I. Locator Information:
Instructor: ______ Dr. A. Umantsev ______  Office Location: ___ LS 318____
Course # and Name: ___ Astronomy-111-02____  Office hours: M: 3:00-4:00pm TR: 2:00-3:00pm
Semester Credit Hours: 4  Office Phone: ___(910) 672-1449____
Total Contact Hours for Class: __4.333/week___  Email address: ___aumantsev@uncfsu.edu___
Day and Time Class Meets: Room 100 (Planetarium) on TR: 12:30-1:45pm for Lectures,
Room 220 on M: 1:00-2:50pm for Labs.

II. Course Description:  A general introductory course covering major areas of modern
astronomy.  Topics include the physical nature of stars and galaxies.  Neutron stars, black
holes, quasars.  Laboratory activities illustrate different techniques used to gather and
interpret information about these objects.

III. Prerequisite: There is no prerequisite to this course.  The basic knowledge of high school
algebra, however, is important, as we will be using fractions, proportions, and diagrams.

IV. Disabled Student Services:  In accordance with Section 504 of the 1973 Rehabilitation Act
and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you
have a disability to please contact the Center for Personal Development in the Spaulding
Building, Room 155 (1st Floor); 910-672-1203.

V. Instructional Material:
Text: We recommend “Astronomy Today” by Chaisson & McMillan, 6th edition.  However,
there are many very good astronomy textbooks which will do as well as this one.  Early editions
will also work for you; just check the contents of the book against the Outline of topics in the
syllabus.
Lab Manual: “Contemporary Activities in Astronomy”: D.B. Hoff, and J.A. Wilkerson,
Kendall/Hunt Publishing, 1999 or later edition.  You will need THIS manual as all the labs will
be taken from it.
Beware that the textbooks can be purchased not only from a campus bookstore, but off the
Internet also.  Explore all your options and look for the best deal for you.

VI. Student Learning Outcomes: Upon completion of the course you should be able to:
1. Identify major stars and constellations.
2. Determine the major properties of stars, galaxies and universe.
3. Appreciate the current theories of cosmology.
VII. Course Requirements and Evaluation Criteria
There will be 3 regular tests and a final test (not comprehensive), 50 POINTS EACH. Students will be allowed to use their lecture notes on the test, but NOT THE TEXTBOOKS. There will be NO MAKE-UP TESTS FOR ANY REASON. However, the lowest score of ONE TEST will be dropped.
There will be 10 (approximately) graded lab assignments, 10 POINTS EACH. Although students are encouraged to work on lab reports in a group of two or three, they MUST submit INDIVIDUAL reports in order to get credit.
Students may write an open-ended research-type paper on one of the subjects related to the course, which will bring them up to 15 POINTS of extra-credit.
A student who earns the largest number of points gets A. Also:
92 - 100% of the largest number of points = A
80 - 91.9% of the largest number of points = B
64 - 79.9% of the largest number of points = C
48 - 63.9% of the largest number of points = D
Below 48% of the largest number of points = F

VIII. Teaching Strategies and Course Practices
The lecture-demonstration method will be used throughout the course. The required readings will include the textbook and the handouts. Students are encouraged to think over problems in the textbook pertinent to the classroom discussion.
Attendance of all lectures and lab sessions is expected. This class is being taught in the Planetarium where low light level or no light at all may be expected from the beginning of the class. Tardiness will be disruptive to the students present and create a safety hazard to a tardy.

TURN OFF YOUR CELL PHONES BEFORE ENTERING THE CLASSROOM!!
DO NOT BE LATE!!

Much of the work that will be done in completing laboratory activities will require the student to complete graphs and make calculations. For these reasons you have to bring the following items to each lab session:
   1. A ruler
   2. A protractor
   3. Scientific graph paper
   4. A calculator
Your final report should contain conclusions that you made while working on the project. See Appendix A.
There may be one/two observational sessions when students will have to attend a night session of the lab. This session will solely depend on the weather conditions and may be postponed. Students will be notified about that approximately a week in advance.
IX. Outline of Topics and Tentative Schedule of Tests

1. The Foundations of Astronomy
   The Scale of the Cosmos. Our place in the Universe. The Measurement of Distance
   Chapter 1

2. Newton's Laws and Newtonian Mechanics
   Gravity and Motion. Explanation of Planetary Motion
   Chapter 2

3. Information from the Cosmos
   Test #1
   Chapter 3,4

4. The Sun is our Parent Star.
   Chapter 16

5. Measuring Properties of Stars
   Test #2
   Chapter 17

6. Star Formation
   Chapter 19

7. Stellar Evolution.
   Chapter 20
   Test #3

8. Stellar Explosions
   Chapter 21

9. Neutron Stars and Black Holes
   Chapter 22.
   Final Test, April 30th, 2009


12. Cosmology.

X. Lab Assignments

Exercise 11: Angles and Parallax 77
Exercise 15: Determining the Mass of the Moon 101
Exercise 12: Kirchhoff's Laws and Spectroscopy 83
Exercise 13: Image Size-Focal Length Relationship 91
Exercise 24: Solar Rotation 155
Exercise 25: Proper Motion of a Star 171
Exercise 26: Spectral Classification 177
Exercise 27: A Color-Magnitude Diagram of the Pleiades 185
Exercise 28: Distance to the Pleiades 191
Exercise 29: Galactic Clusters and HR Diagrams 199
Exercise 30: The Distribution of Star Clusters on the Sky 209
Exercise 31: Supernova 1987A 217
Exercise 32: Measuring Distances to Objects of Known Luminosity 229
### FSU Policy on Disruptive Behavior in the Classroom (Optional)

The *Code of the University of North Carolina* (of which FSU is a constituent institution) and the *FSU Code of Student Conduct* affirm that all students have the right to receive instruction without interference from other students who disrupt classes.

FSU Core Curriculum Learning Outcome under Ethics and Civic Engagement (6.03): All students will “prepare themselves for responsible citizenship by fulfilling roles and responsibilities associated with membership in various organizations.” Each classroom is a mini-community. Students learn and demonstrate responsible citizenship by abiding by the rules of classroom behavior and respecting the rights all members of the class.

The FSU Policy on Disruptive Behavior (see FSU website for complete policy) identifies the following behaviors as disruptive:

1. Failure to respect the rights of other students to express their viewpoints by behaviors such as repeatedly interrupting others while they speak, using profanity and/or disrespectful names or labels for others, ridiculing others for their viewpoints, and other similar behaviors;
2. Excessive talking to other students while the faculty member or other students are presenting information or expressing their viewpoints.
3. Use of cell phones and other electronic devices
4. Overt inattentiveness (sleeping, reading newspapers)
5. Eating in class (except as permitted by the faculty member)
6. Threats or statements that jeopardize the safety of the student and others
7. Failure to follow reasonable requests of faculty members
8. Entering class late or leaving class early on regular basis
9. Others as specified by the instructor.

The instructor may take the following actions in response to disruptive behavior. Students should recognize that refusing to comply with reasonable requests from the faculty member is another incidence of disruptive behavior.

1. Direct student to cease disruptive behavior.
2. Direct student to change seating locations.
3. Require student to have individual conference with faculty member. At his meeting the faculty member will explain the consequences of continued disruptive behavior.
4. Dismiss class for the remainder of the period. (Must be reported to department chair.)
5. Lower the student’s final exam by a maximum of one-letter grade.
6. File a complaint with the Dean of Students for more severe disciplinary action.

Students who believe the faculty member has unfairly applied the policy to them may make an appeal with the faculty member’s department chair.

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### XI. Academic Support Resources –

A number of resources are for students to succeed in this class, including University College Learning Center and Chesnutt Library.
APPENDIX A

1. At the beginning of each report give
   a. Title of the exercise
   b. Name (Yours)
   c. Date
   d. Laboratory partner(s) names, if any.

2. Purpose
   Summarize in your own words the purpose of the exercise, including any modifications as the exercise progressed.

3. References
   If any references other than those that may be given in the exercise have been used, list them. All exercises assume that your text is the reference of choice; you do NOT have to list them as references.

4. Procedures
   Summarize in a few lines the basic procedures used. If any substantial changes from the procedures suggested in the exercise guide were made, note them.

5. Data
   a. Label all data
   b. Give units for all data
   c. List data in tabular form
   d. If possible, take several readings for each data point and use the average value.

6. Graphs
   a. Plot each graph to as large a scale as is practical.
   b. Title each graph.
   c. Label the quantities plotted on each axis and label each curve if you have more than one.
   d. Give units on each axis.
   e. Where appropriate, draw a smooth curve or line through the data points. **DO NOT CONNECT THE POINTS IN A DOT-TO-DOT MANNER UNLESS SPECIFICALLY TOLD TO DO SO.** The actual data points do not have infinite accuracy, and thus may not lie exactly on the proper curve. Draw a smooth curve such that positive and negative deviations are about equal and such that the curve matches the general trend of the data (this is called a "best fit curve"). This process averages the experimental fluctuations and the results deduced from the curve are usually more accurate than those deduced from individual measurements.

7. Calculations
   a. Give calculations in a logical order down the page. Indicate the equation being used or the mathematical operation being done for each step.
   b. Give units in each step of a calculation. Keeping close track of units of measure may often help you avoid errors.
   c. If one method of calculation is repeated several times for different values, give a sample calculation and tabulate the results of the repeated calculations.
   d. If a standard value is available for the quantity you have calculated, compare your experimental value to the standard and compute your percent of error. The percent of error is given by
      \[
      \frac{(SV - EV)}{SV} \times 100 = \text{Percent Error}
      \]
      Note that this error in your derived value is not the "experimental error" which results from uncertainty in measurements. Percent uncertainty or discrepancy between two values is calculated in a similar manner.

8. Conclusions
   Give a brief statement of your conclusions and final results.

9. Discussion Questions
   Answer all questions asked in the exercise guide, as well as any others your instructor presents, as concisely and completely as possible. **THINK** before you write.