INTRODUCTION TO ASTRONOMY (PHY161)
COURSE SYLLABUS
Winter-Spring 2014

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Office Hours: Tuesdays and Fridays, 15:30 to 16:50; other times by appointment.

Text: Schneider and Arny, *Pathways to Astronomy*, 2012, 3rd ed., ISBN 978-0-07-351213-6, McGraw Hill, New York: Available as an e-book or hardcopy in the bookstore.

Course Manual: Pfeiffer, R. J., *A Manual for Introductory Astronomy*, Revised 2012 Edition, Cengage Learning, Mason, OH: Available only in the College Bookstore. Do not buy a used copy, it may be the wrong edition.

Course Materials: A protractor for measuring angles; a 30-cm (12 in.) long centimeter ruler, preferably of clear plastic, a calculator, and a stapler. (The pages of all lab reports must be stapled together in the upper left corner; no paper clips)

Course Description: A study of the knowledge gained in our investigation of the universe from an historical perspective. Topics included are (1) celestial coordinates, (2) observing the sky, (3) the Earth and its motions, (4) time and the calendar, (5) the seasons, (6) the properties, origin, and evolution of the solar system, stars and stellar systems, including galaxies, and (7) cosmology.

Laboratory sessions will involve an investigation of observable celestial phenomena, including celestial coordinates, the diurnal motions of the stars, the orbital motions of the planets, the phases of the Moon, and eclipses. This will involve the use of interactive computer software, the TCNJ planetarium and the observatory facilities. Some nighttime observing is included on a voluntary basis.

General Course Outline:

1. Introduction: a general overview of the contents, dimensions and structure of the physical universe, including the Earth and its place in the cosmos. Week 1.

2. The celestial sphere, the motions of the Earth and their consequences for celestial phenomena. (Most of this material will be covered in the laboratory.) Weeks 1 - 9

3. The nature, physical properties, and formation of the solar system and its members. Weeks 2 - 6

4. The physical properties and evolution of stars and stellar systems. Weeks 7 - 10

5. The structure and physical properties of the galaxies. Weeks 11 & 12

6. Cosmology and cosmogony. Weeks 12 &13

COURSE PURPOSE & LEARNING GOALS

The purpose of this course is to familiarize the student with the knowledge that has been garnered in the investigation of the physical universe, from the immediate vicinity of the Earth within the Solar System to the largest scales of physical reality. This will be done with a historical perspective. One should achieve and appreciation of the place of the Earth within the cosmos, the structure of the universe, and a sense of evolution that occurs on various levels. Laboratory sessions will involve an investigation of observable celestial phenomena so that one can appreciate and understand what may be seen happening in both the daytime and nighttime sky.

This course may be elected to satisfy the liberal learning requirement in the natural sciences. It may also be elected by anyone who has a curiosity about astronomy.

COURSE SCHEDULE AND OTHER DETAILS MAY BE FOUND IN OTHER DOCUMENTS **AT THIS WEB SITE.**

In this class, the deep learning outcomes associated with TCNJ's 4th hour are accomplished by a series of rigorous educational assignments that extend beyond the typical scheduled class time. These include activities conducted in the scheduled laboratory section and the following out-of-class assignments:

1. Additional laboratory exercises to be done using computer software.
2. Writing lab reports to be submitted for grading
3. Homework assignments to be completed and graded.
4. Online reading assignments on which you will be tested.
5. Additional readings in the Textbook and Course Manual on which you will be tested.
6. Visits to the observatory at night.

Tests:

There will be three or four major tests given during the semester, one every 3 weeks or so. These tests are designed to take between 40 minutes and 50 minutes, and for the time remaining, regular class will be held.

There may also be some very short quizzes.

A comprehensive final examination, worth approximately 25 to 30% of the course grade, will be given during the final exam period. The final exam is usually three hours long.

Students are advised to keep up with their studies in order to avoid cramming for tests.

Attendance:

Students are expected to participate in each of their courses through regular attendance at lecture or discussion sessions. It is further expected that every student will be present on time and prepared to participate when scheduled class sessions begin. Attendance will be taken daily. Attendance is strongly correlated with test performance. Students with poor attendance lose credit for class participation: Ten points will be subtracted from a student's total accumulated points for every class missed, unless a documented excuse is submitted. Attendance in lab is also mandatory**.** See below and the online document "LABINFO" for more specific information about lab requirements and attendance.

If a student misses a class, regardless of the reason, that student must find out the material they missed and master it before the next class. If a test or quiz is given on the day a student returns to class, the student must be prepared to take that quiz. An exception shall be made for students with documented evidence of prolonged illness.

More information about TCNJ's attendance policy is available on the web at:

http://www.tcnj.edu/~recreg/policies/attendance.html

Missing a Test:

All outside-class appointments must be made around scheduled test times. Missing a test or quiz must be considered a grave matter, since make-up tests are given only in rare cases and only when documentation for a valid absence can be provided.

Trips for personal reasons are not valid excuses for missing a test.

In all cases, make-up tests are much harder than regularly scheduled tests. So, if a student knows in advance that a scheduled test will be missed for a valid reason, it may be possible to reschedule that test for another day or at a different time on the same day, if the instructor is notified as soon as possible. In this way, the problem of taking a make-up test can be avoided. A test will not be postponed for a student because they are unprepared. Missed quizzes cannot be made up.

Saying, "I missed the test because I was ill" is not an acceptable excuse. If a student is sufficiently ill to miss a test, then they should go to the College Infirmary or see their physician.

If a test or quiz is missed because of illness, a student must present documentation from their physician or the College Infirmary in order to take a make-up test. A note from a dormitory RA is not a valid medical document. Failure to comply with these procedures could mean automatic failure of the missed test.

Students who arrive late to class and miss a quiz automatically fail the quiz. If a student misses a quiz because they were absent, they fail the quiz unless they have a medical or some other legitimate excuse. In any event, a student who misses a class is still responsible for the subject matter they missed and must be prepared to take the quiz on the day they return.

If a student misses a test or quiz because of a death in the family, proper procedure is for the student to notify the Dean of Student Life, who, in turn, will notify the instructor. Only such notification from the Office of Student Life will entitle a student to take a make-up test, otherwise a failure will be incurred. must contact their instructor to arrange for a make-up test at the earliest opportunity but no later than the first day they return to campus. Do not wait until class to notify me.

In general, excuses for missing a test because of transportation problems are not acceptable. It is the student's responsibility to get to class for a test, by whatever means it takes (plane, train, bus, cab, bicycle, or skateboard), even if they are late. Students who depend on others for commutation to campus should particularly take note of this.

The basis for these somewhat stringent rules is, in part, to provide equity amongst all students. Simply put, to excuse someone for missing a test is not fair to those students who have made the effort to be in class for the test.

Classroom Protocol:

Please do not try to settle personal matters with me immediately before or after class because I need this time to prepare for class and/or it takes from class time. All personal problems must be dealt with during office hours.

Common courtesy for the instructor and other students demands that there be no talking, or eating while class is in session. Food and liquids of any kind are not permitted in the laboratory or planetarium. Violators will be cast out into the cold where there will be weeping and wailing.

Audio and video recordings of classes are not permitted.

Please turn off your cell phone during class.

During class time, I request your full and undivided attention. Hence, do not attend class with an i-pod or other listening devices in your ears. Otherwise, stay at home.

Laboratory:

Laboratory work is a necessary aspect of the course and constitutes about 30% of the course grade. Every student must attend all scheduled lab sessions and complete all exercises or they will be considered not to have completed all the requirements to pass the course. If a student is absent from a scheduled laboratory session, 30 points will be deducted from that student's number of earned course points for each missed lab, unless a student fills out and submits a "MISSED LAB FORM" to their instructor with a documented excuse. This must be done even if the lab is made up.

The "MISSED LAB FORM" is available as a site on this web page; it is to be downloaded and printed when needed. However, submission of the form does not guarantee you will be absolved of the above penalty unless your excuse is deemed valid and you have submitted proof that you have completed the missed work. Regardless, a student is still responsible to know the missed material for any test.

All lab and homework assignments that are to be handed in for grading and credit must be done thoroughly, according to the instructions, neatly, and on time. Late reports will be penalized.

Answer sheets removed from the Course Manual and submitted as part of a lab report will not be accepted. Lab reports will usually consist of answer sheets downloaded from my web page, photocopies of other specified pages from the **Course Manual,** or forms distributed to the student by the instructor. All pages of a report, including any photocopies, must be 8.5 x 11 inches. Photocopies obtained that are larger than this should be cut to 8.5 x 11 dimensions before handing in the report and all pages must be stapled together. Photocopies must be legible and clear. Your name, date, and lab section number (e.g. Lab Section 05) should be at the top of each page. Each assignment is to be done with care, neatness, and style as though it were a term paper. **Assignments done carelessly or that do not adhere to the above criteria will be returned without credit.**

Be sure to bring your lab manual, ruler, protractor, and calculator with you to every lab session, unless told otherwise.

Also see "LAB INFO" file at this web site.

Extra Credit

Do not ask for extra credit work to enhance your grade or to prevent you from failing. You must demonstrate by means of the tests and laboratory reports that you have mastered the subject matter. The exception is that extra credit may be obtained by filling out an "Observation Form" that may down-loaded from this web site. The form is then to be taken to the Observatory on a night when it is open and have the observatory technician sign the form in the appropriate place. You are to make a sketch or drawing of the object that you been have shown through the telescope. Tell the technician that looking at just a star is not a suitable object. The object must be the Moon, a planet, a star cluster, a nebula, or a galaxy, that is, any Messier Object. The better the drawing you make the more credit you will obtain. Extra credit is limited to 10 objects, each of which must be a different object. The link to the observatory website to find out when it is open, and other information, is: www.tcnj.edu/~vega

Returned Assignments:

Do not discard any tests, quizzes, lab reports, or any other graded assignments that have been returned to you, until the end of the semester. This is because they should be used to prepare for the final exam. In addition, they may be recalled by the instructor, if he so requests, to check the grading, or if grades are lost because of some unforeseen circumstance. Failure to return a document when requested may result in a zero or penalty deemed appropriate by the instructor.

Course Requirements:

1. Ability to work with numbers, to do arithmetical calculations, and to do very simple algebraic manipulations.

2. You will be required to run software on a computer in the Science Computer Lab and complete any assignments. No prior computer experience is necessary.

3. To do well on all tests, the final exam, all laboratory exercises, and any other assignments.

4. Equipment needed: a pocket calculator with trig and log functions, a centimeter ruler (at least 25 cm long and preferably flexible and of clear plastic), a protractor, and a stapler. Be sure to bring your ruler, protractor, and calculator with you for all labs. A Cell phone, or any electronic device that can store information or the internet, may not be used as a calculator during a test or quiz.

5. All pages of an assignment **must be stapled together. Please Note: paper clips and bending and tearing a corner are not acceptable means of binding.**

6. Extra credit may be earned by going to the observatory. See observatory form to download.

Grading Criteria:

1. Students are expected to memorize the terminology, comprehend the subject matter, and to be able to apply the concepts to specific problems and questions on the tests. Test performance will be the primary factor for determining a student's course grade.

2. The instructor shall make a professional judgment of each student's mastery of the course material based on his observations of the student in both the classroom and laboratory. This judgment will be important when a student's grade is borderline.

3. Each student is expected to attend all laboratory sessions and satisfactorily complete all assignments. Laboratory work will be graded through both test results and evaluation of an unspecified number of lab reports that will be submitted for grading and/or lab manuals will be inspected.

4. Students will complete all assignments on time and in a satisfactorily manner. All assignments handed in for credit must be done on standard 8.5x11 inch, white paper, without serrated edges. Failure to adhere to these requirements will result in a failure or no grade.

5. Students are expected to adhere to the College's standards for communication skills, especially for writing grammatically correct English. Tests will be graded accordingly. All astronomical terms, nomenclature, and proper names introduced as part of the matter must be spelled correctly.

6. Note: Extra credit assignments will not be given in lieu of poor test grades or lab reports, or to avoid failing the course.

7. Extra credit may be earned by going to the observatory. See observatory form to download.

Computation of Course Average and Grade:

Course grades will be awarded primarily on the basis of a student's grand average percentage. The latter is found by adding together all the points a student has earned on all tests and assignments (total earned course points) and dividing this by the total number of possible course points. The following is a partial example for a hypothetical student:

Test #1: 185 out of 200 points
Test #2: 165 out of 180 points
Test #3: 175 out of 210 points
Quiz #1: 25 out of 40 points
Lab #5: 55 out of 60 points
Hmwrk #3: 40 out of 45 points
Final Exam: 305 out of 320 points

Sums: 950 earned course points out of 1055 total number of possible course points.

This is a grand percentage equal to 950 / 1055 = .900 = 90%.

This grand percentage is converted to a letter grade (A, A-, B+, ... F) for the course after the instructor examines the distribution of all such percentages for all the students in the class. This is often referred to as "curving." For example, a 90%

usually translates to an A- and an 85% usually translates to at least a B. However, curving may translate an 85% to be a higher grade such as B+, but a curve usually does not lower a grade.

It is expected that every student will calculate and know their course average as explained above at all times. So do this every time a test or assignment is returned to you.

Academic Integrity Policy

Academic dishonesty is any attempt by the student to gain academic advantage through dishonest means, to submit, as his or her own, work which has not been done by him/her or to give improper aid to another student in the completion of an assignment. Such dishonesty would include, but is not limited to: submitting as his/her own a project, paper, report, test, or speech copied from, partially copied, or paraphrased from the work of another (whether the source is printed, under copyright, or in manuscript form). Credit must be given for words quoted or paraphrased. The rules apply to any academic dishonesty, whether the work is graded or ungraded, group or individual, written or oral.

TCNJ's academic integrity policy is available on the web: http://www.tcnj.edu/~academic/policy/integrity.html.

Americans with Disabilities Act (ADA) Policy

Any student who has a documented disability and is in need of academic accommodations should notify the professor of this course and contact the Office of Differing Abilities Services (609-771-2571). Accommodations are individualized and in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992.

TCNJ's Americans with Disabilities Act (ADA) policy is available on the web: http://www.tcnj.edu/~affirm/ada.html .

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