SAMPLE SYLLABUS
Fall 2013
ASTR 1345, SECTION 001 (INTRODUCTORY ASTRONOMY I)
NIGHT SKY AND SOLAR SYSTEM

Instructor: Dr. Nilakshi (Nila) Veerabathina
Office Location: Room 120 C, Science Hall, UT Arlington
Office Hours: MWF: 10:00 – 11:00 am or by appointment
Email: Please use the mail option in Blackboard (http://elearn.uta.edu)
Mailbox #: 19059

Classroom Location: 101 Science Hall, UT Arlington
Class Schedule: Monday, Wednesday, Friday: 9:00 AM- 9:50 AM


Required Course Material:
2. Clicker: iClicker 2 Classroom Response Device (The purchase and registration information is given at the end of Page 4 of this syllabus.)
   More information about labs is available at: http://www.uta.edu/physics/astrolab/
   (Caution: Never buy a used lab manual as it will have missing worksheets.)
4. Class Slides: The class slides will be available on http://elearn.uta.edu/ after every lecture.

Description:
This is the first of a two-semester, lecture plus laboratory course on introductory astronomy with an emphasis on celestial motions, phases of moon, eclipses, history of astronomy, gravity, electromagnetic radiation, telescopes, and physical properties of the planets, asteroids, meteoroids, comets, and the discovery of extrasolar planets.

This course may be used to satisfy the UT Arlington core curriculum requirement in life and physical sciences.

Learning Objectives:
On the completion of this course students should be able to
½ demonstrate the methods and the advantages of advanced technology that astronomers use to obtain information about celestial objects.
½ describe the nature of scientific research and process of science in the fields of Physics and Astronomy.
½ discuss the historical development of our understanding of the Heliocentric Solar System from Aristarchus to Galileo to modern times.
apply an understanding of the orbital and rotational motion of the Earth, Moon and planets to predict and observe the changes in the sky that result from these motions.
explain the basic concepts of Physics, such as gravity, nature of light as a wave and as a photon, laws of motion (Kepler’s as well as Newton’s) etc.

identify the components of the electromagnetic spectrum and demonstrate the need of observing outside the visible range and outside the Earth’s atmosphere.

discuss the properties of the other planets, their moons and other objects in our solar system as well as in extra solar systems in comparison to the planet Earth.

develop the critical thinking, empirical and quantitative skills needed to solve scientific problems.

demonstrate the ability to utilize technology in a variety of forms, and express their scientific ideas in clear, logical, organized, and concise ways in both written and oral forms.

effectively communicate orally with small groups and in front of the class.

apply Astronomy and basic Physics knowledge to analyze new situations.

prepare to study other subjects that require an a priori knowledge of Astronomy and basic Physics.

**Prerequisites:**
While there are no formal prerequisites, a familiarity with high school mathematics is needed.

**Exams and Grading:**
There will be three Tests. If you are not present for a Test, you will receive a zero. There will be *no makeup* tests, except in special circumstances in which case they must be arranged in advance. The tests are multiple choices. Your course grade will be determined as follows:

Tests: 60%
Lab: 30%
Class participation: 10%

The grading scale would be as follows.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>60-69</td>
<td>D</td>
</tr>
<tr>
<td>Less than 60</td>
<td>F (Fail)</td>
</tr>
</tbody>
</table>

**Lab Work:**
As this is a lab science course, *if you do not obtain a passing grade (60%) in your lab you cannot pass the course*, regardless of how well you do on your tests.

You will be attending lab once every week. The labs meet at different locations every week, such as Round House Planetarium, Science Hall lab rooms, or outside for the telescope night lab. Keep the lab syllabus handy to know the location for each week. In the lab you will collect and analyze data, interpret their result, and draw meaningful conclusions. In addition to weekly labs, there will also be a couple of signature assignments that you will do in teams over a period of few weeks. Signature assignments will help you to develop laboratory, problem solving, and presentation skill. A significant portion of the lab grade will be based on the completion of these assignments. More information about the labs in general and the signature assignments is available on the lab syllabus (attached at the end of this syllabus) and website [http://www.uta.edu/physics/astrolab/](http://www.uta.edu/physics/astrolab/).
Attendance Policy:
Attendance in class is strongly recommended, since lectures will provide supplemental material that will appear on the tests. Roll call will not be taken on regular basis, but there will be several class activities, for example, group discussions and presentations, hands-on work, homework activities, in-class writing, pop-up quizzes, before-and-after lecture quizzes, think-pair-share etc. that will count towards your class participation points.

Additional Information:
This syllabus provides a general plan for the course; deviations may be necessary. Test dates are targets and subject to change. You have to bring your own scantrons (# 882-E) for the tests and the final exam.

Dates to remember:

<table>
<thead>
<tr>
<th>Dates</th>
<th>Lecture Topics</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 2</td>
<td>Labor Day Holiday (No Classes)</td>
<td></td>
</tr>
<tr>
<td>Sept 9</td>
<td>Census Date</td>
<td></td>
</tr>
<tr>
<td>Oct 30</td>
<td>Last day to withdraw with an automatic grade of W</td>
<td></td>
</tr>
<tr>
<td>Nov 28-29</td>
<td>Thanksgiving Holidays (No Classes)</td>
<td></td>
</tr>
</tbody>
</table>

Special Astronomy thrill:

<table>
<thead>
<tr>
<th>Dates</th>
<th>Lecture Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 21</td>
<td>An excellent show in the CPB planetarium</td>
</tr>
<tr>
<td>Oct 15</td>
<td>A great show in the CPB planetarium</td>
</tr>
<tr>
<td>Nov 12</td>
<td>A marvelous show in the CPB planetarium</td>
</tr>
</tbody>
</table>

Two Small Pieces of Glass  
We are Astronomers  
Stars of Pharaohs

Class Schedule: (modifications may be necessary)

<table>
<thead>
<tr>
<th>Dates</th>
<th>Lecture Topics</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 24, 27, 29, 31, Sep. 5, 7, 10</td>
<td>Discovering the Night Sky</td>
<td>1</td>
</tr>
<tr>
<td>Sep. 12, 14, 17</td>
<td>Gravitation and the Motion of the Planets</td>
<td>2</td>
</tr>
<tr>
<td>Sep. 19, 21, 24</td>
<td>Light and Telescopes</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sep. 26</strong></td>
<td>Test 1 (Chapters 1 - 3)</td>
<td></td>
</tr>
<tr>
<td>Sep. 28, Oct. 1, 3</td>
<td>Atomic Physics &amp; Spectra</td>
<td>4</td>
</tr>
<tr>
<td>Oct. 5, 8, 10, 12, 15</td>
<td>Formation of the Solar System and Other Planetary Systems</td>
<td>5</td>
</tr>
<tr>
<td>Oct. 17, 19, 22, 24</td>
<td>Earth and Moon</td>
<td>6</td>
</tr>
<tr>
<td><strong>Oct. 26</strong></td>
<td>Test 2 (Chapters 4 – 6)</td>
<td></td>
</tr>
<tr>
<td>Oct. 29, 31, Nov 2, 5, 7, 9</td>
<td>The Other Terrestrial Planets</td>
<td>7</td>
</tr>
<tr>
<td>Nov. 12, 14, 16, 19, 21, 26</td>
<td>The Outer Planets</td>
<td>8</td>
</tr>
<tr>
<td><strong>Nov. 28</strong></td>
<td>Test 3 (Chapters 7– 8)</td>
<td></td>
</tr>
<tr>
<td>Nov. 30, Dec. 3</td>
<td>Vagabonds of the Solar System</td>
<td>9</td>
</tr>
<tr>
<td>Dec. 5</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td><strong>Dec. 12</strong></td>
<td>Final Exam (Chapters 1- 9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9:00 – 10:30 AM (Same room 101 SH)</td>
<td></td>
</tr>
</tbody>
</table>

Electronic Communication:
UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using...
this account, which remains active even after graduation. Information about activating and using MavMail is available at [http://www.uta.edu/oit/cs/email/mavmail.php](http://www.uta.edu/oit/cs/email/mavmail.php).

**Academic Dishonesty:**
It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents’ Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

**Student Support Services Available:**
The University of Texas at Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. These resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals to resources for any reason, students may contact the Maverick Resource Hotline at 817-272-6107 or visit [www.uta.edu/resources](http://www.uta.edu/resources) for more information.

**Drop Policy:**
Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships ([http://www.uta.edu/ses/fao](http://www.uta.edu/ses/fao)).

**Student Feedback Survey:**
At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory will be asked to complete an online Student Feedback Survey (SFS) about the course and how it was taught. Instructions on how to access the SFS system will be sent directly to students through MavMail approximately 10 days before the end of the term. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback data is required by state law; student participation in the SFS program is voluntary.

**Americans With Disabilities Act:**
The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112 -- The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act - (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.
As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

“iClicker 2” Purchase and Registration Instructions

**Purchase:** You can purchase the iClicker 2 remote device either from UT Arlington Bookstore [http://uta.bkstr.com](http://uta.bkstr.com) or directly from the iClickers company’s website [http://www1.iclicker.com/](http://www1.iclicker.com/).

**Registration:**

1. Log into Blackboard Learn and select your course (SCIE3304-001).
2. Locate and click on the i>clicker Registration link on the left panel of the course.
3. Enter your i>clicker remote ID (given at the back of your device) and click Submit.
4. Your clicker is all set to be used in the course.

**Note:** If you are using i>clicker for more than one course, you only need to register the clicker in one course and the registration data will automatically be applied to all of the other Blackboard courses.

**Live by the HONOR CODE**

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or that I contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.
ASTR1445 (ASTRONOMY I) SAMPLE LAB SYLLABUS

Lab Coordinator: James J. Davis – Science Hall 120G
Email: James.Davis@UTA.edu

Required Lab Materials

Lab Manual
- "Practical Universe: Observations, Experiments, and Exercises" by M. Cuntz, N. Veerabathina, and L. Gurdemir
- Do not buy a used manual; it will be missing pages that you are required to do in class and you will receive a zero for the missing lab. Make certain all lab pages are in your book, specifically, Units 3.1, 4.4, 5.2, 5.3, 5.6, 5.7, 6.2, and 6.6

Scientific Calculator
- Your smart phone might be good at some things, but it really isn’t a very good calculator. You may use it, but there are some functions at which it will inevitably fail and give you terrible answers.

Astronomy Lab on Blackboard
All information about the labs is found on Blackboard at elearn.utah.edu. The following documents are posted in Course Materials: pre-lab exercises; Lab Syllabus; Lab Schedule; and the Star and Constellation Sheet for summer. Grades will be posted ONLY on Blackboard and cannot be emailed.

Signing In and Out
On-time attendance does factor into the lab grade. In order to receive full credit for the lab, make sure to sign in at the beginning of the lab session. From the time the lab is opened until the PowerPoint begins, there will be a sign-in sheet available. If you arrive after lab has begun, the sign-in sheet will no longer be out and 5 points will be deducted from the lab grade. When you are finished with the lab, hand in your work and sign the sign-out sheet which will be at the front of the room.

Pre-lab Assignments
Pre-lab assignments are meant to give you a feeling for the type of material that will be introduced during the lab, including equations and vocabulary. Pre-lab assignments are posted as multiple choice questions on BlackBoard. They are available from the end of one lab until the very beginning of the next session’s lab. The non-mandatory pre-lab exercises can be answered by reading the objective, introduction, and procedure for the related lab, and by using your textbook, Discovering the Universe. The score of your pre-lab will be added to the grade of your lab as extra credit.

Location of Labs
Labs will take place in Science Hall room 122 or in the Round House Planetarium, depending on the lab subject (with locations noted on the syllabus lab schedule).

Round House Planetarium
We have two Planetarium facilities on campus. All Astronomy labs will meet in the Round House Planetarium – room 107 Preston Hall – when scheduled. The Round
House Planetarium is located in Preston Hall, next to Science Hall. It is NOT the large planetarium in the Chemistry and Physics building.

Please note:

- The Planetarium doors lock when lab begins. Show up at least 5 minutes before lab time to avoid being locked out of lab. If you are locked out, this will count as a missed lab; there is no option to enter after the doors have closed and no way to make up the lab.

- The Planetarium temperature is set to 65° F. You should bring a jacket or sweater if this temperature is uncomfortable for you.

- If you hear an annoying clicking noise in the planetarium, that is just the air conditioning system switching on and off. The planetarium is a huge metal dome and as such, rising and falling temperatures cause the dome to expand and contract which would wear it out and eventually cause damage. So we keep the temperature cool and constant.

- No food or drink allowed in the planetarium.

Lab Attendance

Any missed lab will result in a zero for that week’s lab assignment. There are no make-up labs or make-up lab days scheduled. Each missed lab is worth about ten percent of your grade (or about an entire letter grade) so it is important that you attend each lab.

If you are aware that you will be absent from a lab due to a University Excused Absence, you must notify me a week ahead of time and arrange to complete the lab during a different time that week. Notification after the event voids the excused absence as outlined in the rules and regulations for excused absences in the Undergraduate catalog. Doctor’s notes are not considered to be a University Excused Absence, and will count as a missed lab. If a lab is missed, see the Missed Lab section below for your options.

Missed Labs

The lowest lab grade will be dropped and the lab average will be taken from the remaining labs. Whether your lowest grade is a 99 or a 0, the lowest will not factor into your final grade. The only grades which cannot be dropped are: the Round House Planetarium Point Outs, the Night Lab, and the Final Quiz. If more than one lab is missed, the additional missed labs will receive a grade of zero. For reference, each lab is worth approximately 10% of the final grade, so each missed class beyond the dropped lab will lower your grade by about 10 points.

Lab Report Requirements

Complete the pre-lab assignment by the beginning of the lab period. The pre-labs are not mandatory, but serve as extra credit.

You are required to bring the lab manual to each lab. Hand reproductions of the pages from the manual will not be accepted. Photocopies of lab pages will not be
accepted. Be sure to have your lab book with you at the start of each class. If you
forget your lab book, you may take notes on the lab and attempt to do it on your own.
The lab will be accepted for a 25 point penalty and only if it is handed in by the
beginning of the following lab meeting.

Office Hours
When help is needed to complete a lab or if you have a particular question, you can
attend my office hours from 11AM – 12PM each Wednesday or, if the time is available,
you can schedule a meeting at another time. My office is in Science Hall, Room 120G.

Grading Policy
Your lab average will be reported to your course instructor at the end of the
semester. Pass-Fail policy and the weight of your lab grade in your overall Astronomy
course grade is up to the course instructor.

Graded lab work may exceed 100 points (if you complete the pre-labs). The sum of
each lab grade multiplied by the lab weight will be the lab average. Remember, the
lowest grade (excluding the Quiz, Point Outs, and Night Lab), will be dropped.

Grades will be posted on Blackboard about one week after all labs are received. You
can access Blackboard at elearn.uta.edu. Please double-check Blackboard grades with
your returned papers.

Please keep in mind that in most cases, if you receive less than a 60% in the lab,
you will receive an “Incomplete” for the entire course.

Semester Assignment
The semester assignment will give you an opportunity to more thoroughly study the
electromagnetic spectrum, from the low energy radio to the high energy gamma ray.
Working with partners, you will use data from ground and space-based NASA and
ESA observatories to study an object of your choice – such as nebulae, pulsars,
galaxies, planets, and star clusters – in multiple wavelengths. Different wavelengths
will reveal different features of the object as well as vastly different physical
processes occurring. Taken together, these multi-wavelength observations will allow
you to detail the origins and evolution of diverse and exotic objects in the universe.
You will also prepare a short in-class presentation on your specific object.

Academic Dishonesty and Misconduct
Academic dishonesty may result in a grade of zero for the lab in question (including
the final quiz), expulsion for that lab, and a report to the dean of students. Academic
dishonesty includes and is not limited to: copying someone's answers while “working
together,” and letting someone copy your work.

A more complete description: "Scholastic dishonesty includes but is not limited to
cheating, plagiarism, collusion, the submission for credit of any work or materials
that are attributable in whole or in part to another person, taking an examination for
another person, any act designed to give unfair advantage to a student or the attempt
to commit such acts." (Regents’ Rules and Regulations, Part One, Chapter VI, Section
3, Subsection 3.2, Subdivision 3.22)
Student with Disabilities
Students who need an accommodation based on disability should arrange to meet with the lab coordinator to determine what arrangements are necessary to accommodate your needs.

Astronomy 1445 Schedule

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lab</th>
<th>Lab Topic</th>
<th>Location</th>
<th>% of grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 3/4</td>
<td>Lab 1</td>
<td>Introduction to the Night Sky</td>
<td>Planetarium</td>
<td>4</td>
</tr>
<tr>
<td>Jun 5/6</td>
<td>Lab 2</td>
<td>Unit 3.1 – Telescopes*</td>
<td>Science Hall</td>
<td>12</td>
</tr>
<tr>
<td>Jun 10/11</td>
<td>Lab 3</td>
<td>Unit 6.2 – Scale Model of the Solar System*</td>
<td>Science Hall</td>
<td>12</td>
</tr>
<tr>
<td>Jun 12/13</td>
<td>Lab 4</td>
<td>Unit 5.7 – Celestial Coordinates</td>
<td>Planetarium</td>
<td>8</td>
</tr>
<tr>
<td>Jun 17/18</td>
<td>Lab 5</td>
<td>Unit 5.2 &amp; 5.3 – The Apparent Motion of the Sun*</td>
<td>Planetarium</td>
<td>12</td>
</tr>
<tr>
<td>Jun 19/20</td>
<td>Lab 6</td>
<td>Unit 5.6 – The Apparent Motion of the Moon*</td>
<td>Science Hall</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Lab 7</td>
<td>Night Lab Observations – June 19, 9:30PM</td>
<td>TBA</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Lab 8</td>
<td>Planetarium Star and Constellation Point Out</td>
<td>Planetarium</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Lab 7</td>
<td>Night Lab Observations – June 25, 9:30PM</td>
<td>TBA</td>
<td>12</td>
</tr>
<tr>
<td>Jun 26/27</td>
<td>Lab 9</td>
<td>Unit 6.6 – Kuiper Belt Objects*</td>
<td>Science Hall</td>
<td>12</td>
</tr>
<tr>
<td>Jul 1/2</td>
<td>Lab 10</td>
<td>Quiz</td>
<td>Planetarium</td>
<td>20</td>
</tr>
</tbody>
</table>

Lab units are subject to change. Notice will be given on Blackboard and the lab website.

*The lowest grade from these labs will be dropped.
Signature Assignment (ASTR 1345) – The Electromagnetic Spectrum

1. **Critical thinking skills** – creative thinking, innovation, inquiry, analysis, evaluation and synthesis of information

   In this assignment, students will be given the task of exploring the nature of astronomical objects across the electromagnetic spectrum, exploring how astronomers can study a range of physical properties of astronomical objects by investigating different types of emitted energy. Each student will work in a team to identify a unique astronomical object – such as a specific nebula, planet, or galaxy – and obtain – through use of NASA data archives – images of this object produced by telescopes operating in different regions of the electromagnetic spectrum.

   Each student in the group will be responsible for one regime of the electromagnetic spectrum – from low energy radio, microwave, and infrared; moderate energy visible or ultraviolet; and high energy x-ray or gamma ray – and study how energy of this type is typically created. Studying their particular object, the students will familiarize themselves with the telescope which made the observation as well as the unique physical processes occurring in their object.

   Taken together, the students will fully explain the nature of their chosen object, identifying processes both seen and unseen, internal and external dynamics shaping the object’s environment, member populations, chemical makeup, sources of energy, and formative history.

   **Creative thinking:** Choose an object which is well studied and scientifically fascinating.

   **Innovation:** Students will learn to recognize that all objects radiate energy and that many physical processes occurring in the world do so invisibly to the human eye in ways that can only be processed and studied in other wavelengths.

   **Inquiry:** Students will present a fact and data based the origin and evolution of the object, including the effect the object’s environment may have had on it or vice versa. They will also delve into the nature of light, how it is created and how brightness, intensity, or color reveal properties of the matter creating the photons.

   **Analysis:** Identify different physical regions of the object – such as jets or bow shocks or winds – and explain how the energy is distributed over the picture. What do different colors/brightness levels mean in a photograph?

   **Evaluation:** Explain how the object created these features or what these features point to, dynamically.

   **Synthesis of information:** Combine all data into a complete picture of the system in question, tracing its effect on its surrounding environment, its evolution, and/or its origin.
2. **Communication Skills**: to include effective development, interpretation and expression of ideas through written, oral and visual communication.

Separately, the students will present an evaluation of the telescope that gathered the data used to produce a photograph of their chosen object, explaining the location of, sensitivity of, size of, and any relevant fact concerning the telescope in a written paper. Their write-up will also include an explanation of how their electromagnetic spectrum is produced in general and in their object specifically.

The final evaluation of the semester-length project will include a short oral and visual presentation to the lab class explaining the results of their investigation. Each student will be expected to demonstrate a clear and effective understanding of the nature of electromagnetic radiation as it pertains to their object. In fulfillment of visual communication, the students will use presentation software to identify for their audience specific features of their object, how those features were produced, and the dynamics that lead to their photographed appearance.