# Department of Physics
# Weber State University

# Program Review
# Self-Study

# Executive Summary

February 3, 2008

The Program Review Self-Study and the executive summary (this document) were prepared by the Chair of the Department of Physics in consultation with the departmental faculty members

# A. Program Mission Statement

The mission of the Department of Physics at Weber State University is to provide high-quality instruction in physics at the undergraduate level. This includes providing courses in the general education area of physical science, pre-professional and pre-engineering courses in physics, and courses and programs for those who want to major or minor in physics.

Further activities of the department include providing opportunities for research and other scholarly activities of both faculty and students, advising the students served by the department, and serving as a resource for the campus and the state of Utah in the areas of physics and astronomy.

*Last Reviewed: November 9, 2007.*

# B. Curriculum

- The Physics Department offers both B.S. and B.A. degrees in Physics, Applied Physics, Physics Teaching, and Physical Science Composite Teaching (jointly with Chemistry and Geosciences)
- Qualified students can elect to enroll in the General Honors Program and receive departmental honors in Physics, Applied Physics, or Physics.
- The Physics Department also offers two minor programs in Physics and Physics Teaching
- Students may choose physics as one of the three emphasis areas for the Bachelor of Integrated Studies major (BIS).
- During the 2006 – 2007 academic year
    - 89.1% of all SCHs were attributable to general education and service course enrollments.
    - 81.0% of all TCHs were directed toward general education and service course instruction.
- The Department currently offers an online version of Phys PS/SI1010.
- There is no admission process for students majoring in physics.

# C. Student Learning Outcomes and Assessment

Student learning outcomes and assessment measures were formally developed and approved by the Department of Physics during the 1998-99 academic year. Details of the departmental assessment process are available in the Department of Physics Program Review Self Study (Febriary 3, 2008).

# D. Academic Advising

- Primary responsibility for advising Physics majors, Applied Physics majors, Physics minors, and BIS students with physics emphases rests with the Department Chair.

- Advisement of Physics Teaching majors, Physical Science Composite Teaching majors, and Physics Teaching minors is assigned to our departmental specialist in physics education.
- Standard forms have been developed within the Department for degree declaration, graduation sign-off, course scheduling (via a semester-by-semester grid that details sequencing), and an anonymous graduating senior exit survey.
- A separate file is created for each major/minor/BIS student at the time he/she declares his/her program of study. Each file is maintained throughout the student's undergraduate career. These files are also retained on an ongoing basis after graduation as a mechanism for maintaining information on our graduates.
- Ali Miller is responsible for advisement regarding general education.
- Gregory Nielson is assigned part-time to the College of Science for the purposes of career and graduate school advising. He develops and maintains a database of career employment opportunities and contacts for most major programs within the College of Science, including in physics and related areas.

# E. Faculty

- At the end of the 2006 – 2007 academic year, the Physics Department had 10.75 FTE faculty in tenured or tenure-track positions.
- Special reappointments within the Department include:
    - the Department Chair with a 0.5 FTE reassignment for administrative duties.
    - the Planetarium Director with a 0.25 FTE reassignment.
    - Honors Program instruction: 0.25 FTE.
- The Department currently employs three adjunct faculty members to teach evening courses on a regular basis.
- The faculty are composed of 6 Professors, 2 Associate Professors, 4 Assistant Professors.
- Eight contract faculty (8) are tenured and four (4) are on tenure-track appointments.
- Ten of the 12 contract faculty and 4 of the 5 currently active adjunct faculty members are male.
- One faculty member is Asian and the remaining 11 contract and 5 adjunct faculty are White.
- In support of our academic programs, the Physics Department employs a female secretary and one white male laboratory manager.
- The Department Chair reviews all contract faculty and classified/professional staff on an annual basis.
- Tenure-track faculty and tenured faculty below the rank of full professor are also extensively evaluated through a university-wide procedure for progress toward tenure and/or advancement in rank.
- All contract faculty within the Department currently have Ph.D.s in physics or physics education.

# F. Program Support

- Principle funding for the programs and activities of the Physics Department is provided through State of Utah legislative appropriations.
- For the 2006 – 2007 academic year, allocations to the Physics Department totaled $1,114,183.59, including all salaries and benefits for faculty and staff. Of that total, the available funding for instructional and hourly wage salaries (including benefits), travel, and current expense was collectively $37,925.
- Allocations were also provided for the College of Science Shops, operated by the Physics Department: $500.
- Departmental faculty have been successful in obtaining funding through competitive sources, such as the National Science Foundation and NASA. Donations have also been obtained through private sources that have been cultivated with assistance of the University Development Office. Internal grant sources are available through the Academic Resources and Computing Committee, the Research, Scholarship, and Professional Growth Committee, the Office of Undergraduate Research, and the Hemmingway Trust.
- The Physics Department has been fortunate to receive generous donations from private sources and through University tuition waivers to provide financial support for many of our majors as they progress through their undergraduate careers.
- The Physics Department supplements its lower-division laboratory budgets (a portion of the current expense budget) through laboratory fees of $20 per semester.
- As undergraduate research activities continue to expand, additional funding will become increasingly important. Significant resources are required simply to maintain existing equipment; additional resources will be needed in the future to replace aging equipment and provide additional opportunities for undergraduate research experiences.
- Most critical at the present time is the need for additional space to support our various programs. The initiation of a joint electrical engineering degree with Utah State University, and the anticipated creation of an engineering major at WSU, will have a profound impact on the growth of the Department. The expected increase in our service course Phys 2210/2220 with an influx of engineering students will place a severe strain on the Department's present resources unless the level of support is raised significantly. Offering these courses at the WSU Davis campus, as is eventually anticipated, will place an even greater burden on the Department because it will be necessary to have at least one faculty member stationed full-time on that remote campus. A direct result is that without another faculty member, this additional instructional burden will likely come at the expense of being able to offer sections of general education and service courses on the main campus.
- As the student population of the institution continues to grow at a rapid rate, it is becoming increasingly difficult to handle the demands for general education and service courses. The Department has only four classrooms and three student laboratories, and these facilities are already fully scheduled. Our largest lecture room, LL121, seats approximate 100 students. Over the past several years, registration in the Fall semester sections of Phys 2010 and Phys 2210 have been very near, or exceeding capacity.

- Along with lecture and laboratory space, faculty office space is becoming critical. For several years the Department has been forced to provide office space for one faculty member in an area that was originally meant to be a small office for a laboratory manager.
- In the area of library resources, the Physics Department appears to be adequately supported. The library resources are sufficient for student and faculty needs. The Department is allotted an adequate budget for buying new books, and the library's interlibrary loan program works very well

## G. Relationships with the External Community

- The faculty of the Physics Department have numerous professional relationships with a wide variety of external communities, ranging from local businesses and organizations to national and international agencies and organizations. These relationships are summarized in Appendix E of the Department of Physics Program Review Self Study (Febriary 3, 2008).
- The Department's outreach effort includes many audiences, and involves departmental personal going out to these communities, as well as bringing the communities to Weber State.
- The Physics Department created its first Physics Department Open House in April, 2007. The demonstration shows, lectures, physics activities and planetarium shows brought approximately 500 people to the campus.
- The Physics Department's Ott Planetarium is responsible for most of the Department's outreach activity. Students from regional schools (as far away as Salt Lake, Southern Idaho and Western Wyoming) come to the Ott Planetarium for field trips. The planetarium has tailored its shows to the Utah K-12 Core Curriculum. In 2007 more than 12,000 K-12 students have visited the planetarium. Planetarium shows were created in Spanish to reach out to local disadvantaged and Hispanic groups.
- Physics Department faculty visit high schools and grade schools, work with teachers and school boards in northern Utah, and host visits from interested students to the Department.
- The faculty within the Physics Department are members of and actively involved in a large number of professional societies.
- The American Institute of Physics is also an important source of information on employment trends and opportunities, curricular developments, enrollments and graduation rates in undergraduate and graduate programs, graduate schools, women and minorities in physics and astronomy, and various other demographic studies.
- Center for Science and Mathematics Education serves as a resource for pre-service and in-service training for grade school and secondary school teaching. The Center offers a variety of programs for middle and high school age students, including Science Olympiad, Science Fair, and S4 ("Science Seminars for Superior Students").
- Career Services has resource to assist in providing information to students and departments regarding career opportunities and post-graduate education.
- University Development: The Office of University Development has primary institutional responsibility for fund raising efforts within the university. One member of

the staff in the Development office, Lisa Largent, has primary responsibility for programs within the College of Science. As a part of that program Lisa interacts on a regular basis with each of the departments in the College, and meets periodically with the Chairs and the Dean of the College.

- The Office of Sponsored Projects assists faculty across the institution in obtaining and managing external grant programs.

## H. Student, Faculty, Contract/Adjunct Faculty and Staff Statistical Summaries

These summaries may be found on the following pages in Appendices A - D.

## I. Information of Program Review Evaluation Team Members

The Program Review Evaluation Team members are listed below. Their curriculum vitae are included as Appendix G of the Department of Physics Program Review Self Study (Febriary 3, 2008).

- Dr. Paula Szkody, Professor, Department of Astronomy, University of Washington, Box 351580, Seattle, WA 98195, szkody@ astro.washington.edu
- Dr. D. Mark Riffe, Associate Professor, Department of Physics, Utah State University, Logan, UT 84322, riffe@cc.usu.edu
- Dr. Daniel Bedford, Assistant Professor, Department of Geography, Weber State University, Ogden, UT 84408-1401, dbedford@weber.edu
- Dr. H. Laine Berghout, Associate Professor, Department of Chemistry, Weber State University, Ogden, UT, 84408-2503, hlberghout@weber.edu

# *Appendices*

Appendix A

**Student Statistical Summary**
(NOTE: data provided by Institutional Research)

| | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
|---|---|---|---|---|---|
| Student Credit Hours* | 7,370 | 7,120 | 7,007 | 6,602 | 6,076 |
| Student FTE | 245.67 | 237.33 | 233.57 | 220.07 | 202.53 |
| Student Majors | 53 | 63 | 74 | 63 | 61 |
| Program Graduates | 7 | 3 | 7 | 10 | 7 |
| Student Demographic Profile | 53 | 63 | 74 | 63 | 61 |
| Majors | 3 | 10 | 12 | 10 | 11 |
| Minors | 50 | 53 | 62 | 53 | 50 |

* Student Credit Hours do not include Honors courses (Physics has a 0.25 FTE position devoted to Honors).

Appendix B

**Faculty Statistical Summary**
(NOTE: data provided by Institutional Research)

| | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
|---|---|---|---|---|---|
| Adjunct FTE* | 2.30 | 2.98 | 4.50 | 3.04 | 2.97 |
| Contract FTE | 9.42 | 9.41 | 8.74 | 10.74 | 10.15 |
| Total FTE | 11.72 | 12.39 | 13.24 | 13.78 | 13.12 |

* Adjunct FTE includes contract FTE overload teaching, contract FTE for WSU Online, and contract FTE WSU Davis teaching.

Appendix C

## Contract Faculty Profile

(NOTE: data provided by Institutional Research)

| Name | Gender | Ethnicity | Rank | Tenure Status | Highest Degree | Years of Teaching | | | Areas of Expertise |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | WSU | Other | Total | |
| Amiri, Farhang | M | Asian | Prof | 07/01/89 | Ph.D. | 24 | 4 | 28 | Elementary Particles |
| Armstrong, John | M | White | Assist | | Ph.D. | 3 | | 3 | Astro-Biology |
| Arnold, Michelle | F | White | Assist | | Ph.D. | 6 | | 6 | Nuclear Medicine |
| Carroll, Bradley | M | White | Prof | 07/01/90 | Ph.D. | 23 | 3 | 26 | Astrophysics |
| Inglefield, Colin | M | White | Assoc | 07/01/07 | Ph.D. | 7 | | 7 | Condensed Matter |
| Galli, Ron | M | White | Prof | 07/01/67 | Ph.D. | 45 | 2 | 47 | General Physics |
| Johnston, Adam | M | White | Assoc | 07/01/07 | Ph.D. | 7 | 1 | 8 | Physics Education |
| Larson, Shane | M | White | Assist | | Ph.D. | 2 | | 2 | General Relativity |
| Palen, Stacy | F | White | Assist | | Ph.D. | 6 | | 6 | Astrophysics |
| Schroeder, Daniel | M | White | Prof | 07/01/98 | Ph.D. | 15 | 3 | 18 | Theoretical Physics |
| Sohl, John | M | White | Prof | 07/01/97 | Ph.D. | 18 | | 18 | Optics/ Electronics |
| Spjeldvik, Walther | M | White | Prof | 07/01/90 | Ph.D. | 23 | 1 | 24 | Atmospheric/ Space Physics |
| Ostlie, Dale | M | White | Dean | 07/01/89 | Ph.D. | 24 | 2 | 26 | Astrophysics |

## Adjunct Faculty Profile

(NOTE: data provided by Institutional Research)

| Name | Gender | Ethnicity | Rank | Tenure Status | Highest Degree | Years of Teaching | | | Areas of Expertise |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | WSU | Other | Total | |
| Davis, Lee | M | White | Adj | | Ph.D. | | | | Industrial Physics |
| Hills, Richard | M | White | Adj | 07/01/ 68 | Ph.D. | 44 | | 44 | Solid State |
| Webb, Michael | M | White | Adj | | Ph.D. | | | | Industrial Physics |
| Lewis, Cristine | F | White | Adj | | M.A. | | | | Earth and Planetary Sci |
| Lear, Charles | M | White | Adj | | B.S. | | | | Engineering |
| Nelson, Matt | M | White | Adj | | B.S. | | | | Physics |

Note: Dr. Richard Hills is emeritus Professor of Physics

Appendix D

### Contract Staff Profile

(NOTE: data provided by Institutional Research)

| Name | Gender | Ethnicity | Job Title | Years of Employment | | | Areas of Expertise |
|---|---|---|---|---|---|---|---|
| | | | | WSU | Other | Total | |
| Hesterberg, Nereyda | F | Other | Secretary | 3 | | 3 | Secretary |
| Schroeder, Rick | M | White | Lab Manager | 4 | | 4 | Lab Technician |