

MISSION, GOALS, AND OBJECTIVES

A. Mission Statement: The Department of Physics defines its mission in the context of academic excellence, scientific rigor, and scientific integrity. Our primary responsibility is to prepare undergraduate students for careers in physics and technical fields. In keeping with Santa Clara University's overarching mission, the Department of Physics makes student learning its central focus and promotes faculty and staff learning in its various forms. The faculty and staff of the Department uphold the teacher-scholar model of higher education, in part by creating an educational environment that integrates rigorous inquiry and scholarship, creative imagination, reflective engagement with society, and a commitment to fashioning a more humane and just world. In light of the fact that Physics is a bridge between technology and society, the Department of Physics is also committed to bringing an understanding of physics and science to both the general student population and the campus community at large.

The faculty of the Department of Physics can potentially come into contact with every student at Santa Clara. We provide lower and upper division lectures, laboratories, and research opportunities to a growing number of students pursuing one of our two majors – Physics and Engineering Physics – as well as to students who have elected Physics as a minor. We also serve three other distinct constituencies: non-science majors fulfilling their Core natural science requirement, engineering majors, and other science majors, primarily pre-medical students, who take our introductory non-calculus sequence. We encourage all of our students to develop an interest in and a curiosity about physics and science. For all of the student constituencies served by the Department, we are committed to:

- * *Providing an opportunity to develop and hone problems-solving skills, that is, critical thinking in the true sense of the phrase,*
- * *Providing an opportunity to develop and hone presentation skills, particularly as they pertain to scientific and technical presentations,*
- * *Providing a solid grounding in the methods of scientific inquiry,*
- * *Instilling a strong sense of scientific integrity, and*
- * *Presenting physics to all of our students in a way that conveys our individual and collective excitement about our discipline.*

In addition, the Department strives to provide:

- * *A breadth of courses in both the theoretical and experimental aspects of physics,*
- * *A laboratory experience which takes students beyond “cookbook” experimentation,*
- * *An opportunity for students to take a meaningful role in fundamental research,*
- * *Close mentoring relationships, and*
- * *Preparation specific to helping those students continuing on to graduate school reach their full potential.*

The Department of Physics faculty counts these characteristics among our strengths:

- * *Close student-faculty relationships,*
- * *The ability to connect students with good post-Santa Clara career paths,*
- * *High quality students,*
- * *The ability to offer students a variety of research opportunities,*
- * *Small class sizes, and*
- * *A strong, dedicated faculty.*

B. Student Learning Goals and Objectives

Competence (two Goals; four Objectives)

Goal: To prepare Physics and Engineering Physics majors, and other science and engineering students, for success in graduate school, professional school, or a career in their chosen field.

Objectives:

1. Students demonstrate appropriate competence and a working knowledge of classical physics, including the areas of mechanics, electricity and magnetism, thermodynamics, optics, and modern physics, including the areas of atomic physics, solid state physics, statistical mechanics, and quantum mechanics.
2. Students demonstrate competence in the physics laboratory, including a working knowledge of basic electronics and the ability to work independently.
3. Students demonstrate the ability to identify and apply the appropriate analytic, numerical, computational, and other mathematical tools necessary to solve physics problems.

Goal: To immerse students, particularly non-science majors taking physics in order to satisfy Core requirements, in the methods of inquiry that citizens of the 21st century require to become active participants and to assume leadership roles in an increasingly scientific and technological world.

Objective:

4. Students demonstrate the ability to analyze scientific problems, generate logical hypotheses, evaluate evidence, and tolerate ambiguity.

Connections (one Goal; two Objectives)

Goal: To insure that Physics and Engineering-Physics majors, and other science and engineering students, are aware of the importance of physics in today's world and society, and to see the connections between science, events, and physical phenomena.

Objectives:

5. Students demonstrate the ability to apply knowledge of physics in one area to make appropriate intellectual connections and solve problems in other areas of physics or other fields.
6. Students demonstrate a familiarity with the current state of research in one or more subfields of physics, including the most significant research questions being pursued by today's physicists.

Communication (one Goal; one Objective)

Goal: To prepare Physics and Engineering Physics majors, and other science and engineering students, to communicate scientific ideas effectively.

Objective:

7. Students demonstrate the ability to communicate scientific information effectively in written and oral formats.

C. Additional Goals and Objectives.

Curriculum and Pedagogy (one Goal; one Objective)

Goal: To offer an integrated, internally coherent curriculum which builds from introductory to advanced levels while allowing connections to be drawn between different realms within physics.

Objective:

8. Courses in major are tied together in both content and approach, and provide material in an appropriate order.

Scholarship (two Goals; four Objectives)

Goal: To strongly encourage and support scholarship by both faculty and students.

Goal: To foster a community of scholars within the Department of Physics.

Objectives:

9. All faculty members and, to the extent possible, all research students, have funds available for conference travel.
10. The Department offers a regular series of colloquia on a wide range of physics topics.
11. All faculty members have flexibility in course scheduling when necessary and possible.
12. All faculty members maintain an active research program in an area of physics consistent with their talents and interests.

Service (one Goal; two Objectives)

Goal: To strongly encourage service contributions by faculty. These contributions include service to the university, service to the department and service to the profession.

Objectives:

13. All faculty members make contributions to the university, department, and/or field that are appropriate to interest and ability.
14. Faculty members discuss what constitutes appropriate departmental-level service and redistribute assignments accordingly, taking into account personal interests, academic rank, and departmental need.