Descriptive Astronomy 2010 (Section 002) – Syllabus, Winter 2013

Lecture: Monday and Wednesday, 12:50 – 14:40
Location: 150 General Lectures
Professor: Edward Cackett
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Phone: (313) 577 9355
Office hours: Monday and Wednesday 11:30 – 12:30 or by appointment

Text:
Pathways to Astronomy (3rd Edition) by Steven E. Schneider and Thomas T. Arny (McGraw-Hill, 2012) – e-book is also available. The 2nd edition is usable as the changes between the two editions is small. The textbook is *required* and can easily be purchased from the campus bookstore. The textbook is written in short, bite-sized 'units'. Typically, we will cover 3 or so units per class. It is highly recommended to read those units *before* class, especially as in-class quizzes will be asked on the material.

Clickers:
We will be using the **i>clicker2**, which is *required* for this class for **in-class quizzes** (see below). This is the clicker that has been adopted campus-wide and is used in many classes throughout Wayne State. If you do not have one, they can be purchased from the campus bookstore, where they can also be sold back afterwards if no longer needed. You will need to register your clicker in Blackboard so that you receive credit for participating in class.

Course synopsis:
This is a four-credit course which can be taken concurrently with the one credit lab, Astronomy 2011. This course is an elementary introduction and survey of astronomy. It covers a very wide range of introductory topics including: methods of science, the sky, the earth-moon-sun system, the motion of the planets, gravity, light, telescopes, the solar system, the planet earth, the moon, the inner planets, the gas giants, minor bodies of the solar system, the sun, stars, stellar evolution, evolved and dead stars, the Milky Way, galaxies, cosmology, and astrobiology.

Blackboard:
Course announcements etc will be made using the Blackboard system (blackboard.wayne.edu). Please make sure you check it regularly.

Exams:
- There will be 3 mid-term exams and 1 final exam. Exam questions will be multiple-choice or true/false.
- The final exam will be held on **Monday, April 29 from 10:40am – 1:10pm** (note the different time).
- The best two scores of the three mid-terms will be used for your final grade. In other words, the lowest mid-term grade will be dropped.

- Material covered on each exam will be announced in class, and through Blackboard
- The final is a cumulative exam, i.e. covers all the material seen through the semester.
- There will be **no make-up exams**. Taking the best 2 of the 3 mid-term grades gives flexibility for most circumstances.
- **If you do not take the final exam, your course final grade will be automatically 'F' – no exception.**
- **If you miss more than one mid-term, your course final grade will automatically be 'F' – no exception.**

In-class quizzes:
We will be using the **i>clicker2** throughout the course to answer in-class questions. There will be two types of questions asked – participation questions, where you get credit for just answering the question regardless of whether the answer is correct or not, and quiz questions where you only get credit for the correct answer. If you answer 80% of the participation questions you will get full credit (5% of the final grade). Similarly, if you get 80% of the quiz questions correct you will receive full credit (again, 5% of the final grade). This allows for flexibility in case you need to miss a class for some unforeseen circumstance. Given this policy, make-up clicker questions will **not** be given.

Quiz questions will be asked on material covered in the course that day. It is therefore highly recommended that you read the appropriate chapter **before** coming to class. Check the class schedule for what material we will be covering each class. Announcements will also be made in class.

To allow everyone a chance to get an i>clicker2, the first day where credit will be given for clicker questions will be Wednesday, January 23. Please do bring your clickers to class before this date, as we will be asking clicker questions every class.

Planetarium Visits:
Two visits will be scheduled to the planetarium during the term. These visits are a required part of the course and count for 5% of your grade (2.5% for each visit). The date and time of presentations will be posted on Blackboard. The WSU planetarium is in the basement of the Old Main building, see planetarium.wayne.edu for details and for links to the schedule. There will be quizzes on each of the planetarium visits for *extra credit* (worth 2.5% each).

Performance Evaluation:
Your final grade in this course will be based on the following items:

Mid-terms (lowest dropped)	50%	(each mid-term counts for 25%)
Final Exam	35%	
In-class clicker questions:	10%	(5% participation, 5% quiz questions)
Planetarium Visits	5%	(each show counts for 2.5%)
Total regular credit	100%	
Planetarium quizzes extra credit:	5%	(each quiz counts for 2.5%)

Final Grades:
Final grades will be given using the grading scale in the table below.

A	90 – 100 %
A-	85 – 89
B+	80 – 84
B	75 – 79
B-	70 – 74
C+	65 – 69
C	60 – 64
C-	55 – 59
D+	50 – 54
D	45 – 49
D-	40 – 44
F	< 40

All in-class quizzes and exam grades will be posted in Blackboard, however, the final grade will be posted in pipeline only.

Advice:
1. While this is not a particularly difficult class, there is a large amount of material. So, **get the text**, read it before class, go to class, take notes and participate in the discussion.
2. **Come to class!** Research has shown that students who come to class do better, on average, than those that don't.
3. **Ask questions in class**. If things aren't clear, or even if you just want me to leave a slide up for longer to write something down, **don't be afraid to ask**. You will likely not be the only one with the same question/request.
4. Even though your lowest mid-term exam will be dropped, you should not skip an exam because you feel it won't affect your grade. If you miss more than one mid-term you will receive a grade of 'F' regardless of your class standing otherwise. No exceptions.
5. You cannot skip the final exam because you feel you are getting a good enough grade without it. If you miss the final exam you will receive a grade of 'F'. No exceptions.

Student e-mails:
Please look for announcements on Blackboard and check this syllabus before emailing the instructor with questions. Please follow proper etiquette in your emails. For instance it is appropriate to address your instructor as "Prof. Cackett", and to use full sentences with proper grammar and punctuation (i.e. no 'text' slang, please). **Rude or improper emails will not be answered**. Finally, be patient as there are many students in this class.

Course Schedule: This schedule is subject to change as needed, except for dates of exams. The exact chapters to be covered for each week will always be given on Blackboard.

AST 2010 – Descriptive Astronomy, Winter 2013
Prof. Cackett

Week	Day	Date	Lecture Topics	Units
1	M	1/7	Earth, the Solar System, the Galaxy, the Universe; scientific notation & units; scientific method, fundamental forces & particles.	1 - 4
	W	1/9	Celestial coordinates, equator and ecliptic; Earth's axial tilt and seasons; sidereal and solar days .	5 - 7
2	M	1/14	Lunar phases, eclipses; calendars; ancient Greek astronomy, measurements of the size of the Earth and Moon, distances to the Moon and Sun.	8 - 10
	W	1/16	Phenomenology of the planets and Ptolemy's model; beginnings of modern astronomy: Copernicus's model and Kepler's laws; astronomical motion and forces.	11, 12, 14
3	M	1/21	**MLK Holiday**	
	W	1/23	Newton's laws of motion and universal gravitation; measuring astronomical masses.	15 - 17
4	M	1/28	Orbital and escape velocities; tides; conservation of energy and angular momentum.	18 - 20
	W	1/30	Electromagnetism, light, emission and absorption from atoms; electromagnetic waves and the electromagnetic spectrum; blackbodies and thermal radiation.	21 - 23
5	M	2/4	Thermal radiation; continuous and discrete spectra; atomic spectra; the Doppler effect.	23 - 25
	W	2/6	**First mid-term exam**	
6	M	2/11	Instrumentation and telescopes. The photoelectric effect and CCDs. Optical, radio, and x-ray telescopes. Refracting and reflecting telescopes.	28 - 30
	W	2/13	Telescope resolution & effects of Earth's atmosphere. Space observatories. Introduction to the Solar System.	31, 32, 34
7	M	2/18	The structure and origin of the Solar System. Introduction to extrasolar planets.	34 - 36
	W	2/20	Earth as a terrestrial planet and its atmosphere. Supervolcanoes. The greenhouse effect and the ozone layer. The Moon: its surface, structure, and theories of origin.	37 - 39
8	M	2/25	Mercury: surface, rotation, and orbit. Venus: atmosphere, surface, rotation. All about Mars.	40 - 42
	W	2/27	Jupiter and Saturn: features, composition, atmospheres. Uranus and Neptune. Satellite systems and rings.	45 - 47
9	M	3/4	Galilean satellites in detail; Kuiper belt and TNOs; Pluto, dwarf planets vs. planets. Comets, meteors, meteorites, impacts and mass extinctions.	48 - 50
	W	3/6	**Second mid-term exam**	
-----			**SPRING BREAK**	
10	M	3/18	The Sun: basic features, magnetic field, solar weather, power source. Nuclear reactions and fusion.	51 - 53
	W	3/20	Measuring stellar distances, luminosities, compositions. Parallax, parsecs, apparent and absolute magnitudes; standard candles; stellar spectroscopy.	54 – 56

11	M	3/25	Measuring stellar temperatures, masses, sizes. Wien's and Stefan-Boltzmann's laws. Stellar classification. Binary star systems: visual vs spectroscopic binaries; eclipsing binaries. Relationship between stellar size, temperature, and luminosity.	56 - 58
	W	3/27	The H-R diagram; stellar evolution, star formation. Life cycle of stars: main sequence stars.	59 - 62
12	M	4/1	Life cycle of stars: giant stars, variable stars. The fates of low and high mass stars; white dwarfs and supernovae.	63 - 67
	W	4/3	Neutron stars; general relativity and black holes. Star clusters.	68 - 70
13	M	4/8	The Milky Way, stars and populations. Gas and dust.	71 - 73
	W	4/10	**Third mid-term exam**	
14	M	4/15	Galaxies, Hubble's law. Active galaxies, quasars, their energy source. Galactic rotation curves and dark matter.	75, 78, 79
	W	4/17	Cosmology and the expanding universe; Olbers' paradox, the Big Bang and the CMB; geometry of space, density of matter and the fate of the Universe.	80, 81, 82
15	M	4/22	Astrobiology; the Gaia hypothesis; the anthropic principle; the origin of life, Panspermia; criteria for extraterrestrial life; the Drake equation; SETI.	85, 86
	M	4/29	**Final Exam (cumulative)**	

Students with Disabilities:
If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.