

# Department of Chemistry and Physics

## Academic Plan

### 2004 – 2009

#### Table of Contents

- I. Introduction
  - a. Background
  - b. Executive Summary of Department Plan
    - i. New Programs and Initiatives
    - ii. Related Themes
    - iii. Required Resources
    - iv. New Structure or Organizational Changes
    - v. Anticipated Student Demand
    - vi. Interdisciplinary Collaboration
- II. Process
- III. Assumptions
- IV. Unit Mission and Vision
- V. Proposed Goals and Objectives
- VI. Proposed Actions
- VII. Evaluation

## I. INTRODUCTION

### A. Background

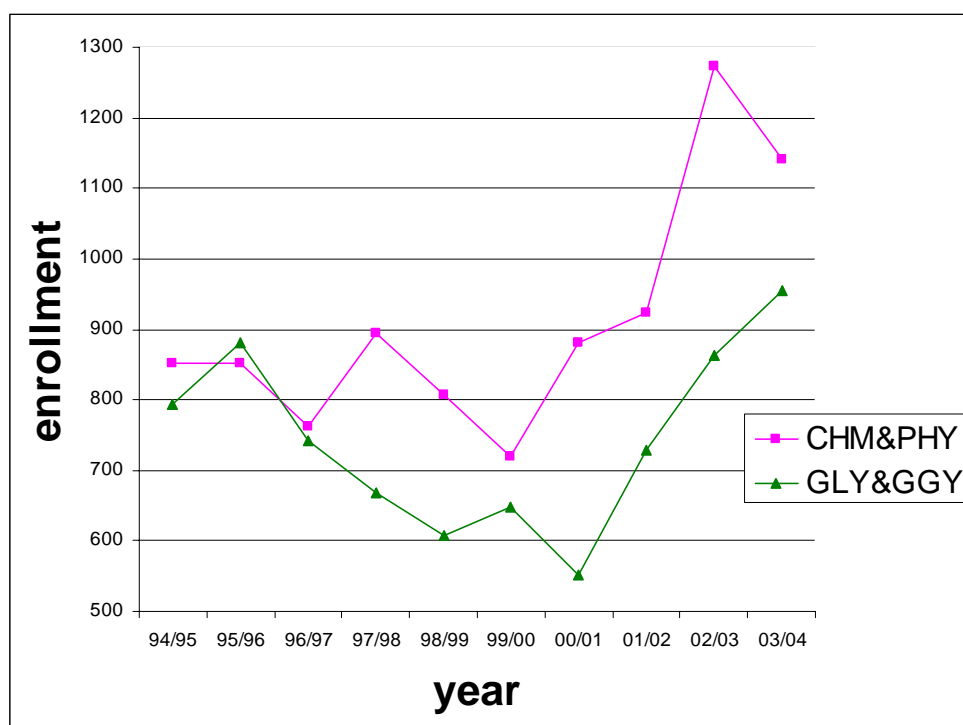
The UNCP Chemistry and Physics Department offers the B.S. degree with a major in either Chemistry or Applied Physics, coordinates the interdepartmental B.S. and M.S. degree programs in Science Education, provides for minors and academic concentrations in Geography, Geology and Physics, and offers a pre-engineering curriculum for students planning subsequent transfer to another University. The Chemistry program maintains approval by the American Chemical Society (effective Fall 2000 Semester), a long-pursued goal that provides external validation of the program's quality and offers accreditation to its graduates.

The Department is presently comprised of one full time administrative secretary and one laboratory manager in support of fifteen full-time teaching faculty distributed among disciplines as follows:

- Chemistry (7 total: 4 full-time tenure track, 2 phased retirement, 1 full-time temporary)
- Physics (4 total: 3 full-time tenure track, 1 full-time temporary)
- Geology & Geography (4 total: all full-time tenure track)

- Science Education (2 total: 1 full-time tenure track, 1 phased retirement).

Student enrollment in Department programs has climbed steadily and more rapidly than total University enrollment over the past decade. For example, the number of declared Chemistry majors has more than doubled from about 40 in 1990 to well over 100 in 2004, with the number of Chemistry graduates likewise increasing from an average of ca. 5-8 to ca. 12-18 annually over the same time period. Such growth in the Chemistry program, coupled with the recent addition of programs in Applied Physics (B.S.) and Science Education (M.S.), has resulted in significant increases in the Department's student audience. Further, enrollment in our department's general education offerings has seen significant growth in the past few years, outpacing total campus enrollment growth and placing greater demands on the teaching loads of our faculty (see the figure below).



The Department is physically housed in two campus locations, i.e., the locations of the previously distinct Chemistry/Physics and Geography/Geology Departments prior to their merger in the 1999/2000 academic year. Classrooms, laboratories, and faculty offices for Chemistry and Physics programs, in addition to support staff offices, are presently located in the temporary modular units on the north side of campus awaiting relocation to the expanded and renovated

Oxendine Science Building (scheduled for August 2004). Geography and Geology classes and labs are located on the second floor of the Business Administration Building, and faculty offices are located in Old Main. As described in section III of this report, the Department plans to implement reversal of the 1999 merger upon reoccupation of the Oxendine Building in the Fall of 2004.

## **B. Executive Summary of Department Plan**

### **1. New Programs and Initiatives**

*Chemistry and Physics.* For the 2004-9 period, the Chemistry & Physics Department will begin implementation of two new tracks in its B.S. Chemistry program, Environmental and Prepharmacy, both of which have received approval via the UNCP campus process in the 2003/4 academic year. The Department will also seek permission, jointly with the Biology Department, to implement a new, interdisciplinary B.S. degree program in Biotechnology (program coordinators are Len Holmes and Maria Pereira).

*Physics.* For the 2004-9 period, the Chemistry & Physics Department will begin investigating the feasibility of joint program in physics between UNCP and FSU. Presently UNCP has a BS in Applied Physics and FSU does not have a BS in Physics. Historical, degree programs in physics have low enrollments, and a joint program would allow students at both schools the opportunity to pursue a degree in physics with the excellent resources available at each school. This initiative would be an example of dual programs as recently proposed by the Office of the President. The Department will also seek permission to consider additional tracks beyond its present computational science track. Areas such as nanotechnology and optical physics are becoming important fields during the next 10 years.

*Geology and Geography.* For the 2004-9 period, the newly reconstituted Geology & Geography Department will propose a new interdisciplinary major in Geo-Environmental Studies and will develop a minor in GIS (Geographic information systems).

*Science Education.* ...input from SCE faculty requested here...

### **2. Related Themes**

Our Department's established, new and planned programs are relevant to all of the six planning themes identified by the University, most directly to those listed below:

*--Preparing knowledgeable managers and professionals for the future to ensure economic development.*

*--Understanding the impact of science and its relationship to ethics, the environment, everyday life, public health, public policy, religion, and technology.*

*--Viewing the Liberal Arts as the basis for both critical thinking and life-long learning skills.*

### **3. Required Resources**

*Chemistry and Physics.* The phased retirement of two Chemistry faculty, in addition to the substantial enrollment increases in general education and major courses, will necessitate the addition of a minimum of two new full-time tenure track faculty in Chemistry (one in organic, one in physical chemistry). These new faculty will be critical to the successful continuation and expansion of Department activities during the 2004-2009 period. The estimated annual cost for these two positions is approximately \$140,000 (salary and fringe benefits). Additionally, the expansion of our Department's instrumentation holdings has continued to the point of requiring a staff position (e.g., "Instrumentation Specialist") whose primary duties would include the maintenance and operation of lab equipment and instruments. Such duties have to date been delegated to our lab manager and various faculty members as "overload", but the combined impacts of enrollment and inventory growth makes this arrangement increasingly unacceptable. We anticipate this position to require a master's degree in a physical science or related field, or a bachelor's degree with extensive relevant experience, and estimate the annual cost to be approximately \$60,000 (salary and fringe benefits).

A reliable supply and equipment budgets will become increasingly important to the effective implementation of the Department's expanded program activities, reasonable estimates being approximately \$50,000 for equipment (including ongoing maintenance and repair service costs for major equipment) and \$15,000 for supplies annually.

Finally, an expanded faculty development budget will be required to permit professional growth of Department faculty appropriate to the expanded Departmental programs and activities.

A realistic estimate for these funds would be \$1000 per faculty member per year, for a total of \$11,000 annually.

*Note re. Physics: We do not anticipate the need of any new faculty members in the Physics area, but we do see the need to update our equipment holdings to adequately teach our upper level physics offering. A reasonable estimate would be approximately \$40,000 for equipment and \$5,000 for supplies annually*

*Geology and Geography.* A major immediate concern is classroom and lab space for the Geography and Geology program. Presently GGY/GLY classes are housed in BA Building, but we realize that the imminent renovation of BA Building means our space is not a permanent situation. It is imperative that the classroom needs of Geography and Geology program be considered in space allocation – and that faculty input is taken in the planning of space. Program needs include not simply the classroom space but adequate room nearby for the program's teaching collections of maps, rocks, fossils, and related material. The "prep room" area storage for Geology is especially important.

In addition to increases in supplies and equipment budgets, the Geology and Geography program will need, based on current enrollment projections for the University, at least two additional full-time positions within the next two years, and two additional positions in the 2006-2009 years. The estimated annual cost for two positions in 2004-2005 is \$140,000.00 and \$145,000 for the two in 2006-2009.

*Science Education. ...input from SCE faculty requested here...*

#### **4. New Structure or Organizational Changes**

As noted in section I.A above, the 1999 merger of the Chemistry and Physics Department with the Geology and Geography Department will be reversed upon reoccupation of the renovated/expanded Oxendine Science Building (scheduled for August 2004). Also in this regard, it should be noted that the Science Education faculty plan to propose a separate organizational structure to house the Science Education program in the near future.

#### **5. Anticipated Student Demand.**

The number of students majoring in degrees offered by our Department has increased by more than 50% during the past decade, roughly three-times the rate of increase in total University enrollment of approximately 14%. Considering this trend, the predicted enrollment growth for UNCP, and the current status of the economy, a prudent assumption would be that our Department's enrollment will continue to grow, possibly at a lesser rate, over the next five years. If these assumptions are accurate, our enrollment might increase by approximately 10-25% during the 2004-2009 period.

#### **6. Interdisciplinary Collaboration**

The interdisciplinary B.S. program in Biotechnology that is presently being planned and will be submitted for implementation approval in the near future (see section B.1 above) entails extensive collaboration with both the UNCP Biology Department and several off-campus organizations (NC Biotechnology Center, various biotechnological industries, etc.).

### **II. PROCESS**

The Chair of the Chemistry and Physics Department notified all Department faculty of the call for an updated academic plan covering the 2004-2009 period in the fall of 2003. Prof. Flowers was assigned the task of drafting the plan, and the input of all Department faculty was solicited by email. The initial draft of this plan was distributed to Department members for review and revision prior to submitting the final draft to the Department Chair.

### **III. ASSUMPTIONS**

More than a dozen statements of various social, political and economic factors expected to impact the University ("assumptions") were provided as Attachment D of a January 5, 2001 memorandum from the Provost. In short, these assumptions predict continued growth and further diversification of the student body, increasingly tight budgets, and a subsequent need to increase the cost effectiveness of University programs without jeopardizing academic quality. Also noted in the listed assumptions were additional challenges that the University would face in keeping up with instructional technology advancements, as well as a need for increased emphasis on public

relations issues, particularly with the local community. All these assumptions were considered in developing our Department's academic plan.

Additional assumptions of particular relevance to our Department were also considered. The percentage of the total undergraduate enrollment majoring in degrees offered by our Department has increased steadily over the past decade (*vide supra*), hence we assume the impacts of the projected enrollment growth will be even more significant for our curriculum. Tighter state budgets and reduced, more competitive federal funding programs will compound the challenges posed by rising costs for the tools and materials necessary for quality undergraduate instruction in the physical sciences. Finally, it is assumed that our Department will reverse the 1999 merger that combined Chemistry/Physics with Geography/Geology upon occupation of the expanded / renovated Oxendine Science Building in August 2004, and we assume the reconstituted Geography and Geology Department will either remain in its present location or find new campus quarters.

#### **IV. UNIT MISSION AND VISION**

The Department of Chemistry and Physics is dedicated to its mission of (1) instilling an appreciation of and a literate knowledge of the physical sciences in all its students; (2) affording a solid foundation in the theory and practice of chemistry, physics, and science education to its majors; (3) supporting the professional and scholarly development of its faculty; and (4) providing professional service based on faculty expertise to the local and regional communities. The Department aims to fulfill this mission through a thoughtfully balanced program of curricular and extracurricular activities consistent with the University's commitment to academic excellence. Beyond the fulfillment of its mission, the Department earnestly pursues a vision of providing local, regional and national leadership in the development and implementation of effective instructional practices for undergraduate science education.

#### **V. PROPOSED GOALS AND OBJECTIVES**

Descriptions of the Department's goals, objectives, planned actions, and evaluation procedures are presented here and in subsequent sections of this document. Appropriate to the distinct programs offered by the Department (see Section I above), these descriptions will be

presented separately for the areas of Chemistry, Applied Physics, Science Education, Pre-Engineering, Geology and Geography.

### Chemistry

The primary educational goal of the Department's Chemistry Program is to produce B.S. graduates qualified for a wide variety of relevant post graduation pursuits. Specific objectives germane to this goal include the following:

- to graduate B.S. students that are successful in securing and maintaining immediate, postgraduate employment;
- to graduate B.S. students that are successful in gaining admission to and completing graduate programs in Chemistry and related fields; and,
- to graduate B.S. students that are successful in gaining entrance to and completing relevant professional degree programs (medicine, law, etc.).

The Chemistry Program further aims to pursue the goal of providing and supporting faculty scholarship and promoting service to the University and the off-campus community. Specific objectives related to this goal include the following:

- to maintain an atmosphere conducive to the professional development of its faculty;
- to facilitate the conduct of scientific research and the dissemination of resulting knowledge; and,
- to encourage and support the application of faculty expertise to service activities for the University, the Chemistry profession, and the local, state, national and global communities.

### Physics

This is a relatively new program, established in January 2000, and it is the first baccalaureate program in physics offered by UNCP. This Applied Physics program has a strong emphasis on applications of the laws of physics to real world problems. Students in the program will develop these problem-solving skills by successfully completing a series of courses that will focus on the underlying physical principles working in all of today's modern technology. This will be presented

in a program that will stress a hands-on approach to understanding the laws of nature. This program will have a strong laboratory components which will develop those experimental techniques necessary to prepare students for work in high-demand technical fields such as engineering, computers (software and hardware), and health science. This program will also enhance other programs offered by the department of Chemistry and Physics. It will contribute to our physics concentration in science education and aid in the preparation of needed high school physics teachers. It will contribute to our pre-engineering programs and to our Biotechnology and Chemistry programs. The broad technical background that a student of physics acquires provides him/her with many of the skills valued in a wide range of professions. These skills include the ability to think analytically and objectively, to solve problems, to work with technical equipment and to frame questions in an analytical manner.

Our Applied Physics program is unique in several ways. First, since our program is coordinated by a department that also coordinates courses in chemistry, geology and science education as well as physics, there is a strong cooperation across several disciplines. We use all this expertise to ensure that our majors will receive excellent training across several disciplines. Second, with support from the computer science department, our program strongly emphasizes computer acquisition and visualization of data to solve problems using our very powerful Silicon Graphic workstations and their direct access to NCSC facilities. Presently we only offer just one track, Computational Physics, but we hope to develop other tracks, (e.g., nanotechnology, optical physics, environmental physics, etc.) within the next 5 years.

The educational objectives, reflected in the course work and other education experiences, of the Applied Physics program is to prepare students as follows:

- Provide a fundamental understanding of the laws of physics.
- Provide the knowledge, skills, and abilities needed to effectively use technology to solve real world problems.
- Provide the knowledge, skills, and abilities needed in solving problems across interdisciplinary scientific fields.

- Provide the skills in data collection, critical thinking and application of these skills to solving problems related to society in many diverse areas.
- Provide prospective physics teachers with a strong foundation in the application of physics principles that will enhance the quality of science teaching provided to schools in the region and state.
- Provide programs and workshops for educators in the region to enhance their skills in physics and technology education.
- Provide the knowledge, skills, and abilities needed to enter the technical workplace, graduate school, or a career in engineering.

The specialized knowledge, skills and abilities students will be expected to demonstrate include:

- understanding of the various stages and substages of problem solving.
- skills in laboratory techniques, experiment design, measurements and electronic interfacing.
- skill in data collection, data analysis and modeling.
- skills in mathematics and statistics.
- skills in computer programming.
- skills in the use of computers and related technology
- knowledge and skills in working collaboratively.
- knowledge of and skills in applying physics principles to solving problems in society.
- positive attitudes toward science and society, and a strong commitment in helping to solve problems across multidisciplinary fields.

The versatile nature of a B.S. degree in Applied Physics provides the graduate with an opportunity to choose from a number of fields. Bureau of Labor Statistics indicate that students who possess the skills an Applied Physics program develops will be "useful for entry into many other occupations". With 55% of graduating physics college students attending graduate school

and another 32% obtaining immediate employment, close to 90% of those students with a B.S. degree in physics will be employed or headed to higher education.

It is clear from the evidence cited that a person with a degree in physics is indeed a marketable commodity. This degree is a path to various opportunities within the physics community as well as providing a solid background for entrance into many other high demand fields outside of physics. The projected demand is initially small, but expected to increase each year as the program becomes established and our first class of students graduate.

#### Science Education

The primary educational goal of the Department's Science Education Program is to produce competent, effective teachers for secondary school systems. Specific, measurable objectives related to this goal include the following:

- to graduate students with the B.S. in Science Education that receive positive recommendations for the North Carolina Secondary School Comprehensive Science License;
- to produce lateral entry and licensure-only students that receive positive recommendations for the North Carolina Secondary School Comprehensive Science License;
- to graduate students with the M.A.Ed. in Science Education that receive positive recommendations for the North Carolina Advanced Competency License in Secondary School Comprehensive Science.

#### Pre-Engineering

The primary educational goal of the Department's Pre-Engineering Program is to produce undergraduate students who are qualified for direct transfer into one of the three UNC engineering campuses, UNC Charlotte, NC State and NC A&T. Specific, objectives related to this goal include the following:

- To place all students who enter the pre-engineering program into the UNC engineering campus of their choice

- To ensure that the education received by these students meets with the standards established by all three engineering campuses.
- To recruit more students from the surrounding area into the pre-engineering program as well as enhance retention of those students in the program.
- To have a signed agreement between the three engineering campuses and UNCP. This agreement will be more specific in what is required of the student by each campus and goes beyond the verbal understanding that is now in place.

#### Geology and Geography

- To execute superior undergraduate teaching and provide introductory level courses that meet the goals and objectives of UNCP's General Education Program.
- Encourage students to participate in regional research/activities [take UNC Pembroke into communities]
- To prepare students for graduate school
- To provide Science Education and Middle Grades Education (Science) students with the firm background they need to teach Earth Science in North Carolina's public schools.
- To educate in-service teachers with limited geologic background to meet the new Earth Science elements of the required state curriculum.
- To provide courses that will enable students to acquire knowledge and appreciation of humankind's physical and cultural environments from geological and spatial perspectives. (Thus meeting the liberal arts mission of the university.)
- To encourage students to use the knowledge they gain to forge rational thoughts about the environment in which they live.
- To produce students who are well informed about the physical and cultural components of the planet earth, and who can use their knowledge to help prevent further decay of the total environment.
- To provide quality minor and concentration programs in geography and geology that will enable students to enter graduate school in the discipline, or otherwise use the knowledge gained to go on to be responsible citizens and members of the workforce.

- To establish a major in “Earth Sciences”—this major will have to tracks: (1) Geography, and (2) Geology.
- Develop an interdisciplinary major to meet local needs and encourage a broader view of the world by students.

## **VI. PROPOSED ACTIONS**

### Chemistry

The goals and objectives of the Chemistry Program will be achieved through the concerted efforts of the Department chair and the Chemistry faculty. The recently acquired approval of the Department’s Chemistry Program by the American Chemical Society (ACS) represents external validation of our earnest pursuit of the previously cited educational goals, and maintaining ACS approval will require continued diligence in this regard. The Department plans to continue its practice of dynamic curriculum revision, making changes, additions and deletions to its instructional offerings as appropriate to the advancement of the discipline and related educational approaches. To the extent permitted by budgetary constraints (*vide supra*), the Department will support faculty in their efforts to improve the Chemistry curriculum.

The Department plans to further its efforts to provide opportunities for faculty research, particularly in conjunction with undergraduate assistants, as this activity is well suited for achieving both faculty development and student learning. An established campus leader in the area of undergraduate research, the Department will continue to encourage its faculty to pursue all available sources for support of research activities, particularly external funding agencies. Additionally in this regard, the Department will likely experience a synergistic relation with the planned University Center for Undergraduate Research, an entity proposed in a recent Title III grant proposal submission by UNCP that will hopefully come into existence with or without the sought external support.

Finally, faculty service to the University, the Chemistry profession, and the off-campus community will remain a focus of the Department. The long history of coordinating the State Region IV Annual Science Fair is perhaps the most visible example of such service, and the

Department plans to continue furnishing the considerable effort required for this event. Other less conspicuous actions in this regard (consulting, public school outreach, etc.) will likewise continue, encouraged and supported by the Department through recognition and, when possible, physical resources.

### Physics

The Department will seek approval for a joint program in physics with FSU, as a means of increasing the numbers of students who wish to pursue a degree in physics and as a way of making use of the resources at both universities. We will also investigate the possibilities of new tracks in physics.

### Science Education

The goals and objectives of the Science Education Program will be achieved through earnest application of the relevant curricula by the Program coordinator, teaching faculty, and the Science Education Advisory Committee. These curricula are continually assessed and revised by cognizant UNCP faculty to insure their effectiveness and conformity with guidelines of the State Department of Public Instruction.

### Pre-Engineering

The goals and objectives of the Pre-Engineering Program will be achieved through earnest application of the relevant curricula by the Program coordinator. The coordinator will maintain contact with the UNC engineering campuses to ensure that pre-engineering students are being accepted into their engineering programs and that those students are succeeding in their goal of a degree in engineering. The Program coordinator will take specific actions, including:

- to guarantee transfer of specialized engineering courses such as Statics to each of the engineering campuses.
- to seek out a contact in each engineering campus and produce a signed agreement with each engineering campus. At present there is a newly signed agreement with UNC Charlotte for entrance into their Mechanical, Electrical and Civil Engineering programs. These agreements will provide a more secure and concrete program for the pre-engineering student to follow.

- to recruit students from the surrounding area into the program through advertisement and talks at the local schools.
- to create distance education courses from a UNC engineering campus, which would guarantee transfer of higher level engineering courses to all UNC campuses. At present, UNC Charlotte will start teaching Statics as well as other courses via the Internet to UNCP in the fall of 2001.

### Geology and Geography

The Geography and Geology faculty will work with faculty members from other departments and administrators to achieve the goals listed above. All Geography and Geology full-time faculty have research interests and activities and it is expected that this will remain so. The faculty will seek outside funding for research projects, and will also collaborate with faculty at other institutions. Where feasible, the faculty will include students in research activities.

## **VII. EVALUATION**

### Chemistry

Achievement of the Chemistry Program's educational goals and objectives will be evaluated through regular assessment of appropriate performance indicators, including:

- the number of B.S. graduates obtaining and maintaining immediate postgraduate employment;
- the number of B.S. graduates gaining admission to and completing graduate programs in Chemistry and related fields; and,
- the number of B.S. students that are successful in gaining entrance to and completing relevant professional degree programs (medicine, law, etc.).

Data relevant to these performance indicators have to date been obtained annually through the graduate tracking efforts of the Department, with all faculty sharing the responsibility of gathering relevant information on graduates and passing it on to the Department secretary for archiving. This approach is in need of improvement, however, as each year a few Chemistry graduates "slip

through the cracks". Further, maintaining ACS approval of the Chemistry Program will require more accurate and complete data than have been available in the past. The Department plans to strengthen its resolve in the area of graduate tracking by (a) making the annual data collection effort a rotating responsibility for its faculty, (b) extending the scope of the tracking process by including annual "progress checks" on graduates over an extended time period (e.g., 5 or 10 years), perhaps assigning each faculty member responsibility for a reasonable portion of this time period, and (c) investigating alternate means of gathering the tracking data (telephone solicitations, web-based form submissions, postal mailings, etc.). The Department will meet each Fall Semester to discuss details and assign faculty to the various evaluation tasks, and to review the evaluation results from the previous academic year (see "Use of Evaluation Results" section below).

Evaluation of the scholarship and service goals and objectives of the Chemistry program will involve primarily the assessment procedures outlined in the UNCP Faculty Evaluation Model. The information provided in annual faculty self-evaluations will be most useful in this regard, hence the Department chair will be the person responsible for gathering these data.

*Use of Evaluation Results.* A compilation of the evaluation data described above will be prepared annually by the designated faculty member and presented at a Department meeting for all to consider. Should the data show cause for concern in any of the areas addressed, the Chair will confer with appropriate faculty members to investigate the point(s) of concern and formulate plans of corrective action.

### Physics

*Success in obtaining employment.* The University of North Carolina Pembroke Career Services Center monitors the employment status of graduates. This information is shared with department chairs, who in turn share the information with program coordinators.

*Feedback from employers.* The department of Chemistry and Physics will solicit formal feedback from employers of our graduates. This feedback may be solicited through surveys of employers or through focus groups of employers. These evaluations will occur once every five years.

*Evaluation by External Agencies.* UNCP policy for evaluation of programs is to have all departments undergo an extensive review every five years with the aid of off campus evaluators. The department will also solicit program review from such agency as American Institute of Physics.

*Use of Evaluation Results.* A compilation of the evaluation data described above will be prepared annually by the designated faculty member and presented at a Department meeting for all to consider. Should the data show cause for concern in any of the areas addressed, the Chair will confer with appropriate faculty members to investigate the point(s) of concern and formulate plans of corrective action.

#### Science Education

The extent to which the Science Education Program's goals and objectives are being achieved will be evaluated through regular assessment of appropriate performance indicators, including:

- the number of B.S. graduates receiving positive recommendations for licensure;
- the number of lateral entry and licensure-only students receiving positive recommendations for licensure; and,
- the number of class "A" licensed high school teachers completing the M.A.Ed degree and receiving positive recommendations for advanced competency licensure.

Data relevant to these performance indicators will be obtained from the School of Education's licensure officer and evaluated by the Program coordinator and the Department chair on a five-year cycle.

*Use of Evaluation Results.* The evaluation data described above will be compared to objective standards agreed upon by the Program coordinator and the Department chair.

Presently, it is expected that 90% of B.S. graduates, 75% of lateral entry and licensure-only

students, and 90% of M.A.Ed. graduates will achieve the primary Program objective of licensure over the five-year period. If the evaluation data show underachievement in these licensure objectives, the Program coordinator, Department chair, Science Advisory Committee, and the Dean of the School of Education will confer to investigate the cause of underachievement and to plan and implement appropriate corrective actions.

### Pre-Engineering

The extent to which the Pre-Engineering Program's goals and objectives are being achieved will be evaluated through regular assessment of appropriate performance indicators, including:

- Updated statistics on which students and the percentage of students who are accepted into a UNC engineering program
- Updated statistics on the percentage of accepted students that go on to graduate from a UNC engineering program

*Use of Evaluation Results.* A compilation of the evaluation data described above will be prepared annually by the designated faculty member and presented at a Department meeting for all to consider. Should the data show cause for concern in any of the areas addressed, the Chair will confer with appropriate faculty members to investigate the point(s) of concern and formulate plans of corrective action.

### Geology and Geography

We consider recommendations made by our professional organizations with regard to ideal programs. The external review which is conducted every five years is another assessment tool. Otherwise, we have no formal procedure to assess the previously mentioned goals except through student examinations, papers, and dialogue with our peers, both at UNCP and other institutions. As we progress toward a major, we expect that our evaluation procedures will become more formal.

We use comparisons with other campuses, and opinions from professors on other campuses, as well as our individual perceptions of student progress to assess if our goals for the students who have completed a program in our Department are effective. This includes former

students who have attended graduate school and those who have entered the workforce. This includes students who have gone on to graduate school and those who have entered the workforce.

The curriculum is assessed by comparing what comparable institutions offer, by feedback from students on their performance on standardized tests (NTE, GRE) that include questions related to the Departmental disciplines, by discussing with potential employers how well suited our minors are for employment and by consulting with graduate school faculty at other institutions on the preparedness level of our students for graduate studies. These indicators are positive. The curriculum of the Department has been periodically reviewed.