SYLLABUS: ASTRONOMY 1020, FALL 2006
STELLAR AND GALACTIC ASTRONOMY

Prof. Paul J. Wiita

Lecture Timings: Tuesdays & Thursdays: 9:30 AM — 10:45 AM

Room: 101 Classroom South

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Office Hours: Mondays 10:30 – 11:30 AM, Tuesdays 11:00 AM – noon, Wednesdays 10:00 – 11:00 AM & **by appointment**. Note that I will not normally be in the office on Fridays this semester, as I will be spending most weekends in Princeton, NJ with my family. If you need to contact me on those Fridays you can call me at (609) 273-7177 or e-mail me. I will be reading my e-mail frequently on all Fridays and sporadically on Saturdays and Sundays. I will communicate with you via your student e-mail account at GSU, so you should either check it frequently or arrange to forward mail sent there to your preferred e-mail address.

Required Textbook: E. Chaisson & S. McMillan, **Astronomy Today**, Fifth Edition (2005), Pearson Prentice Hall. If you took Astr 1010 some time ago and still have a Fourth Edition of this book you can use it.

GENERAL INFORMATION:

Astronomy Today is an excellent text, but it does not include all the material in my lectures and, I will not cover *everything* in the text. The textbook web-site
http://wps.prenhall.com/esm_chaisson_astronomytoday_5 should be quite helpful to many students. Please use the practice questions and other study aids on these electronic course supplements. Many of you might also benefit from looking at texts with different viewpoints; another excellent book is **The Cosmic Perspective** by Bennett et al.

All students are expected to be familiar with the Policy on Academic Honesty, section 1380 (pages 72-75) of the **Undergraduate Catalog**, which can be downloaded from the web at:
http://www.gsu.edu/es/catalogs_courses.html ;

furthermore, you are expected to abide by it. If you are caught cheating you will earn a zero on that assignment, quiz or exam, and the penalties can be substantially more severe.

You are expected to be considerate and respectful of other students; talking (other than to ask questions of me) or eating in class are patent forms of discourtesy. **Cell phones and pagers are to be turned off while in class.** I will confiscate any devices making noise during class. If you find yourself distracted by the behavior of other students and I do not notice that disruption, please bring that discourtesy to my attention.

COURSE GOALS:

This is the second of two introductory astronomy courses that include a weekly laboratory. Although nearly all students taking this course will have had ASTR 1010 already, it is not an absolute prerequisite, and the most important material covered in 1010 that is needed for this class will be summarized in the early lectures. We will study the nature of the entire universe, beginning with a review of properties of light, since it is mainly through radiation that astronomers can gather information about stars, galaxies and the universe as a whole. The main topics are: the Sun as a star; what we know about stars and how we have learned it; the formation, lives and deaths of stars, including neutron stars and black holes; the nature of our Galaxy and other galaxies; active galaxies and quasars; the distribution of matter and energy in the universe; the entire history of the universe. Aside from learning a significant amount of exciting and important factual material, comprising a summary of our best current knowledge of astronomy, students should come away from this course with an appreciation of the techniques and thinking styles employed by scientists when they attempt to understand what is going on in very distant places which they cannot actually visit to perform experiments. **As this is a natural science course, quantitative reasoning will be used frequently**; however, the only mathematics you are expected to know is basic algebra.

COURSE REQUIREMENTS:

You are responsible for all the material in the assigned readings and in the lectures unless you are specifically told otherwise. While attendance at every lecture is not required, it is expected, and prompt attendance will be a factor in grading. It will be difficult for any student to get a grade better

than a C if (s)he does not attend nearly every class. If you must miss a lecture, you should be certain to hand copy the notes of another student as soon as possible. This active copying is far more conducive to learning the material than making an electronic copy and just reading it.

A summary of most class notes, as well as assignments and answers to assignments, will be posted directly to my web-site, at `http://www.chara.gsu.edu/~wiita/teaching.html` . These abbreviated notes will not substitute for the need to attend (and pay attention in) class, but they will allow you to check that you have not made significant errors in your personal notes and to fill in any gaps in that note taking. Note that I do not use Web-CT, as it is involves too clumsy an interface; my personal web-site provides adequate functionality for this course.

You are strongly encouraged to ask questions before, during or after class if something is not clear. If my office hours conflict with your schedule, just make an appointment to meet with me. You are also welcome to ask questions of your laboratory instructors at the end of a lab period. I *strongly urge* you to read the assigned chapter *before* the corresponding lecture(s). As you do so, note the points with which you have difficulty, so that if they are not clarified during the class you can immediately raise questions. Soon after the lecture, carefully (re-)read the corresponding text sections to reinforce the material. DO NOT WAIT UNTIL A DAY OR TWO BEFORE AN EXAM TO TRY TO CRAM THIS MATERIAL INTO YOUR BRAIN. It won't work!

I hope that most students will attend my office hours during the semester. Office hours are designed to accomplish these purposes: students who are very interested in the subject can discuss advanced topics with the professor; the professor can answer questions from students that were not adequately clarified by a careful rereading of the text and notes; we can discuss how best to improve your results in this course.

There will be four one-hour exams. All of the questions will be of a short answer (true/false, multiple choice, matching, fill-in-the-blank, etc.) variety. No more than 25% of any exam will comprise questions involving simple mathematics. The examination questions will stress the material covered in class, so punctual attendance and careful notetaking will be keys to doing well; however, there will typically be a few questions asked that are covered in the text but not in the lectures, so don't neglect your reading.

The average student will do well in this course if (s)he devotes four to

six hours a week (outside of lecture and lab) to reading the textbook and reviewing her or his notes. If you are not prepared to devote this much time to studying, you really should not be taking a science course this semester. Although I will only assign a small number of questions to be graded, you should be sure to answer many of the questions at the end of each chapter and on the textbook web-site to test your knowledge of the material well in advance of exams.

GRADING:

Each of the four hour exams will count as 15% of your grade. Several pop quizzes and four assignments will comprise a total of 15%, and your lab work will count for the remaining 25%. (Because I will be out of town during the final exam period there will be no cumulative final exam this semester.)

Scheduled Exams: There will be no make-up exams; however, I will drop the lowest of the four one-hour exam grades in computing your final grade, so if you miss one of the hour tests that will count as your lowest score and each of the other three tests will count for 20% of your grade. If you miss two of them, you'll receive a zero for one, and the remaining exams will still contribute a maximum of 45 out of 100 points, so it will be nearly impossible to get a B (and it will be very difficult to get a C). *Therefore, don't get sick on more than one exam date.*

Quizzes: There can be no make-up for an unannounced quiz, so missing one yields a zero; this provides an incentive for attending every class. I plan to give each of these quizzes at the beginning of a class, so they are also an incentive for being punctual. I won't grade all of them, so a few will just serve as a check that you were there, but most of them will be graded as a check that you are keeping up with the material. The answers will usually be given to you immediately after the quiz is collected so you will know your grade for that quiz and I will return them with the next exam.

Assignments: Note that all assignments will be posted to the web-site, so that if you miss class on a given day, be certain to check if an assignment was given so that you can hand it in on time. Assignments will usually be distributed three classes before each exam and collected and reviewed during the class before the corresponding exam. These assignments and the posted summaries of class notes are designed to serve in lieu of "study guides", which are inappropriate for a college course.

An average grade of 93% or better guarantees an A, an average grade of

$>$ 90% but $<$93% is an A^-, between 90% and 87% will produce a B^+, one between 83% and 87% will give a B, while an average grade of $>$ 80% but $<$83% is an B^-, between 80% and 77% will produce a C^+, one between 73% and 77% will give a C, and $>$ 70% but $<$73% is an C^-. At the low end, a grade between 60% and 70% is enough for a D (no plus/minus is allowed on D's) and an average $<$60% produces an F. If the mean class grade on an exam falls below 70% I will 'curve' the scores so as to bring the mean up to between 70% and 75%.

The lab portion of the course tends to raise most people's course averages.

THE LABORATORY COMPONENT OF THIS COURSE:

When you registered for this course you automatically signed up for one of the associated lab sections, to be held in Room 516 Kell. Before attending the first lab (on August 28–Sept. 1) you must have the lab manual; if you have taken Astronomy 1010 recently, the one you have contains both sets of labs. Bring a protractor, drawing compass, cm ruler, calculator and the manual to your first lab. Dr. John Wilson (Rm. 713 One Park Place, Ph: 404-651-2287, wilson@chara.gsu.edu), is in overall-charge of the labs. Either Dr. Wilson or one of the Graduate Laboratory Assistants will be your lab instructor. If you have any questions about the labs, be sure to ask your instructor first, then Dr. Wilson (if he isn't your instructor); contact me in this regard only after speaking with him. Computer number 80311 corresponds to a lab on Mondays from 9:00 AM–10:50 AM; 80512 to a lab on Tuesdays from 11:00 AM–12:50 PM; 80313 to Fridays from 9:00 AM–10:50 AM.

Any missed lab counts as a zero in your lab average; however, one missed lab is allowed in the sense that grade will be dropped in computing your lab grade. But any missed lab in excess of one per semester counts as a zero, and will have a substantial negative impact on your lab grade, which in turn, you will recall, is worth 25% of your course grade.

You are also required to attend an observing session, the schedule of which will be announced in the labs. The smart student does this early in the semester, since they can get very crowded toward the end of term, or bad weather can cause their cancellation. Finally, note that while you are **expected** to complete every lab you **absolutely must** attend at least 7 labs and an observing session in order to get credit for this *laboratory science* course (i.e., if you miss half or more of the labs, you can't pass the course, even if you have a 100% average on the exams, assignments and quizzes).

COURSE SCHEDULE

Date(s)	**Topic**	**Chapter(s)**
Aug. 22	Introduction & The Scientific Method	
Aug. 24	The Nature of Light (a review)	3
Aug. 29, 31	Spectroscopy: Atoms and Light	3, 4
Sept. 5, 7	The Sun: The Nearest Star	16
Sept. 12, 14	Observed Properties of Stars	17
Sept. 19	FIRST HOUR EXAMINATION	3, 4, 16
Sept. 21	The Hertzsprung–Russell Diagram	17
Sept. 26, 28	The Interstellar Medium	18
Oct. 3, 5	Star Formation	19
Oct. 10	Red Giants	20
Oct. 12*	SECOND HOUR EXAMINATION	17, 18, 19
Oct. 17	White Dwarfs	20
Oct. 19, 24	Stellar Explosions and Neutron Stars	21, 22
Oct. 26, 31	Pulsars and Black Holes	22
Nov. 2, 7	Our Home Galaxy: The Milky Way	23
Nov. 9	Other Normal Galaxies	24
Nov. 14	Quasars and Other Active Galaxies	24
Nov. 16	THIRD HOUR EXAMINATION	20, 21, 22, 23
Nov. 21, 23	NO CLASS, HAPPY THANKSGIVING!	
Nov. 28	Galaxy Formation and Dark Matter	25
Nov. 30	Cosmology: Structure of the Universe	26
Dec. 5	Cosmology: History and Fate of the Universe	27
Dec. 7	FOURTH HOUR EXAMINATION	24, 25, 26, 27

*Oct. 13th is the last day to withdraw with a grade of W possible; see Section 1332.10 of the Undergraduate General Catalog.

Of course, **modifications to the above schedule may be necessary**.