ASTR 1400 Solar System Astronomy

Lecture Syllabus Section 002 CRN 10019, Texas Tech University, Fall 2016

This course will satisfy a four-hour laboratory science requirement. It is an introductory course aimed at a general student audience. Science is more important in our daily lives than ever before – scientific reasoning will play a large role in this course.

Instructor

![Dr. Robert C. Morehead](image)

Dr. Robert C. Morehead

Contact

- **Email:** [robert.morehead@ttu.edu](mailto:robert.morehead@ttu.edu) (Preferred Contact Method)
- **Phone:** (806) 834-7940
- **Office:** Science Building room 14, TTU campus
- **Open Office Hours:**
  - Monday 3 - 4:30pm
  - Tuesday 9:30 - 11am
  - Thursday 9:30 - 11am
  - Friday 10:30am - 12:30pm
- **By Appointment:** [http://rmorehead.youcanbook.me](http://rmorehead.youcanbook.me). This site links directly to my calendar and displays all the times I am free, eliminating the need for several emails back and forth to schedule an appointment.

Class Meetings

Tuesday and Thursday 8 - 9:20am
Science Building RM 007

Learning Objectives

After completing these course students will be able to:
• Identify and describe the features of the our Solar System and the physical principles relevant to astronomy.
• Apply quantitative reasoning to solve a variety astronomical and practical problems.
• Recognize Science as a process and summarize how astronomical data is acquired and understood.
• Develop critical thinking tools that can be applied to life outside the classroom.

Required Materials

Textbooks

The Cosmic Perspective: The Solar System (8th Edition); by Bennett, Donahue, Schneider & Voit. ISBN-10: 0134073819/ ISBN-13: 978-0-1340738-1-1; Publisher: Pearson. This is only the solar system-focused half of the full version of the text. I recommend acquiring the 8th edition. Astronomy is a field that is constantly making new discoveries, older versions may be significantly out date.

Astronomy 1400: Solar System Astronomy Lab Manual produced by the Texas Tech Department of Physics. Lab Manual Sales: During the first week of class, there will be signs throughout the building presenting details on Lab Manual purchasing.

You MUST purchase a lab manual at these times.

Other Materials

Voting Card. I will provide a multiple choice voting card that you are expected to bring to class every day. For lost voting cards, a PDF replacement copy will be available in Blackboard, but you will need to print it out in color.

Optional: A non-programmable scientific calculator will be allowed on exams, although it will not be required to solve the problems. You will not be allowed to use a phone or another device with internet capability in place of a calculator.

Course Website

Blackboard: http://ttu.blackboard.com. The course webpage is (or will soon be) on the Blackboard (BB) system. Course announcements and homework assignments will be posted on this site. BB will also be used for electronic communications, and to post other relevant course material (such as homework solutions, grades, etc.).

Course Requirements

I expect you to be considerate to me and to your classmates during class. You are expected to turn off phones, iPods, and other electronic devices not necessary for class before class
begins. Laptops are allowed for note-taking or following along with course materials only. Please arrive on time, do not pack up your things before class is over, remain until the end of the class period, and notify me before class if you need to leave class early. If you are distracting your classmates or disrupting the class you will be asked to leave.

In return, I will start and end class on time, give you time in class to discuss concepts with your classmates, ask for your feedback about the class, and will be welcoming of all of your questions during class and during my office hours.

Please note that while there is no prerequisite for this class, you will be expected both on the homework and in the exams to be able to perform mathematical calculations without a calculator. Examples will be given in class and in the course notes. Examples of the mathematical concepts we will use in this class are:

- scientific notation
- multiplying and dividing powers of 10
- converting between different metric units
- rearranging and solving simple equations (e.g., if \( v = H \cdot d \), solve for \( d \) given \( v \) and \( H \))

A colleague in the Dept. of Astronomy and Astrophysics at Penn State co-authored A Student’s Guide to the Mathematics of Astronomy (ISBN: 9781107610217), and she wrote it specifically to support courses like ours. You may find it useful with the math used in this course.

Assessment

Students' understanding of the learning goals will be evaluated from selected questions on homework assignments, in-class activities, and exams.

Class Preparation

Students are expected to keep up with the material and to not fall behind. It will be assumed that you have tried to look over the relevant text material before the corresponding lecture, so that the lecture can serve as a concentrated review and clarification, with time for discussion. If you are coming to class “cold,” without having skimmed the material in the text, you will find yourself at disadvantage.

Grades

Your final numerical course grade will be calculated as a weighted average of:

- Midterm Exams (lowest dropped): 15%
- Cumulative Final Exam: 25%
- Homework assignments (lowest dropped): 20%
- Discussion Boards: 6%
- Surveys and Feedback: 2%
- Attendance: 2%
- Laboratory/Observing: 30%

No extra credit will be given and grades will not be rounded up. Although I may adjust the lower end of the grade cutoffs listed below, I guarantee that if your final grade is in the following percentage range you will receive the listed letter grade:

<table>
<thead>
<tr>
<th>Numerical course grade</th>
<th>Letter grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=90.0%</td>
<td>A</td>
</tr>
<tr>
<td>80.00%-89.99%</td>
<td>B</td>
</tr>
<tr>
<td>70.00%-79.99%</td>
<td>C</td>
</tr>
<tr>
<td>60.00-69.99%</td>
<td>D</td>
</tr>
<tr>
<td>&lt;60.00%</td>
<td>F</td>
</tr>
</tbody>
</table>

**Attendance Policy**

**Faithful attendance is necessary to do well in this course and is required.** During each class, we will spend some time writing a one-sentence micro-essay, that will answer a review question or give class feedback. You will be required to turn it in with your name and your TechID Number (R Number). These micro-essays will just be reviewed for content and will not influence your grade, but your micro essay will be used to determine your attendance. There will be some allowance to miss a small number of classes (life happens), that will be determined by a class discussion on the first day of the course.

You must notify the instructor ahead of time to be excused for absences due to official university events.

If severe illness occurs, seek treatment immediately, contact the instructor as soon as possible, and **stay home**. A plan for any make-up work will be made on an individual basis, and documentation from a medical professional may be required. In case of an illness that will require absence from class for more than one week, the student should notify his or her academic dean.

**Homework**

There will be several homework assignments during the course, and you will be given two opportunities to complete them on-line within Blackboard, and only the higher of your two grades will count. These will be announced in class, and you will have at least one week to complete them. Do not wait until the end of the time period to complete the homework; problems with a computer or internet access are not acceptable excuses for not completing the homework. **Typically, no late homework submissions will be accepted.**
Discussion Boards and Surveys
You will also be asked to complete several short surveys and to contribute to discussion boards in Blackboard during the semester. These will be announced in class and more details will be posted on Blackboard.

Laboratory
There is a required laboratory worth 30% of the course grade. You will receive one grade for the lecture and the laboratory combined – they are not separate courses.

NOTE: If you fail the laboratory portion of this class, you will fail this course!

In addition to the weekly lab meetings, you have the opportunity to visit the Texas Tech Observatory for some nighttime observations as part of your lab grade. These observational exercises are not optional. All necessary information regarding these activities will be posted on the observatory website (linked from the Texas Tech Department of Physics homepage); it will also be discussed by your laboratory instructor during the first week of class. If no lab is listed on your schedule, see your professor immediately. Questions about the laboratory should be addressed to your laboratory instructor, not the lecturer.

Midterm Exam Policy
There will be two midterm exams, however, the grade on the lower exam will be dropped. There is no make-up day for the midterm exam unless severe illness occurs (see class policies regarding illness). In the event of a documented direct conflict (two exams scheduled at the same time on the same day), students should contact the instructor at least 10 days before the exam. Alternative arrangements for the exam TIME (the exam day will NOT be changed) will be offered. The midterm exam will cover material up to the date of that exam, it will be administered in the lecture room, and you will need to bring a non-programmable scientific calculator, a #2 pencil (with eraser), and your Texas Tech ID.

Final Exam Policy
There will be one final exam worth 25% of the final numerical course grade. There is no make-up day for the final exam: the Final Exam is mandatory. The final exam is comprehensive, it will be administered in a room to be announced later in the semester, and you will need to bring a non-programmable scientific calculator, a #2 pencil (with eraser), and your Texas Tech ID. Final examination period for Fall 2016 WILL BE CONFIRMED LATER IN THE SEMESTER BY THE UNIVERSITY REGISTRAR. For this reason, DO NOT PLAN TO LEAVE TTU BEFORE OR ON Dec 14th. TTU's policy regarding final exams states:
1. ALL Final Exams must be given at the assigned time. They may not be given prior to the officially assigned time.
2. If a student misses their Final Exam, they must contact their Instructor. This is a matter between the student and the Instructor. The policy for this class is that no make-up Final Exams will be given except in the event of severe documented illness.
3. There is no policy on how many Final Exams a student can have in one day. The Final Exam Schedule was posted in the Schedule of Classes and must be followed. For more info about the final exam policy, please visit: http://www.depts.ttu.edu/opmanual/OP34.10.pdf

Course Schedule

This projected schedule is subject to change with advance notice.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Chapters</th>
<th>Assignments Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue, Aug 30</td>
<td>Introduction</td>
<td>1</td>
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<tr>
<td>Thu, Sep 1</td>
<td>Cosmic scales, age of the universe, Earth's Motion, Night Sky</td>
<td>1-2</td>
<td></td>
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<tr>
<td>Tue, Sep 6</td>
<td>Seasons, Phases of the Moon</td>
<td>2</td>
<td>Survey 1 (BB*)</td>
</tr>
<tr>
<td>Thu, Sep 8</td>
<td>Eclipses</td>
<td>2</td>
<td>HW 1 (BB)</td>
</tr>
<tr>
<td>Tue, Sep 13</td>
<td>The Copernican Revolution</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Thu, Sep 15</td>
<td>The Scientific Method</td>
<td>3</td>
<td>HW 2 (BB)</td>
</tr>
<tr>
<td>Tue, Sep 20</td>
<td>Kepler's Laws, Newton's Laws</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Thu, Sep 22</td>
<td>Gravity</td>
<td>4</td>
<td>HW 3 (BB)</td>
</tr>
<tr>
<td>Tue, Sep 27</td>
<td>Light, Doppler Effect</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Thu, Sep 29</td>
<td>Telescopes</td>
<td>4</td>
<td>HW 4 (BB)</td>
</tr>
<tr>
<td>Tue, Oct 4</td>
<td>Exam 1</td>
<td></td>
<td>Exam 1 (In Class)</td>
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<tr>
<td>Thu,</td>
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<td>Topic</td>
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<tr>
<td>Oct 6</td>
<td>Our Star the Sun</td>
<td>14</td>
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<tr>
<td>Tue, Oct 11</td>
<td>Our Planetary System</td>
<td>7</td>
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<tr>
<td>Thu, Oct 13</td>
<td>Exploring the Solar System</td>
<td>8</td>
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<tr>
<td>Tue, Oct 18</td>
<td>Planetary Geology</td>
<td>9</td>
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<tr>
<td>Thu, Oct 20</td>
<td>Planetary Geology</td>
<td>9</td>
<td></td>
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<tr>
<td>Tue, Oct 25</td>
<td>Planetary Atmospheres</td>
<td>10</td>
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<tr>
<td>Thu, Oct 27</td>
<td>Planetary Atmospheres</td>
<td>10</td>
<td></td>
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<tr>
<td>Tue, Nov 1</td>
<td>Terrestrial Planets</td>
<td>10</td>
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<tr>
<td>Thu, Nov 3</td>
<td>Terrestrial Planets</td>
<td>10</td>
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<tr>
<td>Tue, Nov 8</td>
<td>Jovian Planets</td>
<td>11</td>
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<tr>
<td>Thu, Nov 10</td>
<td>Jovian Planets</td>
<td>11</td>
<td></td>
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<tr>
<td>Tue, Nov 15</td>
<td>Exam 2</td>
<td></td>
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<tr>
<td>Thu, Nov 17</td>
<td>Asteroids, Comets, and Dwarf Planets</td>
<td>12</td>
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<tr>
<td>Tue, Nov 22</td>
<td>Exoplanets</td>
<td>13</td>
<td></td>
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<tr>
<td>Thu, Nov 24</td>
<td>THANKSGIVING</td>
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<tr>
<td>Tue, Nov 29</td>
<td>Exoplanets</td>
<td>13</td>
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<tr>
<td>Thu, Dec 1</td>
<td>Life in the Universe</td>
<td>24</td>
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</tbody>
</table>

HW 5 (BB). Mid-Semester Feedback (BB)
HW 6 (BB)
HW 7 (BB)
HW 8 (BB)
HW 9 (BB)
HW 10 (BB)
HW 11 (BB)
Tue, Dec 6 | Life in the Universe | 24 | Survey 2 (BB)  
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TBA | Cumulative Final Exam |  |  
*BB denotes assignments to be completed on Blackboard  

**ACADEMIC INTEGRITY**

I support the TTU Code of Student conduct. Essentially, it states:

> It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

For the remainder of the code, see: [http://www.depts.ttu.edu/opmanual/OP34.12.pdf](http://www.depts.ttu.edu/opmanual/OP34.12.pdf)

**RELIGIOUS HOLIDAYS**

Texas law requires institutions of higher education to excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holiday. The student shall also be excused for time necessary to travel. An institution may not penalize the student for the absence and allows for the student to take an exam or complete an assignment from which the student is excused. While no prior notification of the instructor is required, OP 34.19 indicates that a student who intends to observe a religious holiday should make that intention known to the instructor prior to the absence. The student should make up any missed work. For more information, please visit: [https://www.depts.ttu.edu/opmanual/OP34.19.pdf](https://www.depts.ttu.edu/opmanual/OP34.19.pdf)

**DISABILITY SERVICES**

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor’s office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in 335 West Hall or call 806.742.2405.  
[http://www.depts.ttu.edu/opmanual/OP34.22.pdf](http://www.depts.ttu.edu/opmanual/OP34.22.pdf)
UNIVERSITY COUNSELING AND RESOURCES FOR DISCRIMINATION, HARASSMENT, AND SEXUAL VIOLENCE

The university experience can be a time of substantial growth for students, filled with changes, challenges and new decisions. Few students move through this time without some personal turbulence, and many experience periods of trauma, crisis, stress, and confusion. The Student Counseling Center staff is available to help students with any problems they may be experiencing. For more information, please visit: http://www.depts.ttu.edu/scc/. Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the Office for Student Rights & Resolution, (806)-742-SAFE (7233) or file a report online at titleix.ttu.edu/students. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are:

- **TTU Student Counseling Center, 806-742-3674, [https://www.depts.ttu.edu/scc/](https://www.depts.ttu.edu/scc/)  (Provides confidential support on campus.)**
- **TTU Student Counseling Center 24-hour Helpline, 806-742-5555, [806-742-5555](tel:806-742-5555)**, (Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.)
- **Voice of Hope Lubbock Rape Crisis Center, 806-763-7273, [http://voiceofhopelubbock.org](http://voiceofhopelubbock.org) (24-hour hotline that provides support for survivors of sexual violence.)**
- **The Risk, Intervention, Safety and Education (RISE) Office, 806-742-2110, [http://rise.ttu.edu](http://rise.ttu.edu) (Provides a range of resources and support options focused on prevention education and student wellness.)**
- **Texas Tech Police Department, 806-742-3931, [http://www.depts.ttu.edu/ttpd/](http://www.depts.ttu.edu/ttpd/) (To report criminal activity that occurs on or near Texas Tech campus.)**

SECURITY

It is very important that you familiarize yourself with the emergency procedures for evacuation, fire, flood, medical, violence and workplace threats, and tornado. You can find these procedures at the following link: [http://www.depts.ttu.edu/communications/emergency/procedures.php](http://www.depts.ttu.edu/communications/emergency/procedures.php) In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location. When clear of the building please continue away from the building and meet class Instructor at Memorial Circle.

EMERGENCY NOTIFICATIONS AND ALERTS
TechAlert! is the principal method that the University uses to communicate emergency situations and class cancellations or delays. If you have not already done so this semester, update cell phone, home phone or text message information at: https://appserv.itts.ttu.edu/EmergencyAlert/