Physics 494: Physics Seminar

Sonoma State University
Department of Physics and Astronomy
Fall 2009

General Information

Instructor: Dr. Scott A. Severson

Class Schedule: 4:00 – 5:00 PM Monday

Classroom Location: Darwin 103

Office Hours: 10:00 - 11:30 AM Monday and Thursday

Office: Darwin 300L

Email: scott.severson@sonoma.edu

Phone: (707) 664-2376

Course Website:
http://www.phys-astro.sonoma.edu/people/faculty/severson/p494

Course WebCT site:
https://webct6.sonoma.edu/webct/logon/306063976001

Course Description

A series of lectures on topics of interest in physics, astronomy, and related fields. May be repeated for credit up to 3 units maximum.

Prerequisite

Consent of instructor.

Textbook

None

There may be occasional readings presented in the form of articles, and web references. These will be made available at the course WebCT site listed above.

Course Goals

- Students will learn about active research topics in physics and astronomy through public lectures presented by professional scientists.
- Students will learn important research and critical thinking skills by preparing for the talks through web-based research and reporting.

Policies

University Policies

There are several important University policies of which you should be aware, such as the add/drop policy; cheating and plagiarism policy, grade appeal procedures;

accommodations for students with disabilities and the diversity vision statement.
Go to this URL for details:
http://www.sonoma.edu/uaffairs/policies/studentinfo.shtml

Grading

Relative Weighting

Attendance ***50 %***

Attendance is mandatory. There will be a sign-in sheet at the lecture. More than 3 absences in class will result in a failing grade for the course. Arrive at the lecture in advance. Missing a substantial portion of a talk will be treated as an absence.

Pre-lecture assignments ***50 %***

Prior to each of lectures 2-12 in the series (September 14 — November 23) students will upload a short summary (approximately 200 words) of their research on the topic and speaker of that lecture. Research may be web-based and must include a list of at least two references used. Students will include in their submission two sample questions for the speaker based on their research. Asking a question of the speaker, whether based on the research or in response to the lecture itself, is encouraged.
The writing assignments will be graded according to a rubric and assigned a numerical grade. These grades will be averaged, dropping the lowest, in order to determine your final grade. Writing assignments will be submitted via WebCT and checked for originality. Rubric categories for assignment grading include;

- *Ideas* – how interesting and complete is the summary of the topic,
- *Organization/Mechanics* – is it well structured with correct grammar,
- *Support* – do you provide appropriate citations (at least two),
- *Questions* – are the questions appropriate and well-formed.

Instructor Discretion

I reserve the right to raise your grade if exceptional effort and class participation are observed through the semester. Improvement throughout the semester is also noted.

Other opportunities

Many of our invited speakers stay for a dinner with the faculty and any interested parties. It is recommended that each student attend at least one of the dinners during the semester. Furthermore, by regular attendance of this series and completion of pre-lecture assignments, students enrolled in PHYS 494 are poised to have productive and enjoyable discussions of these topics. Brown-bag lunch discussions or other informal meetings are encouraged.

Final discussion

During class time on the final week of regular classes (December 7, 4:00-5:00 PM in Darwin 103) we will be having an informal final discussion of the Fall 2009 What Physicists Do lecture series. All PHYS 494 students are expected to attend.

Other Class Policies

- Questions are encouraged.
- Turn off phones and small electronics.
- Arrive to class on time.
- Try your best to attend every class.
- Read any subject material before each class.
- Start and complete all assignments.
- Come to office hours with questions

CSU Employee Furloughs – Impact on Classes

This year across this campus and around the CSU system some class days will be cancelled because of furloughs. A furlough is mandatory un-paid time off; faculty and staff on each CSU campus are being "furloughed" two days per month.

These cancelled class days are marked on your syllabus above. It is important to recognize that these days off are not holidays. Instead, they are concrete examples of how massive state budget cuts have consequences for you as students and for me as a faculty member.

The CSU has suffered chronic underfunding for at least 10 years. This year the budget cuts are the worst in the history of our university system — $584 million or 20% of our budget.

The CSU administration is attempting to deal with these cuts with increases in your student fees (32%), eliminations of your classes, and lay-offs of faculty and other university employees.

In addition to paying higher fees, you will be affected by reduced services and classes. The library will have shorter hours. Many campus support services will be decreased or eliminated. It will be more difficult to get signatures to meet deadlines. Classes you need may have been cut from the class schedule or are full.

If you would like to take action or simply learn more, I recommend you contact the California Faculty Association located on campus in Stevenson 3004-A.

PHYSICS 494 - Physics Seminar - Fall 2009

AUG 31 **IMAGING A PLANET AROUND FOMALHAUT USING THE HUBBLE SPACE TELESCOPE**
Dr. Paul Kalas of University of California, Berkeley tells us how to spot an extrasolar planet from Earth.

SEP 14 **CONDENSED MATTER LIGHT SCATTERING**
Dr. Thomas Peter Devereaux of Stanford University is the head of the X-ray Science and Techniques Group at the Stanford Institute for Materials and Energy Sciences, which focuses on the scientific foundation related to the energy challenge facing our society. He will discuss using the tools of computational physics to understand quantum materials.

SEP 21 **CULTIVATING SCIENTIST AND ENGINEER EDUCATORS**
Dr. Anne Metevier of the Center for Adaptive Optics at UC Santa Cruz will describe her work training early-career scientists and engineers to teach more effectively by using methods that promote inquiry and an equitable college classroom environment.

SEP 28 **PEEKING AT THE YOUNGEST STARS**
Dr. Tom Greene of NASA's Ames Research Center will describe what infrared spectroscopic observations are telling us about very young sun-like stars while they are still accreting their last bits of mass and before their planetary systems have formed.

OCT 5 **THE RICH PHYSICS OF NUCLEAR MUON CAPTURE**
Dr. Tom Banks of the University of California, Berkeley will describe recent efforts by the MuCap Collaboration to precisely measure the rate of nuclear muon capture in hydrogen, and how the process of muon capture--which involves electromagnetism, the weak interaction, and the strong interaction--is a unique confluence of a diverse range of physics.

OCT 12 **FIRST RESULTS FROM THE KEPLER MISSION TO FIND EARTH-SIZED EXOPLANETS**
Dr. Gibor Basri, Professor of Astronomy and Vice Chancellor for Equity and Inclusion at the University of California at Berkeley, will discuss the latest from NASA's new exoplanet-hunting Kepler space telescope.

OCT 19 **FORMATION AND EVOLUTION OF MASSIVE GALAXIES**
Dr. Mariska Kriek of Princeton University will discuss the formation and evolution of massive galaxies.

OCT 26 **SOFIA - THE STRATOSPHERIC OBSERVATORY FOR INFRARED ASTRONOMY**
Dr. Dana Backman, the director of education and public outreach for SOFIA, will give us a status report NASA’s new airborne observatory, a 2.5-meter telescope mounted in a Boeing 747.

NOV 2 **THE MILKY WAY’S HIDDEN PAST**
Dr. Constance Rockosi of the University of California, Santa Cruz will talk about what we've discovered about our Galaxy's hidden past and how we can use that past to connect observations of the early universe with the galaxies we see today.

NOV 9 **EXTREME PLANETARY ATMOSPHERES**
Dr. Jonathan Fortney of the University of California, Santa Cruz will show how our understanding of planetary atmospheres is being revolutionized by observations of the super-heated class of Jupiter-like planets that orbit very close to their parent stars.

NOV 16 **THE SEARCH FOR THE HIGGS BOSON**
Dr. John Conway of University of California, Davis will discuss the use of the Tevatron accelerator at Fermilab and the Large Hadron Collider at CERN to search for new particles such as the Higgs Boson.

NOV 23 **PLUTONIUM, THE MOST ENIGMATIC OF ALL METALS**
Dr. Per Soderlind of Lawrence Livermore National Laboratory will discuss some of the peculiarities of this metal and how quantum-mechanical electronic structure from density-functional theory attempts to explain them.

DEC 7 **PHYSICS 494 SUMMARY DISCUSSION**
We will be having an informal final discussion of the Fall 2009 What Physicists Do lecture series. All PHYS 494 students are expected to attend.