

North Georgia College & State University  
Comprehensive Program Review  
B.S. in Chemistry

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B.S. in Chemistry—North Georgia College & State University  
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**1. How does this program compare with similar programs at other institutions?**

This program was triggered due to the number of graduates. Over the five year period of this study the NGCSU chemistry department averaged 8.6 graduates per year. Over the same period of time, the state universities in the University System of Georgia averaged 7.3 graduates per year with a range of 3 to 14 per year. The North Georgia program appears to be in normal range for the number of graduates at similar institutions.

The American Chemical Society has an approval process that operates through its Committee on Professional Training. The guidelines they offer and the approval process are the standard by which quality undergraduate chemistry programs are measured. Those guidelines have been used in preparing this response to the university's program review report. It should be noted that the Chemistry Department met with the ACS committee in 2002 and some specific guidelines were offered at that point for program improvement before seeking such approval.

The table below shows the number of graduates at regional and state universities in the University System in 2003, and shows the status of the departments with respect to American Chemical Society approval.

Institution	Graduates, 2003	ACS accredited
Georgia Southern	10	Yes
Valdosta	5	Yes
Albany	3	No
Armstrong	11	Yes
Augusta	3	No
Clayton	No major	
Columbus	No major	
Fort Valley	6	No
Georgia College	8	No
Georgia Southwestern	9	No
Kennesaw	9	Yes
North Georgia	9	No
Southern Poly	No major	
Savannah State	3	No
West Georgia	14	Yes

In addition, four other private universities in Georgia, all smaller than North Georgia, also have programs approved by the ACS Committee on Professional Training: Agnes Scott, Berry, Mercer and Morehouse.

This program at this institution should obtain approval by the ACS Committee on Professional Training.

2. How coherent is the sequencing of the courses?

Chemistry is a highly sequenced program at North Georgia. It follows a common pattern: Introductory at the 1000 level, Analytical at the 2000 level, and Organic at the 3000 level, both of which have 1000 level prerequisites. Other 3000 level courses include the foundational courses in Physical Chemistry. The 4000 level courses include advanced organic, advanced inorganic, instrumental and biochemistry. All of these are required elements in the ACS recommended sequence.

Requirements and sequencing for the four tracks (professional, non-professional, teacher certification and dual degree/engineering) within the chemistry major are described clearly in the Undergraduate Bulletin. The chemistry components of the non-professional major and the teacher certification track are identical.

3. How logical and appropriate are the courses and other requirements for this program?

The ACS committee on professional training describes Chemistry, calculus and physics as the core of a major. The core curriculum provides and requires those options.

The majors level courses and requirements meet the minimum standards of the American Chemical Society for accreditation.

4. Does this program fill a need as you understand the current and anticipated future state of the profession, in terms of training its graduates for professional employment?

This is one of two chemistry programs in the North Georgia region. This program meets a national need for graduates with training in chemistry for academia, industry, government and secondary education. Graduates have entered all of those fields. This program also meets a national need for scientific literacy in the general population through courses offered in the core curriculum.

Of the ten 2004 graduates, six will enter graduate school in chemistry, one will enter professional school in pharmacy, one has accepted a commission in the U.S. Army, one has accepted employment in-field and one is entering the ministry.

5. What are the areas of this program that are particularly noteworthy in terms of strengths, special attributes, unique qualities?

Students have an excellent record of graduate and professional school acceptance

Alumni support and giving have strengthened the departments program significantly

Caliber of entering students is high

Involvement of students in research has been strong and productive.

6. Is it your recommendation that the program be discontinued, substantially revised and continued, or slightly modified and continued, just as it is?

The program should definitely be continued. Whatever steps are necessary should be taken to secure ACS approval for the major. This will probably include the addition of staff and faculty and the development of a comprehensive plan for instrumentation repair and replacement.

To obtain a better indication of student preparation, consideration should be given to using the standardized end of course examinations available from the American Chemical Society. These will give a better measure of student preparation than the current exit examination.

7. Given the size and nature of this program are the resources adequate in the following areas: 1) faculty; 2)staff; 3)physical space; and 4)technology

Faculty resources are adequate in terms of faculty preparation, but are inadequate in number if the department is to pursue ACS accreditation. While the faculty teaching load of 12 credit hours is within the guidelines, the faculty teaching load including laboratories routinely exceeds 15 contact hours per semester. The ACS guidelines state that "Under no circumstances should a teaching load exceed 15 contact hours per week, and significantly lower loads are strongly recommended." Four out of the five faculty members exceed this load for at least one academic term. Conversations with the other ACS accredited programs at similar institutions reveal that they calculate work load on a contact hour, rather than a credit hour basis.

Staff resources are also inadequate. There is no support staff for instrument repair, and no budget to hire factory repair and maintenance technicians. Consequently, PhD chemists are being used as instrument repair technicians. Sharing one secretary between two departments is also challenging.

The completion of the Natural and Health Sciences building in the summer of 2002 has given the department adequate space. Power and temperature controls in the building need to be stabilized.

Technology cannot be considered separately from instrumentation, which is the technology of chemistry. Computing resources are adequate and the Department of Information technology provides service and upgrades. There is no budget and no plan for instrument purchases, maintenance or replacement. Instrument purchases have been funded by private donations. This approach should not continue.

8. In your professional capacity, would you be pleased to participate in this program?

The program is extremely collegial and concerned about meeting student needs. The staff is qualified and professional. The students are of high quality. All of those factors contribute to the ability to attract qualified professionals. Workload and budgetary issues provide some drawbacks.

9. If you knew a student who was interested in pursuing a degree in this program, would you recommend this particular one to the student, assuming all other factors to be equal?  
Students completing this program have a good record of graduate and professional school admission, are able to find jobs and are sought after as teachers. Therefore I would recommend the program.

10. How does this program contribute, coincide with, reinforce, or in some way serve the university's mission?

Chemistry is a central science, and an expected part of the liberal arts mission of the institution. It is a foundation course for the biology program. The service courses at the introductory level, the allied health courses and the geology courses contribute to the knowledge base of majors in related fields.

11. If this program were discontinued, what impact would it have on the university's mission?

Discontinuing this program would cripple all of the programs in Natural and Health Sciences.

12. What recommendations would you make for improving this program?

- Address the faculty workload issue
- Plan and budget for equipment repair and replacement
- Obtain ACS accreditation
- Consider the use of ACS exams where appropriate.

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(Reviewing this report in the capacity that I have served as an Assistant Professor of Chemistry at Nazareth College of Rochester, and Associate Professor of Chemistry at Eastern College, St. Davids, PA and Division Chair, Natural Sciences. I have been the President of the Mid-Atlantic Association of Liberal Arts Chemistry Teachers and won an Innovative Program Award from the American Chemical Society).