

## AS101 – Introduction to Astronomy: Cosmology

Washburn University  
Spring 2008

Instructor: Dr. Brian Thomas  
Office: Stoffer 210B  
Office Hours: M/W 2:00-4:00. Other times by appointment (call or email), or just drop by.  
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Course website: MyWashburn:MyCourses (check here for announcements, solutions, etc.)  
Instructor's website: <http://www.washburn.edu/faculty/bthomas/>

### REQUIRED TEXT:

*Discovering Astronomy*, 5<sup>th</sup> Ed. By Stephen J. Shawl, et al.

Recommended online supplement: <http://www.astronomynotes.com/>

### DESCRIPTION:

This course is an introduction to general astronomy, including historical discoveries and the nature of light and how we use it in astronomy. This course focuses on stellar, galactic and extragalactic astronomy and cosmology, reviewing what is known about the universe and emphasizing how we know it. Through this course you should gain an appreciation for what science is about and how it works.

This course falls under the “World of Nature” General Education Knowledge Area. General Education skills you will acquire in this course include the ability to

- read intelligently
- reason mathematically and understand numerical data
- process information both in terms of synthesis and analysis
- solve problems using the methods of analysis and considering evidence, relevance and validity

### GOALS:

After completing this course you should be able to:

1. Identify and use the scientific process of exploring nature through observation and explanation, especially as it applies to astronomy.
2. Understand basic terms and vocabulary used in astronomy.
3. Read, appreciate and think critically about news articles and other writings about advances in astronomy and cosmology.

You should also gain a general appreciation for the night sky and the wonders of the universe!

### REQUIREMENTS:

#### Attendance, In-Class Activities and Daily Quizzes

**Class attendance is strongly recommended.** A portion of your grade is based on participation in in-class activities. Along with other coursework, these activities are specifically designed to help achieve the course goals and develop the General Education skills listed above. The in-class activities provide an opportunity for you to engage the material and to interact with your peers and the instructor. Fully participating will help you understand and retain the material and ultimately improve your exam scores.

Information on what will be covered and which activities we will do each day is given in the “Daily Info” document available on the course website. For most activities you will be provided with a sheet which describes the activity and has space for your answers. These sheets are available in a packet online – find a link on the course website. **You are required to print these sheets and bring them to class.** I will *not* have extra copies and you will *not* receive credit for the activity if you do not have a sheet when required. Please note that you may print without charge at Mabee Library.

I recommend that you print both the “Daily Info” and activity sheets for the entire semester, put them in a binder or folder and bring them to class with you each day.

Activities will be graded on the basis of completion and effort shown. You will be given up to 5 points for each day’s activities. There will be no excused absences or make-ups. However, I will drop your 6 lowest activity grades at the end of the semester. Therefore, you effectively have 6 free classes during the semester. Activity sheets you turn in will be returned to aid in your studying. Material from these activities *will* appear on exams. **You are strongly encouraged to get help if you are confused about content covered in activities.**

There will be a quiz every class day, consisting of one question based on the reading for that day. These will be graded and there will be no make-ups. Each quiz will be worth 2 points and you will receive 1 point if you are present to turn in a quiz, even if it is incorrect. I will drop the lowest 6 scores at the end of the semester. The purpose of these quizzes is to encourage you to gain exposure to the material before class.

Find more suggestions and hints on the course website in “Expectations.pdf”, under “Files.”

### Reading

**You must read the text before each class.** Each day’s reading is detailed in the “Daily Info” file and there will be a reading quiz daily, as described above.

Note that reading a science text is not like reading a novel. You'll need to spend more time and energy and be “active” as you read. That is, take notes, write questions in the margins, work out example problems, etc. You might find it helpful to read a section quickly through and then go back and look more closely at the details. The more exposure you have to material the better you will learn it.

As you read, pay attention to the “Inquiry” boxes throughout the chapters. These can help you think about the concepts being introduced as you go along. Answers are listed at the end of each chapter

### Homework

Homework will be assigned for each chapter covered. Homework will *not* be collected or graded – its purpose is to emphasize material covered in class and give you more practice. Exam questions will be drawn from topics covered in the homework (but will not necessarily be the same questions).

Answers to every assignment will be posted on the course website so that you can check your work. **I strongly recommend that you attempt the homework, then check your answers and go through the assignments with me whenever your original answers do not match the solutions or you are confused about the answers.**

### ASSESSMENT:

#### Exams

Exams are used to assess your learning of important terms and concepts as well as your ability reason from those concepts and apply your knowledge. Exams will consist of a combination of multiple choice, short answer and/or diagram questions. Questions will relate to both basic knowledge (e.g. vocabulary) and also applying that knowledge and using critical thinking. Material on exams will be that covered in the readings, lectures, activities and homework assignments. See the “Daily Info” file for more details on each exam.

There will be four midterm exams. The first three of these exams will be short (~ 30 minutes) and we will continue with regular class afterward. Please see the “Daily Info” file for more information. No

materials (text, homework, notes, etc.) may be used during exams unless otherwise announced in advance. There will be a comprehensive final exam, covering both new material from the last few weeks of class and also material covered on the midterms.

### Projects

You will complete two projects during the semester. These are designed as further and more personalized assessment of your attainment of the course goals and General Education skills listed above. The projects are listed briefly here. Further details are given elsewhere as noted.

1. Surface of the Sun: One of the major goals of this course is for you to take your knowledge and apply it. This assignment will give you the opportunity to do that in a guided way, and also to gain some practice thinking about what constitutes good science. Details about the assignment are available in “SunProject.pdf” under “Files” on the course website.
2. Independent Project: This is a more open-ended, independently designed project. This is your opportunity to apply your knowledge from the course to a subject which interests you personally. Complete details about what is required are available in “IndependentProject.pdf” under “Files” on the course website.

In addition, you may complete another project for extra credit.

Observing: This assignment requires you to visit a telescope observation *or* planetarium session at Stoffer Hall and submit a report about your visit. Details about the assignment are available in “ObservingProject.pdf” under “Files” on the course website. You may complete up to 2 reports. Each one will be worth a maximum of 2% extra credit to your overall course grade.

### GRADING:

Grades will be computed using the following weighting:

Midterm exams	40%
Final exam	20%
In-class participation	10%
Daily quizzes	5%
Projects:	(25% combined)
Surface of the Sun	10%
Independent	15%

### GRADING SCALE:

A = 100%-90%
B = 89%-80%
C = 79%-70%
D = 69%-60%
F = below 60%

SCHEDULE: Dates are subject to change. See daily info pages for detailed information.

Day #	Date	Material
1	1/22	Ch 1 – Intro, size scales
2	1/24	Ch 2 – Nature of science
3	1/29	Ch 3 – Angles and uncertainties
4	1/31	Ch 5 – Historical astronomy
5	2/5	Ch 5
6	2/7	Ch 5, 11
7	2/12	Ch 11 – Nature of light
8	2/14	Exam 1 (Ch 1-3, 5), Ch 12
9	2/19	Ch 12 – Telescopes
	<b>2/19</b>	<b>Last day to turn in Independent Project proposals</b> <b>(due by end of class)</b>
10	2/21	Ch 13 – Spectra

11	2/26	Ch 13
12	2/28	Ch 14 – Stellar spectra
13	3/4	Exam 2 (Ch 11-13), Ch 14
14	3/6	Ch 15 – Properties of stars
15	3/11	Ch 15
16	3/13	Ch 16 – Energy sources and internal stellar structure
	3/18 &/20	No Class – Spring Break
17	3/25	Ch 17 – Star formation
	<b>3/25</b>	<b>Last day to turn in “proof of progress” on Independent Project (due by end of class)</b>
18	3/27	Exam 3 (Ch 14-16), Ch 17
19	4/1	Ch 18 – Stellar evolution
20	4/3	Ch 18
	<b>4/3</b>	<b>Last day to turn in “Surface of the Sun” Project (due by end of class)</b>
	4/4	Last Day to Withdraw
21	4/8	Ch 19 – Stellar death
22	4/10	Ch 19
23	4/15	Ch 20 – The Milky Way
24	4/17	Exam 4 (Ch 17-19)
25	4/22	Ch 20
26	4/24	Ch 21 – Galaxies
27	4/29	Ch 21
28	5/1	Ch 21, 23
	<b>5/1</b>	<b>Last day to turn in final Independent Project (due by end of class)</b>
29	5/6	Ch 23 – Cosmology
30	5/8	Ch 23, Review
	5/9	Last day to turn in observing reports (due before 5:00 pm)
	5/15	Final exam – 9:00 am

#### CELL PHONES

Cell phones *may not* be used in class. Period. Turn your phone off before coming to class if you think this will be a problem for you.

#### Select Mission of the University:

Washburn University shall prepare qualified individuals for careers, further study and life long learning through excellence in teaching and scholarly work. Washburn University shall make a special effort to help individuals reach their full academic potential. *Washburn University Board of Regents, 1999*

#### Academic Misconduct Policy:

All students are expected to conduct themselves appropriately and ethically in their academic work. Inappropriate and unethical behavior includes (but is not limited to) giving or receiving unauthorized aid on examinations or in the preparation of papers or other assignments, or knowingly misrepresenting the source of academic work. Washburn University’s Academic Impropriety Policy describes academically unethical behavior in greater detail and explains the actions that may be taken when such behavior occurs. For guidelines regarding protection of copyright, consult [www.washburn.edu/copyright/students](http://www.washburn.edu/copyright/students). For a complete copy of the Academic Impropriety Policy, contact the office of the Vice President for Academic Affairs, Morgan 262, or go on-line to:

[www.washburn.edu/admin/vpaa/fachdbk/FHsec7.html#VIII](http://www.washburn.edu/admin/vpaa/fachdbk/FHsec7.html#VIII)

**Disability Services:**

The Student Services Office is responsible for assisting in arranging accommodations and for identifying resources on campus for persons with disabilities. Qualified students with disabilities must register with the office to be eligible for services. The office **MUST** have appropriate documentation on file in order to provide services. Accommodations may include in-class note takers, test readers and/or scribes, adaptive computer technology, brailled materials. Requests for accommodations should be submitted at least two months before services should begin; however, if you need an accommodation this semester, please contact the Student Services Office immediately.

Location: Student Services, Morgan Hall Room 150

Phone: 785-670-1629 or TDD 785-670-1025

E-Mail: [student-services@washburn.edu](mailto:student-services@washburn.edu)

Students may voluntarily identify themselves to the instructor for a referral to the Student Services Office.

**Center for Undergraduate Studies and Programs (CUSP):**

As a Washburn student, you may experience difficulty with issues such as studying, personal problems, time management, or choice of major, classes, or employment. The Center for Undergraduate Studies and Programs (Office of Academic Advising, Educational Opportunity Program, and Office of Career Counseling, Testing and Assessment) is available to help students either directly through academic advising, mentoring, career counseling, testing and developing learning strategies or by identifying the appropriate University resource. If you feel you need someone with whom to discuss an issue confidentially and free of charge, contact CUSP in Morgan 122, 785-670-1299, [advising@washburn.edu](mailto:advising@washburn.edu).

**Withdrawal Policy:**

During fall and spring semesters, students may withdraw from full semester courses through the second week of class with no recorded grade. From the third through the eleventh week a “W” is recorded for any dropped course. Beginning with the start of the twelfth week, there are **NO** withdrawals, and a grade will be assigned for the course. For short-term or summer course deadlines, please check the appropriate Semester/Session Course Bulletin Web Site ([www.washburn.edu/schedule](http://www.washburn.edu/schedule))

**Official E-Mail Address:**

Your Washburn University e-mail address will be the official address used by the University for relaying important messages regarding academic and financial information and the University will consider this your official notification for important information. **It will also be used by your instructors to provide specific course information.** If you prefer to use an alternate e-mail address to receive official University notices, you can access your MyWashburn e-mail account, choose the "Options" tab, and select "Settings", scroll to the bottom of the screen and enter the e-mail address you would like your Washburn emails forwarded to in the “mail forwarding” area. Click on save changes. This will complete the process of forwarding your Washburn e-mail. It is your responsibility to ensure that your official e-mail box does not exceed your message quota resulting in the inability of e-mail messages to be accepted into your mailbox