Astronomy 4100 / 6100
Spring 2020 REVISED (03/18/2020)

Classroom: 25 Park Place, Room 628
Meeting: Mon & Wed, 2:00-3:15pm
Office Hours: By Appointment

Instructor: Professor Misty C. Bentz
Email: bentz@astro.gsu.edu
Office: 25 Park Place, Office 610

Course Summary: This class will focus on the knowledge, techniques, and skills required to become a successful observational astronomer. We will mainly focus on techniques applicable to optical astronomy. This class heavily emphasizes hands-on learning, problem solving, and direct applications of the knowledge covered in this course.

*** ASTR 4100 is a GSU Signature Experience Course ***

Textbooks:

Required for all: *Observational Astronomy (2nd ed),* by D. Scott Birney
($51 new at Amazon, used available from $34)

Required for 6100: *Handbook of CCD Astronomy (2nd ed)*, by Steve B. Howell
($46 new at Amazon, used from $32), *recommended for 4100 but not required*

Attendance: You are expected to attend all class meetings (unless you have notified me in advance) and to arrive on time and prepared. You can expect me to be aware of time and not keep you beyond the scheduled end of class.

Accommodation for a Disability: Students who wish to request accommodation for a disability may do so by registering with the Office of Disability Services. Students may only be accommodated upon issuance by the Office of Disability Services of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which accommodations are sought.

Academic Honesty: It is expected that all students will be familiar with and abide by GSU's Student Code of Conduct and Policy on Academic Honesty, including all policies related to plagiarism.

Firearms: The passing of GA HB280 means that concealed weapons permit holders are allowed to concealed carry in certain areas on campus. The room where we meet is in a **restricted area**. No firearms may be brought into our meeting room, concealed or otherwise. Any violations will result in an immediate call to campus police to assess the situation.

Group Work: It is understood that students in this class will be required to work together on various aspects of this course. Discussion of homework problems and solution methods with other students in this class is allowed, however all work submitted for a grade must reflect the effort of the student submitting the assignment. Copying another student's work and turning it in for a grade is plagiarism and will be treated accordingly. GSU has a "no tolerance" policy for plagiarism.

Due Dates: Assignments are always due at the beginning of class. Late work will be penalized 25% for each 24-hour period after the due date/time. Exceptions will only be given for exceptional circumstances and will be made at the discretion of the instructor.

Astronomy 4100 / 6100
Spring 2020 REVISED (03/18/2020)

It is expected that you will take the midterm and participate in the proposal reviews on the scheduled dates at the scheduled times. At the discretion of the advisor, the midterm may be taken early. The proposal review cannot be rescheduled because it is a group activity.

Course Components and Grading: This course is comprised of several components. Grades will be determined according to the following criteria:

Homework	20%	90.0% ≤ A	(A- < 92.0%, A+ > 98.0%)
Midterm Exam	20%	80.0% ≤ B ≤ 89.9%	(B- < 82.0%, B+ > 88.0%)
Observing Project	20%	70.0% ≤ C ≤ 79.9%	(C- < 72.0%, C+ > 78.0%)
Presentation	20%	60.0% ≤ D ≤ 69.9%	
Proposal and Review	20%	F ≤ 59.9%	

Homework assignments and the midterm will consist of fewer questions for ASTR 4100 students than those assigned to ASTR 6100 students. The extra questions assigned to ASTR 6100 students will be of a more advanced nature and will require more time and effort to complete than the questions assigned to both groups.

The observing project will consist of the same hands-on requirements for ASTR 4100 and ASTR 6100 students, but will require less data analysis work for ASTR 4100 students. Furthermore, the student's course level will be taken into account when grading the observing project reports and data analysis results and interpretation.

Students in ASTR 4100 will be assigned presentation topics related to detectors used in astrophysics research. Students in ASTR 6100 will be assigned presentation topics related to full instruments (detectors plus additional components) used in astrophysics research.

There is a final project for this class in lieu of a final exam. Students will write observing proposals and participate in peer-review of those proposals, similar to the reviews undertaken by real-life Telescope Allocation Committees (TACs). More details will be given in the second half of the semester.

Course Outcomes: By the end of this semester, students will have experience with the following technical skills (these are good to list on your resume):

- target visibility and planning for an observing run
- computer-controlled telescope and electronic CCD operations
- broad-band imaging
- data reduction and analysis with standard astronomy software
- differential photometry

You will also have knowledge of the basic tools applied in observational astronomy, including their uses, variations, and limitations.

Astronomy 4100 / 6100
Spring 2020 REVISED (03/18/2020)

The course syllabus provides a general plan for the course. Deviations may be necessary.

Week	Monday	Wednesday
1	1/13: Coordinates	1/15: Time
2	1/20: *MLK Jr Day*, No Class	1/22: Telescopes
3	1/27: HW1, Telescopes cont...	1/29: Detectors
4	2/3: CCDs	2/5: Magnitudes, filters
5	2/10: HW2, Errors & uncertainties	2/12: Noise, Signal-to-Noise
6	2/17: Data reduction basics	2/19: Intro to IRAF
7	2/24: HW3, Atmosphere, weather	2/26: Data Reduction Work
8	3/2: Spectroscopy	3/4: Spectroscopy cont...
9	3/9: HW4, Data Reduction Work	3/11: Midterm
10	3/16: *Spring Break, No Class*	3/18: *Spring Break, No Class*
11	3/23: **Class Canceled**	3/25: **Class Canceled**
12	**Fri 4/3: Observing Project Due 5pm**	
13	**Fri 4/10: Recorded Presentations and Slides Due 5pm**	
14	**Fri 4/17: Comments on Presentations Due 5pm**	
15	*Optional: slides for the last 4 lectures on advanced topics have been posted*	
16	**Mon 4/27: Proposals Due 5pm**	**Fri 5/1: Proposal Comments Due 5pm**

The late period begins immediately after an assignment has been collected.

Additional course materials, including this syllabus, lectures, homework assignments, and supplemental reading, can be found at: http://www.astro.gsu.edu/~bentz/astr.4100.6100.html

Course Evaluations: Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take the time to fill out the online course evaluation.

Problems: If you have any problems during this course, please come talk to me and I'll do my best to help resolve the problem. Alternatively, you may contact Dr. Sebastien Lepine, the chair of the Physics & Astronomy Department (slepine@astro.gsu.edu, 404-413-6033), or the GSU Office of Student Support Services (404-413-1680).