Department of Chemistry and Physics
Strategic Plan (2018-2023)

Vision

UTC's Department of Chemistry and Physics is committed to exceptional teaching and scholarship through curricular innovation and undergraduate research. Our graduates will be recognized for their academic preparation and critical thinking, which are paramount in today's scientific arenas.

Mission Statement

The Department of Chemistry and Physics at the University of Tennessee at Chattanooga provides a solid foundation in basic concepts and theories as well as dynamic laboratory experiences to prepare students for professional programs, industry, and scientific professions.

Background

The Department of Chemistry and Physics is committed to a student-centered program of instruction, research, and service activities. It focuses on undergraduate education in the physical and life sciences by providing excellent BS degrees option. A high priority is placed upon the role of research with undergraduates, both in generating new scientific knowledge and in promoting critical thinking with students.

Public service is directed to providing technical support and expertise for industries and local higher education institutions as well as improving pre-college instruction through activities designed to assist teachers and students.

A modern curriculum is offered through the use of state-of the-art scientific equipment, technology, and quality instruction.

An effective advisement-mentorship program guides majors to career opportunities in industry and graduate school as well as professional schools including medicine, pharmacy, and dentistry.

The Department values cultural and intellectual diversity, collegiality, and high standards of professional and ethical conduct.

Goals

Goal 1: The Department of Chemistry and Physics will engage and inspire students by leading the university in innovative undergraduate research.

This goal aligns with CAS's Strategic Plan Goal 4

> GOAL 4: The College of Arts and Sciences cultivates new knowledge through research (theoretical and applied) and creative activities that engage students, faculty, and community partners.

And UTC's Strategic Plan Goal 1

> **GOAL 1: Transform lives through meaningful learning experiences.**

To achieve this goal, our 5-year plan is:

Year 1:

1. Contact area businesses to develop an advisory group. The advisory group will provide insight to the knowledge and skill trends needed for success post-graduation in today's work force.
2. Invite the advisory board to an inaugural meeting with both faculty and students.
3. Submit for approval a request to tenure track assistant biophysics professor to beginning fall 2019. This position will support the biophysics concentration, engage in research, and collaborate with health sciences. This hire will support all four of our overarching goals and is therefore critical to the future of the biophysics concentration.
4. Establish a partnership (student internship) between the Physics program and the Department of Medical Physics of the Erlanger Hospital (contact: Dr. Marian Axente, 2007 UTC Physics graduate).
5. Encourage faculty to invite at least one seminar guest per academic year with topics related to chemistry, physics and astronomy by each tenure track faculty member. Encourage all students within the department, in particular current and potential research students, to attend those seminars.

Year 3:

1. Coordinate our monies from summer teaching to provide research release (1 course per semester) to our department members engaged in active undergraduate research agendas.
2. Develop department policy for semester banking to support faculty participation in summer undergraduate research and provide support for off-campus research projects.
3. Develop collaborations with local 2-year community colleges (e.g., Chattanooga, Cleveland and Dalton State Community Colleges) through research opportunities for students transferring to UTC.
4. Engage in intra-Department, inter-Department, and inter-University collaborations
5. Support majors in experiential learning opportunities by sponsoring semester information sessions on research experiences on and off campus, internships through local institutions, national opportunities, and possible study abroad opportunities.
6. Develop possibilities for team-teaching with other departments and cross-listing of other courses that focus on health science and other areas of interdisciplinary research.

Year 5:

1. Maintain and expand hands-on use of state-of-the-art instrumentation for chemical and physical analysis to classify as a top-tier Primarily Undergraduate Research (PUI) program.
2. Support acquisition and maintenance of and/or access to the use of state-of-the-art instrumentation for physics instruction/research (Lasers, computers, telescope, Oak Ridge National Laboratory, and SIM Center).

Goal 2: The Department of Chemistry and Physics will engage our students through innovative teaching pedagogy, integrating technology and best advising practices.

This supports CAS's Strategic Plan Goal 1C & 2B

> GOAL 1C: Mindfully integrate up-to-date technology and sustain best teaching practices to provide students in the College with the best possible 21st century classroom and learning experience. This includes increasing the accessibility and modality of courses that make up the General Education curriculum.
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> GOAL 2B: Provide instruction and enable student learning through innovative teaching strategies, including flipped classrooms, team-based learning, problem-based learning, facilitations and presentations, online and hybrid instructional delivery.

And UTC's Strategic Plan Goal 1

> GOAL 1: Transform lives through meaningful learning experiences.

To achieve this goal, our 5-year-plan is:

Year 1:

1. Review the chemistry curriculum to ensure measureable student learning outcomes that align with ACS program outcomes.
2. Review and update Scientific Communication (CHEM 2810), Chemical Literature (CHEM 3820), and Chemistry Seminar (4830).
3. Support faculty travel to conferences or workshops on chemical and physics education such as the Biennial Conference on Chemical Education and Building Thriving Physics Programs.
4. Apply research examples in the classroom from faculty's own work or published work, and encourage open student discussion to promote critical thinking.
5. Conduct department-wide Student Success Collaborative (SSC) Campus training to support use of valuable advising tools.

Year 3:

1. Expand our courses offerings to include the UTC Experiential Learning designation for at least one course. Students will have established e-portfolios to guide them to their graduation.
2. Expand offerings of chemistry upper-level electives (only two electives CHEM 4030 and CHEM 4220 currently exist) in innovative areas, perhaps offer as Special Topics Courses that could cross list with Physics.
3. Provide easily accessible advisement information to students via renovation of department website (updating structure, ensuring information is current, annual review) and creation of a department-specific advisement guide for students (e.g. see Duke Chemistry's Handbook for Majors and College of Charleston Handbook for Majors).
4. Establish department specific USTU 1250, enrolling all freshmen chemistry and physics majors.
5. Develop new special topics courses that will link biophysics courses with biochemistry courses to encourage students to double major in the biophysics and biochemistry concentrations.

Year 5:

1. Encourage faculty to develop courses with a study abroad component.
2. Maintain an established Capstone for all majors.
3. Increase undergraduate research students by ten percent over the past five years.
4. Establish student internship program with Erlanger Medical Physics program.
5. Develop possibilities for team-teaching with other departments and cross-listing of other courses that focus on health science and other areas of interdisciplinary research.

Goal 3: The Department of Chemistry and Physics will grow its majors by expanding its recruitment and retention efforts.

To achieve this goal, our 5-year plan is:

Recruitment:

Year 1:

1. Evaluate programs within the department to identify avenues of recruiting success.
2. Use spaces in the building to showcase the department, including hallways and first floor display cabinets.
3. Invite outstand first year non-majors to participate in a spring semester first year seminar spring seminar (both physics and chemistry combined) to teach them about our programs and potential career opportunities to recruit them to chemistry and physics.

4. Participate in area science fairs to recruit high school students both to UTC and to the Department.

Year 3:

1. Discuss degree track in chemistry to focus on pre-professional students, such as BS Chemistry: Pre-professional.
2. Publicize the accomplishments of the chemistry and physics students beyond research-related activities (e.g., fellowships, graduate schools, medical schools, industry, etc…) using our hallways in Grote Hall.
3. Expand our advisory group of industry professionals and alumni to help direct future progress in chemistry and physics.
4. Participate in the Honors program teaching.

Year 5:

1. Review and update promotional materials that are designed to explain our programs to new and continuing students.
2. Establish a High School recruiting program.

Retention:

Year 1:

1. Promote social engagement of our majors by offering receptions twice a semester to highlight department activities.
2. Honor our students who have won awards and scholarships by recognizing them at the spring awards ceremony and through social media.
3. Work closely with professional advisors and reach out to our freshman and sophomore students to make sure they stay in touch with the department.
4. Introduce students to professional opportunities as early as possible, such as using gift funds to sponsor free introductory memberships in ACS and APS.
5. Partner with University Career Services to make students aware of career opportunities that do not necessarily involve graduate, professional school, or STEM education.
6. Encourage and support student and faculty participation in the local chapter of ACS, local chapter of the SPS, volunteering at the Observatory, and outreach programs at the Creative Discovery Museum.
7. Develop a database of department alumni in order to solicit involvement through information exchange and mentorship.

Year 3:

1. Expand opportunities for student-faculty interaction and networking outside the classroom (e.g. aggressively recruiting for student based clubs in both chemistry and physics).
2. Establish student recruiters with current majors.
3. Establish student mentor groups.

Year 5:

1. Evaluate retention trends through a data-supported study which includes factors such as gender, race, major migration, GPA, ACT, and graduation rate to help determine areas in which we can affect improvement in retention.
2. Establish alumni support groups through online discussion groups or face-to-face interaction.