receipts must be provided for full reimbursement). **WARNING: NO OFFENSIVE MATERIAL WILL BE ACCEPTED. THE SUBMITTED PROJECTS WILL NOT BE RETURNED, AND SOME MAY BE PLAYED/SHOWED IN CLASS.**

The project **MUST BE SUBMITTED** by SUNDAY, April 24th. The project is worth 240 points (12% of the total).

Exams

There will be **TWO IN-CLASS CLOSED-BOOK EXAMS** lasting between 60 and 75 minutes (**PLUS A MANDATORY COMPREHENSIVE FINAL EXAM**). The in-class exam will be worth 350 points each (17.5% of the total). **THERE ARE NO MAKEUP EXAMS.**

IN-CLASS EXAM 1: Monday, March 7th, 2016: Chapters 1,3,4,5

IN-CLASS EXAM 2: Monday, April 11th, 2016: Chapters 11,12,13, 14, 15, 16

FINAL EXAM: This exam is comprehensive and covers the whole curriculum in the textbook, lecture tutorials, ranking tests, notes, and handouts. **THE CURRICULUM IN THE TEXTBOOK IS: CHAPTER 1, 3, 4, 5, 11, 12, 13, 14, 15, 16, 17.**

MONDAY, MAY 9TH, 2016, 12:00 PM - 2:00 PM

LOCATION TBD

Early/Makeup exams

NO EARLY EXAMS OR MAKEUP EXAMS ARE OFFERED FOR ANY EXAM. Persons who miss one of the in-class exams will receive a zero on this exam and the other in-class exam will count towards the final grade. Persons who miss more than one exams will be given a failing grade. Exceptions are made for legitimate, documented emergencies that are cleared with the Dean of Student Affairs. For persons that miss an in-class exam for such emergencies, the final grade will be determined based on the other exams and course requirements. Persons who miss all in-class exams through medical necessity will be required to drop the course to avoid a failing grade. Persons who miss the final exam without a legitimate, documented emergency will fail the class. Persons with a legitimate, documented emergency will be given an 'incomplete'. **IMPORTANT:** if you are sick with flu symptoms, stay in your room and call for medical assistance; do not come to class; it is your responsibility to prevent spreading any diseases.

Accommodations:

Tufts University values the diversity of our students, staff, and faculty; recognizing the important contribution each student makes to our unique community. Students with disabilities are assured that the Student Accessibility Services (SAS) office will work with each student individually to create access to all aspects of student life. Tufts is committed to providing equal access and support to all qualified students through the provision of reasonable accommodations so that each student may fully participate in the Tufts experience. If you have a disability that requires reasonable accommodations, please contact the Student Accessibility Services office at accessibility@tufts.edu or 617-627-4539 to make an appointment with an SAS representative to determine appropriate accommodations.

Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

Academic honesty

All professors at the School of Arts and Sciences and Engineering are required to report suspected cases of academic misconduct to the Office of the Dean of Student Affairs. By attending this class you are expected to have read and understood the rules of Academic Integrity and are automatically agreeing to adhere to these rules. The booklet 'Academic Integrity' is available from the Office of the Dean of Student Affairs and on the web site:

<http://studentservices.tufts.edu/dos/publications.htm>

I DO NOT TOLERATE CHEATERS, THOSE ATTEMPTING TO CHEAT, OR THOSE ASSISTING CHEATERS, BECAUSE IT IS HIGHLY UNETHICAL AND IS ENTIRELY UNFAIR TO YOUR FELLOW STUDENTS WHO PUT A LOT OF EFFORT INTO THIS CLASS. IF YOU ARE CAUGHT CHEATING, YOU WILL FAIL THIS CLASS AND BE REPORTED TO THE DEAN OF STUDENT AFFAIRS. IF I SUSPECT YOU ARE CHEATING, YOU ARE ALSO IN TROUBLE. I WILL SUSPEND YOU FROM THIS CLASS AND REPORT YOUR BEHAVIOR TO THE DEAN.

You are required to sign a document stating that you understand these rules and will adhere to them. Sign and hand in the last page of this document you are currently holding.

It is expected that students in Astronomy 9 will maintain the highest standards of academic honesty. In particular, it is expected that:

- During tests and examinations, you will not accept or use information of any kind from other students. You will not use aids to memory other than those expressly permitted by the examiner.
- You will never represent the work of another student as your own.
- You will never try to deceive the instructor or teaching assistant by misrepresenting or altering your previous work or that of others.

Departures from these standards will be viewed with utmost seriousness by the instructors and Tufts University and will be reported to the Dean of Student Affairs.

HAND IN THIS PART TO YOUR INSTRUCTOR:**ACADEMIC HONESTY**

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Departures from these standards will be viewed with utmost seriousness by the instructor and Tufts University and will be reported to the Dean of Student Affairs.

I understand and agree to these terms

Date: _____ Student ID: _____

Print Name: _____

Signature: _____