

# AS 105 – Alien Worlds (Spring 2016)

## Course Syllabus

### **Course Description:**

Astronomy 105 (AS105) focuses on the search for and study of extraterrestrial worlds. We will embark on a detailed examination of our solar system, and the discovery and characterization of the thousands of planets discovered orbiting other stars. This course will examine alien worlds we can touch, alien worlds on which we can land (or have landed), alien worlds that are studied from a great distance, and the question of how common life is in the Universe. Students will use telescopes to observe the worlds of our solar system, learn the tools needed to interpret astronomical observations, and be exposed to the myriad discoveries coming from current studies of extrasolar planets, including recent results that indicate planets around other stars appear to be common.

### **Instructor:**

Professor Philip Muirhead

Office: CAS 403

Phone: 617-353-6553

Email: [philipm@bu.edu](mailto:philipm@bu.edu)

Office Hours: Tues Wed Thurs Fri, 1:00-2:20 in CAS 403

### **Teaching Fellows:**

Michael Malmrose, [mmalmros@bu.edu](mailto:mmalmros@bu.edu)

Office hours: Mon 2:00-3:20 and Wed 3:00-4:20 in CAS 605A

Deep Anand, [gaanand@bu.edu](mailto:gaanand@bu.edu)

Office hours: Fri 12:00 to 2:50 in CAS 524

### **Meeting Times:**

Lecture: Tues/Thurs 3:30 to 4:50 in CAS 522

Discussion Sections: All sections meet in CAS 521

A2 Mon 1:00 to 1:50 in CAS B04 (M. Malmrose)

A3 Tue 2:00 to 2:50 in CAS B04 (M. Malmrose)

A4 Thurs 1:00 to 1:50 in CAS B04 (D. Anand)

A5 Wed 2:00 to 2:50 in CAS B04 (M. Malmrose)

A6 Tues 5:00 to 5:50 in CAS B04 (D. Anand)

A7 Thurs 12:00 to 12:50 in CAS B04 (D. Anand)

A8 Thurs 2:00 to 2:50 in CAS 521 (D. Anand)

Night Labs: Meet at Judson Coit Observatory (Roof of CAS, follow staircase left of 520) on Mondays, Tuesdays and Thursdays at 8:30pm, **weather permitting**. You should only have to attend two clear nights over the semester to complete the night labs. See below for more information. Call 617-353-2630 for a recorded message

about 1 hour before the lab start time. Choose option #1 to see if the night lab will be held that night and option #2 for other night lab information.

**Website:**

We will use Blackboard for course materials and grades: <https://learn.bu.edu>

**Textbook:**

There is no required textbook for the course. Rather, lectures and materials will be made available to students via Blackboard and in your discussion sections.

**Grading:**

25% Homework

15% Lab exercises

25% In-class exams

25% final exam

10% participation

All requests for grading corrections need to be made in writing.

Note that if a student misses both night labs they will not receive credit for the course (a “D” or “F” letter grade, or a “W” if withdrawn), regardless of other work. This policy is to ensure that students complete the laboratory component of the course, required for CAS divisional studies requirement.

**Homework:**

Homeworks will be handed out in the discussion sections, and they will be due the following week. Late homework will not be accepted.

**Night Labs:**

Students are required to complete two night labs over the course of the semester. The Department of Astronomy’s J. B. Coit Observatory is located on the roof of the CAS building. Nights labs will be done here on Monday Tuesday and Thursday nights over the semester, provided the night is clear. Each of the two labs should take about an hour to complete. It is essential not to wait until the end of the possible observing sessions to observe since weather is unpredictable. If you miss one of the two observing sessions because the last two weeks are cloudy, no make-up will be possible. If you miss both, you will not receive credit for the course. To check if the observatory will be open on a given night, call 617-353-2630 for a recorded message about 1 hour before the lab start time. Choose option #1 to see if the night lab will be held that night and option #2 for other night lab information.

The first night lab, “Motions in the Sky” will be available Monday January 25 through Thursday March 3<sup>rd</sup>. The second night lab “Name That Star” will be available Monday March 14<sup>th</sup> through Thursday April 28<sup>th</sup>. If you do not complete the lab within those dates, no make ups will be available.

Lab Manuals: <http://www.bu.edu/astronomy/undergraduate/manuals/>

**Exams:**

There will be 3 midterm exams (only 2 count) and 1 final exam. You may choose to take 2 of the midterms, and there will be no make up exams.

The final exam will take place Thursday May 5<sup>th</sup>, 2016, from 3:00 to 5:00 pm in CAS 522.

**Planetarium Visit:**

The Boston Museum of Science has a planetarium capable of displaying the night sky as seen from any point on Earth. We have arranged a planetarium visit on **Monday Feb 8th and Tuesday Feb 9th starting at 6:30pm**. Please allow plenty of time to get from BU's campus to the Museum of Science (at least 45 minutes). After the program, you will turn in a simple set of questions for extra credit which will count towards your lab grade. Note that it is not possible for us to schedule an additional planetarium visit. You only need to attend one of the shows. It is not possible to earn additional credit by attending both shows.

**Attendance & Late Policy:**

You are expected to attend class. If you miss a class, check Blackboard for any assignments or news and talk with a fellow student to learn what else you missed. Under normal circumstances, the policies on late work are as follows: Late homeworks will not be accepted. If your lab reports are late, they will have 25% of the maximum possible score deducted for each day past the due date. The exams must be taken at the scheduled times.

**Classroom Etiquette:**

Please arrive punctually for the start of class and remain for the duration of the class. If you arrive late or depart early, try to minimize the disruption this causes to other students. Turn off mobile phones during class.

**Academic integrity:**

Group study is encouraged, but your work must be your own. Work that is copied will not be given any credit. If an answer in a homework question or a lab report requires written sentences, do not copy your answer directly from the textbook, a website, or any other source. All students are expected to follow the BU Academic Conduct Code ([www.bu.edu/academics/resources/academic-conduct-code/](http://www.bu.edu/academics/resources/academic-conduct-code/)). Cases of suspected academic misconduct will be referred to the Dean's Office with evidence.

**Course Schedule (subject to change):**

Lecture	Date	Subject	Notes
1	Tues Jan 19	Intro	No discussion sections week 1

2	Thurs Jan 21	Scales	
3	Tues Jan 26	Planet Properties	Night Lab 1: <i>Motions in the Sky</i> begins
4	Thurs Jan 28	Gravity	
5	Tues Feb 2	Transits	
6	Thurs Feb 4	Transits 2	
7	Tues Feb 9	Light	
8	Thurs Feb 11	Planet Formation	
	Tues Feb 16	<b>MONDAY CLASS SCHEDULE</b>	
9	Thurs Feb 18	<b>EXAM 1</b>	
10	Tues Feb 23	Terrestrial Atmospheres	
11	Thurs Feb 25	Greenhouse	
12	Tues Mar 1	Pluto	Last week for Night Lab 1: <i>Motions in the Sky</i>
13	Thurs Mar 3	Radial Velocity	
1	<b>Spring Recess</b>		
14	Tues Mar 15	Direct Detection	Night Lab 2: <i>Name That Star</i> begins
15	Thurs Mar 17	Sun and Stars	
16	Tues Mar 22	Exoplanet Research at BU	
17	Thurs Mar 24	Life in the Solar System	
18	Tues Mar 29	<b>EXAM 2</b>	
19	Thurs Mar 31	Extremeophiles	
20	Tues Apr 5	SETI	
21	Thurs Apr 7	Rare Earth	
22	Tues Apr 12	Apollo	
23	Thurs Apr 14	Moon_Origins	
24	Tues Apr 19	Exomoons	
25	Thurs Apr 21	The Future of Exoplanet Discovery	
26	Tues Apr 26	Wrap Up	Last week for Night Lab 2: <i>Name That Star</i>
27	Thurs Apr 28	<b>Exam #3</b>	
	<b>Thurs May 5</b>	<b>Final Exam</b>	