Catalog Course Title: PHYS-385: How Physicists Work

Name and contact information for future correspondence:
Nathan Harshman
Academic Unit - School/College:
○ CAS ○ KSB ○ SOC ○ SIS ○ SPA ○ SPExS ○ Other:

Teaching Unit – Department or Program: Physics

Date effective:

<table>
<thead>
<tr>
<th>Required Signatures</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Teaching Unit Chair or Director</td>
<td>Nate Harshman</td>
<td></td>
<td>2/1/16</td>
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<tr>
<td>EPC Chair</td>
<td>Jessica Uscinski</td>
<td></td>
<td>2/24/16</td>
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<tr>
<td>Primary Academic Unit Assoc. Dean</td>
<td>Celine-Marie Pascale</td>
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<td>2/24/16</td>
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<td>Second Academic Unit Assoc. Dean</td>
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<tr>
<td>Faculty Senate Chair</td>
<td>Larry Engel</td>
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<tr>
<td>Provost's Designee (VPUG or VPGR)</td>
<td>Lyn Stallings</td>
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Date sent to the Office of the University Registrar:
I. Identifying Information
   a. Proposed effective date: **Fall 2016**
   b. Academic Unit: **CAS**
   c. Teaching Unit: **Physics**
   d. Course Title: **How Physicists Work**
   e. Course Number: **PHYS-385**
   f. Credits: 1
   g. Prerequisites: **None**
   h. Course description for University Catalog (Generally a limit of 50 words)

This course will expose students to the breadth of physics as a discipline and as a career path. Students will discuss and reflect on lectures from physicists and other scientists and engineers in related fields from research, industry, and beyond. Students will acquire research and technical skills from hands-on experiences. Students will develop a professional portfolio to prepare them for future applications to internships, jobs and graduate school.

   i. Grade type: **A/F and Pass/Fail**
   j. Expected frequency of offering: **Every Spring**
   k. Note all that apply: **None**

II. Rationale
   a. Please explain the main purpose of the new course, including whether it will be a requirement for an existing or proposed program or an elective, and how the new course relates to the existing courses in the program and department. **Note:** if the course will be required for an existing program, submit a corresponding Minor Change to Program proposal.

One motivation for the course is to better prepare our students for PHYS-480 Physics Capstone Seminar. In PHYS-480 every major completes a senior capstone project that requires them to integrate knowledge from across our curriculum while diving deep into a particular subject. We felt that having an earlier course that exposed them to different subfields, methods, and working environments within the field, as well as to some research and professional skills, would help the students achieve the senior capstone project goals more successfully. Additionally, PHYS-480 had also included a professional development component preparing them for work and/or graduate school. Students reported that they really appreciated that part of PHYS-480, but that it came too late to aid in their applications for research internships, scholarships and fellowships (as well as grad school and jobs) during their undergraduate career. Finally, because this course will have lots of interesting and entertaining speakers and information relevant to undergraduate interests, we are hoping the course could be used as a recruitment and retention tool for our majors and minors.

If after a few years we deem the course is successful, we will require it for all majors and minors.
b. Will the course require students to pay a special fee associated with the course? If so, please provide a justification for this additional cost to students.

No

c. Has the course previously been offered under a rotating topics course or an experimental course number?

No

d. Please indicate other units that offer courses or programs related to the proposed course and provide documentation of consultations with those units.

Not applicable.

e. Estimate the enrollment per semester.

10-15 students

f. Does your teaching unit’s classroom space allotment support the addition of this course?

This is a difficult question because our department in moving to a new building in Spring 2017 (the first semester we plan to offer the course). The lecture portion of the course is an extension of our normal department colloquium, so we are hoping to offer it in the TIB Lecture Hall.

g. Are present university facilities (library, technology) adequate for the proposed course?

Yes, and they will be enhanced by Spring 2017.

h. Will the proposed course be taught by full-time or part-time faculty?

We anticipate this will be taught by full-time faculty and count as much as a lab section as far as teaching load.

i. Will offering the new course involve any substantial changes to the scheduling of existing courses?

No. We already run this seminar in the spring without credit for the last two years.

j. What are the learning outcomes for the course?
• Students will demonstrate an awareness of the different subjects, methods, and working environments encompassed by the discipline of physics.
• Students will acquire new research and technical skills in data visualization and mathematical typesetting.
• Students will provide evidence of progress in professional development and will be better prepared for future career opportunities in physics.

k. How will those outcomes be assessed?

• Students will provide feedback on lectures from professional physicists in verbal form as part of after lecture discussions and in written form in brief reflection essays.
• Students will complete a professional portfolio that will include evidence of
  o Technical skills development
  o Application preparedness
  o Subject, method and working environment awareness.

l. What are the competencies that students are expected to demonstrate for the course? Please attach a draft syllabus.

Please see attached syllabus.

III. Catalog Copy
   a. Please attach a course description as it is to appear in the University Catalog, following the format of the current catalog.

PHYS-385 How Physicists Work (1) This course will expose students to the breadth of physics as a discipline and as a career path. Students will discuss and reflect on lectures from physicists and other scientists and engineers in related fields from research, industry, and beyond. Students will acquire research and technical skills from hands-on experiences. Students will develop a professional portfolio to prepare them for future applications to internships, jobs and graduate school. Usually offered every spring.
How Physicists Work – Spring XXXX
PHYS-385 – 1 credit

xxxx
Department of Physics
American University

Email: xxxxxxx@american.edu
Phone: (202) 885-XXXX
Office: XXX
Classroom: XXX

Class time: Wednesday, XXX-XXX (2.5 hrs)

Office hours: XXXX; or by appointment

Course description:
This course will expose students to the breadth of physics as a discipline and as a career path. Students will discuss and reflect on lectures from physicists and other scientists and engineers in related fields from research, industry, and beyond. Students will acquire research and technical skills from hands-on experiences. Students will develop a professional portfolio to prepare them for future applications to internships, jobs and graduate school.

Course objectives:
- Students will be exposed to a variety of physics professionals in various careers and fields and discuss these intelligently with their peers and the course professor.
- Students will receive training in career development, technical and professional skills. As part of their project and other course activities, these skills will be applied.
- Students will have a portfolio that includes products from other career and skill development activities in the class.

Learning outcomes:
- Students will demonstrate an awareness of the different subjects, methods, and working environments encompassed by the discipline of physics. Assessed by: Digital notebook, Reflection essay, Personal statement, Elevator Speech.
- Students will acquire new research and technical skills in data visualization and mathematical typesetting. Assessed by: LaTeX typesetting sampler, Data visualization sampler.
- Students will provide evidence of progress in professional development and will be better prepared for future career opportunities in physics. Assessed by: Entire Career Portfolio

Course requirements and grading: Your final grade will be based on the following:

Career Portfolio 70%
Digital notebook 30%

Career Portfolio contains:
- CV or resume
- Personal statement (with prompt)
- Cover letter (with advertisement)
- Elevator speech (60 second audio or video recording)
- Reflection essay on professional development (1-2 pages)
- LaTeX typesetting sampler (5 pages)
- Data visualization sampler (5 pages)
• Other evidence of professional development or preparedness

Digital Notebook contains:
• Brief response to each visitor, guest lecture, or alumni panel.

All of these components and how they will be assessed will be described in more detail as the semester progresses. You will turn most of these in on-line.

Course Materials:

Websites and E-reserves: During the semester, some reading assignments may be linked to or posted on Blackboard. All of them should be on a few weeks before you need to have them read.

Communication: This course will use the Blackboard system of American University for distribution of information outside of class time.

Email: You must have an American University email account to use this system; if you use an email provider other than American, forward your American mail to that account. Online discussion sessions will be managed through Blackboard and some will be submitted on Blackboard. Check your email and the class website of Blackboard frequently to stay up-to-date. I usually respond fairly promptly to email and it is my preferred method of communication outside of class and office hours.

Discussion Boards: Please make use of the discussion boards to ask questions, vent frustrations, share neat ideas or websites, etc.

Privacy: For the record, I can track Blackboard viewing, i.e. count the hits on each page and see who accessed it.

Etiquette: Express yourself freely in this class, in email and on Blackboard. However, be respectful and polite to your fellow students.

Academic Integrity Code: Read it and follow it. It is your responsibility to know it and abide by it. Follow all instruction given here or given on a specific assignment or the full due process of the AIC will come down on you.

Excused absences and extensions: Severe illness, religious observance, University business, and family emergency are acceptable reasons for missing class or needing an extension on an assignment. I have the right to request reasonable documentation, in accordance with University policy. Do not notify me of an absence at the last minute if it is at all possible.

In the case of a weather cancelation: Assume that we will meet online. I will send you instructions by email on how to join the class.

American University provides numerous services that help students maximize their academic success and social and emotional wellbeing.

• Academic Support and Access Center MGC 243, 202-885-3360 supports the academic development and educational goals of all AU students while also providing support to students with disabilities. We offer workshops on topics of interest to all students such as time management, note taking, critical thinking, memory skills, and test taking. Additional support includes free private and group tutoring in many subjects, supplemental instruction, The Math Lab and The Writing Lab.

• Counseling Center MGC 214, 202-885-3500 is here to help students make the most of their university experience, both personally and academically. We offer individual and group
counseling, urgent care, self-help resources, referrals to private care, as well as programming to help you gain the skills and insight needed to overcome adversity and thrive while you are in college. Contact the Counseling Center to make and appointment in person or by telephone, or visit the Counseling Center page on the AU website for additional information.

- **Center for Diversity & Inclusion** MGC 201, 202-885-3651 is dedicated to enhancing LGBTQ, Multicultural, First Generation, and Women’s experiences on campus and to advance AU’s commitment to respecting & valuing diversity by serving as a resource and liaison to students, staff, and faculty on issues of equity through education, outreach, and advocacy.

- **OASIS: The Office of Advocacy Services for Interpersonal and Sexual Violence** 202-885-7070 provides free and confidential advocacy services for anyone in the campus community who experiences sexual assault, dating or domestic violence or stalking.

American University expressly prohibits any form of discriminatory harassment including sexual harassment, dating and domestic violence, sexual assault, and stalking. The university is and equal opportunity, affirmative action institution that operated in compliance with applicable laws and regulations, and does not discriminate on the basis of race, color, national origin, religion, sex (including pregnancy), age, sexual orientation, disability, marital status, personal appearance, gender identity and expression, family responsibilities, political affiliation, source of income, veteran status, an individual’s genetic information or any other bases under federal or local laws in its programs and activities.

If you experience any of the above, you have the option of filing a report with the AU Department of Public Safety 202-885-2527 or the Office of the Dean of Students 202-885-3300 dos@american.edu. Please keep in mind that all faculty and staff - with exception of counselors in the Counseling Center, victim advocates in the Wellness Center, medical providers in the Student Health Center, and ordained clergy in the Kay Spiritual Life Center - who are aware of or witness this conduct are required to report this information to the university, regardless of the location of the incident.

- **The Writing Center** First floor of Bender Library offers free, individual coaching sessions to all AU students. In your 45-minute session, a student writing consultant can help you address your assignments, understand the conventions of academic writing, and learn how to revise and edit your own work. Hours: 11 a.m. to 9 p.m. Monday through Thursday; 11 a.m. to 6 p.m. Friday. Call 202-885-2991 to arrange a session. Meanwhile find handouts, information, and a weekly writer’s blog at the Writing Center website and on Facebook.

- **International Student & Scholar Services**, Batelle 4th Butler Pavilion, Room 410 has resources to support academic success and participation in campus life including academic counseling, support for second language learners, response to questions about visas, immigration status and employment and intercultural programs, clubs and other campus resources.
## Schedule for PHYS-385
### Spring 20XX

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<td>Week 1</td>
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<td>Introduction to course; Fields, methods and loci of physics</td>
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| Week 2 | Crystal Bailey  
Career program manager  
American Physical Society | Physics education research; Academic training and jobs |
| Week 3 | Simi George  
Industrial glass physicist  
Schott Industries | CVs and resumes; Personal statements and cover letters; Job interviews; Guest: Susan Gordan (AU Career Center) |
| Week 4 | Angela Hight-Walker  
Experimental condensed matter  
NIST | Elevator talks and professional communication | Digital Notebook check-in |
| Week 5 | Charles Sukenik  
Experimental atomic physics  
Old Dominion | Latex tutorial 1 | CV or resume draft 1 |
| Week 6 | Douglas Photiadiis  
Acoustic physicist  
Naval Research Lab | Data Visualization in Excel tutorial | Personal statement or cover letter draft 1 |
| Week 7 | Erin De Pree  
High energy theorist  
St. Mary’s College of MD | Elevator talk recording; | Elevator talk |
| Week 8 | Evangeline Downie  
Experimental nuclear physics  
George Washington | Library resources and research skills; Publication and peer-review; Guest: Rachel Borchardt (Science Librarian) |
| Week 9 | Jericho Cain  
Atmospheric acoustics  
Army Research Lab | Scientific communication | Digital Notebook check-in |
| Week 10 | Johanna Teske  
Planetary astrophysicist  
Carnegie Institute | Data Visualization in Mathematica tutorial | CV or resume draft 2 |
| Week 11 | Bill Parsons  
Physicist, lawyer, philosopher  
American University | Latex tutorial 2 | Personal statement or cover letter draft 2 |
| Week 12 | Ira Keltz  
Deputy engineer for the FCC | Data Visualization and Latex work session |
| Week 13 | Patrick Vora  
Experimental condensed matter  
George Mason | Data Visualization and Latex work session | Reflection on course |
| Week 14 | Student speakers | Portfolio show-and-tell, part 1 | Digital Notebook due |
| Finals | Student speakers | Portfolio show-and-tell, part 2 | Career Portfolio complete |