

Board of Governors, State University System of Florida

Request to Offer a New Degree Program

Florida Gulf Coast University
University Submitting Proposal

Fall 2014

Proposed Implementation Term

College of Arts and Sciences
Name of College(s) or School(s)

Chemistry and Physics

Name of Department(s)/ Division(s)

Biochemistry

Bachelor of Science in Biochemistry

Academic Specialty or Field

Complete Name of Degree

26.0202

Proposed CIP Code

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees

President

Date

Signature of Chair, Board of Trustees

Date

Vice President for Academic Affairs

Date

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	15	3.2	6,169	70,943	0.0	0.0	70,943
Year 2	30	6.4					
Year 3	40	7.4					
Year 4	50	11.0					
Year 5	60	12.6	11,679	125,313	0.0	0.0	125,313

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

INTRODUCTION

I. Program Description and Relationship to System-Level Goals

Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

(a) A B.S. level program which will prepare students for direct employment in biomedical, environmental, and defense areas; or, any fields that utilize B.S. level scientists. The program will also prepare students for entry into biochemistry graduate schools in the above mentioned areas.

(b) The biochemistry program is broad; it is not particularly slanted toward one area in biochemistry. There are no concentrations, tracks or specializations.

(c) The program can be completed within 120 credit hours.

(d) Program graduates can enter government laboratories, work as technicians in grant funded university research, obtain employment in industrial labs including pharmaceutical laboratories, and obtain entry into biochemistry M.S. and PhD programs including medical school programs

A. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support. (See the SUS Strategic Plan at <http://www.flbog.org/about/strategicplan/>)

The program addresses SUS goals that purport to increase the number of STEM graduates. The program will contribute towards the creation of a high-tech workforce for the state of Florida and the US.

B. If the program is to be included in an Area of Programmatic Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.

The Areas of Programmatic Strategic Emphasis:

1. Critical Needs:
 - Health Professions
 - Security and Emergency Services
2. Economic Development:
 - Globalization
 - Regional Workforce Demand
3. Science, Technology, Engineering, and Math (STEM)

The Areas of Programmatic Strategic Emphasis:

1. Critical Needs:
 - Health Professions The biomedical fields all use biochemistry to a great extent. The program will provide entry points for graduates into the health professions at several levels. The degree is excellent preparation for medical school, and can provide PhD candidates for the biochemistry departments at medical schools and Universities.
 - Security and Emergency Services Bio defense needs have recently created a need for biochemistry graduates that can identify toxins and germ warfare agents.

2. Economic Development:
 - Globalization: increasingly pharmaceutical companies are global in outlook; small biotech firms with global reach will also hire biochemistry graduates.
 - Regional Workforce Demand: In particular one local company Algenol, employs biochemists, along with the local biomedical firm Neogenomics. As new high-tech companies enter the Lee County area, graduates will feel more and more needs.
3. Science, Technology, Engineering, and Math (STEM). The biochemistry degree is a rigorous science degree requiring requisite backgrounds and mathematics and science (see the course listings for more details).

D. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

The program will be offered from our main campus; the laboratory requirements dictate this approach.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

- A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.**

Through the creation of the Innovation Incentive Program the Florida Legislature has aggressively pursued developing a biotechnology industry to diversify the state's economy and create highly skilled STEM related jobs. From eflorida.com (<http://www.eflorida.com/>, "*Enterprise Florida Inc. (EFI) is a public-private partnership serving as Florida's primary organization devoted to statewide economic development.*"), Florida is the second largest state in medical devices, has the largest and most sophisticated health care system and is 5th overall in pharmaceutical and medicine manufacturing.

Released in 2011, the SUS of Florida Board of Governors strategic plan (Appendix B) aims to boost the annual number of Bachelor's Degree in STEM awarded by 234 percent by the year 2025 and lists increasing the number of STEM Degrees awarded as its Teaching & Learning Goal towards Strategic Priorities for a Knowledge Economy. On December 13th, 2012 Governor Rick Scott released a statement strongly supporting STEM education: "*As Florida's economy continues to grow, demand for STEM related fields is increasing,*" and "*The evidence is clear - we have to ensure we make STEM education a priority for Florida children so that more Florida families have the tools they need to pursue the American Dream.*"

According to the U.S. Department of Labor, 15 of the fastest growing jobs will require substantial math and science preparation and from the Occupational Outlook Handbook, there will be a 4% increase in jobs for chemists between the years 2010 to 2020. The National Research Council report 'BIO 2010' recommends that undergraduate programs in the life sciences should include a more integrated approach to quantitative and analytical disciplines. The increased development of pharmaceutical and biotechnology industries will require employees trained not just in the disciplines of chemistry or biology, but in a program that integrates these disciplines. Central to this B.S. in Biochemistry degree is an emphasis on courses that integrate chemistry with the life sciences (biochemistry, physical chemistry for the life sciences, and a bio-inorganic or medicinal chemistry courses). This integration will make this program unique in the State.

Potential sites for internships include the following Life Sciences companies located in Southwest Florida: Algenol Biofuels, Ecological Laboratories, NeoGenomics Laboratories and Kirax Corporation (Source: <http://www.fortmyersregionalpartnership.com/SiteSelection/KeyIndustries>). In Appendix B is a letter of support from Dr. Mitchell Rosner at Algenol Biofuels and an example of a job advertisement for which a B.Sc. Biochemist could apply.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

To gauge the level of student interest in a B.S. in Biochemistry degree here at FGCU, students enrolled in chemistry courses were surveyed in Fall 2011. In total over 550 students completed the survey and ~30% indicated that they would be interested in a B.S. in Biochemistry degree. This demonstrates a strong level of student interest in a B.S. in Biochemistry degree at FGCU. Please see Appendix C for the survey and results.

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research).

Public institutions in Florida currently offering a B.S. in Biochemistry degree are UF and FSU (CIP code 26.0202). Miami University, Stetson University, Eckerd College, and the Florida Institute of Technology are private institutions which offer B.S. in Biochemistry degrees (CIP codes unknown). FAU and UWF offer a B.S. in Chemistry with a biochemistry track/concentration; this does not have the same CIP code. UF and FSU, which are approximately 250 and 400 miles from FGCU respectively, makes this degree opportunity unique for students planning to attend a SUS institution in south Florida and should not significantly affect the enrollment in the Biochemistry program at UF nor FSU.

The chemistry program at FGCU continues to establish collaborations with other institutions from around the state and country; guest speakers visited the campus from Florida International University and New Mexico State University which have Biochemistry graduate programs. A number of our Chemistry B.A. students have been accepted into Ph.D. and Research Experience for Undergraduates (REU) programs at these institutions.

D. Use Table 1 in Appendix A (A for undergraduate and B for graduate) to categorize projected student headcount (HC) and Full Time Equivalent (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 40 credit hours per year and graduate FTE will be calculated as 32 credit hours per year. Describe the rationale underlying enrollment projections. If, initially, students within the institution are expected to change majors to enroll in the proposed program, describe the shifts from disciplines that will likely occur.

As noted in Table 1A, a headcount of fifteen (15) is anticipated in year 1 of the program with a growth to approximately sixty (60) during year 5. This estimate is conservative and is based upon current enrollment numbers in our B.A. in Chemistry program. Surveys conducted in our undergraduate chemistry classes and among our Chemistry B.A. majors indicate that similar enrollment numbers in the B.S. in Biochemistry degree compared to the B.A. in Chemistry degree can be expected.

By year 5 the majority of the enrollment should come from new admits but it is expected that

in year 1 of the program a portion of the initial enrollment will come from students shifting from the B.A. in Chemistry and B.A./B.S. in Biology programs. These programs are already well established at FGCU and the loss of a handful of students should not significantly affect these programs. We have been in informal discussions, and will continue to do so, with the chair and faculty members of the Biology department.

- E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date in the area below to indicate that the analysis required by this subsection has been reviewed and approved.**

To ensure the desired outcome for student diversity, recruiting efforts will continue with the initial target population area (FGCU's five-county area: Lee, Collier, Charlotte, Hendry, and Glades) and extend to other geographic regions having larger underrepresented population of prospective students. Outreach approaches in the chemistry program which currently include science fair mentoring/judging, science demonstrations in local K-12 schools, and the annual FGCU Chemistry & Mathematics competition can also be expanded to include these geographic regions possessing an underrepresented population of prospective students. FGCU's strong commitment to ensure diversity among faculty and staff will further enhance success in the recruitment, retention and graduation of all students. In addition, the chemistry department is one of the most diverse departments on campus (33% women and 33% minorities) and it can certainly play a role in a student choosing chemistry as a program of study.

Signature of Equal Opportunity Officer

Date

III. Budget

- A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.) If the university intends to operate the program through continuing education on a cost-recovery basis or market rate, provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate.**

From Table 2 we are asking for a total of 70,943 in E&G funds. This includes the cost of an assistant professor to teach upper-level, Advanced Biochemistry I course to be offered in the fall 2014 semester. In addition, the OPS costs are for adjuncts to teach the additional lower-level course that won't be covered by the faculty with the implementation of the program. In addition, with the general chemistry I and II sequence increasing in sections we anticipate that we will need additional undergraduate teaching assistant used in the course. We don't anticipate any reallocation of funds for the new programs to be implemented.

- B. If other programs will be impacted by a reallocation of resources for the proposed program, identify the program and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed**

program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

There are no reallocations of funds from other programs to the B.S in biochemistry program. There are numerous positive impacts. From anecdotal information of other universities enrollment increased dramatically when a biochemistry program was implemented; we anticipate that the number of chemistry majors will increase. In addition, the department has been hiring new faculty with biochemistry-related research and teaching experience and hence we have faculty that have increased the variety and quality of undergraduate research experiences. The new courses and electives that are part of the program will be open, not only to chemistry majors, but STEM-related majors as well and will offer new and cutting edge lectures and laboratories.

- C. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).**

If the program is successful and the enrollment is strong there will be need for general chemistry and organic chemistry course sequences. This will be in conjunction with the growth of the university as a whole. In addition, as the program matures and grows there may be a need for additional sections of the courses listed as electives. Since some of the electives are from the department of biological sciences this may increase their need for additional part-time and/or full time faculty.

- D. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.**

Not Applicable

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

The most important benefit to the local community and university is that FGCU will be graduating biochemists that are not solely trained in the discipline of chemistry or biology but in a program which integrates these disciplines. Students completing a B.S. in Biochemistry program at FGCU will be employable at the State, national, and international levels either in the public or private sector. They will help attract additional biotechnology and biomedical industries to the State by providing a trained workforce. In addition to industries and government agencies, graduates with a B.S. in Biochemistry are poised to contribute to basic research activities at universities within the State or nationally either as employees (e.g. laboratory workers) or as students pursuing graduate degrees. They will provide the needed resources to successfully pursue federal and private funding to further basic research. The Biochemistry program will also increase FGCU's ability to attract private and federal research money.

Finally, it is expected that some students who, prior to the establishment of this degree, would not have considered FGCU as their school of choice because the degree was missing from the university's offerings, will now choose to attend FGCU.

V. Access and Articulation – Bachelor's Degrees Only

- A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)

The program will consist of 120 hours.

- B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see the [Common Prerequisite Manual](#) at FACTS.org). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

See Appendix C for the common prerequisites for CIP 26.0202 Track 1.

- C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that community college transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

Not applicable

- D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see [Statewide Articulation Manual](#) at FACTS.org). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not Applicable

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan.

The proposed program relates to the SUS Strategic Plan goals and FGCU's Strategic Plan by providing a degree in which graduates will fulfill critical statewide professional and workforce needs in fields such as medical science, emerging technologies, and natural science and technology. Since ~50% of the FGCU student population is local, the program will expand the academic opportunities available in Southwest Florida, enhance the ability to bring in private and federal research support with the goal of increasing FGCU's national prominence in undergraduate education.

The National Research Council report 'BIO 2010' recommends that undergraduate programs in the life sciences should include a more integrated approach to quantitative and analytical disciplines. Central to this degree is an emphasis on courses that integrate chemistry with the life sciences (biochemistry, physical chemistry for the life sciences, and a bio-inorganic or medicinal chemistry courses). This integration will make this program unique in the State.

FGCU's chemistry program already has Biochemistry faculty in place and recently hired a new Biochemist. In an effort to gauge the level of student interest in a B.S. in Biochemistry, a survey was administered to each chemistry course during Fall 2011. The results indicated a strong level of student interest in a B.S. in Biochemistry degree at FGCU. Therefore, the chemistry program decided to play to the strengths of our faculty and listen to our students when deciding to pursue a B.S. in Biochemistry program.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

FGCU currently has a total of 28 graduate degree programs, 1 specialist program, and 2 doctoral degree programs within the College of Arts and Sciences, College of Education, College of Health Professions, College of Engineering and Lutgert College of Business. Graduates of the proposed BS Biochemistry program will have a solid undergraduate background to enter any of these programs including the Masters of Science in Health Science, the Masters of Science in Nursing, the Clinical Laboratory Science Certification program or the Clinical Doctorate in Physical Therapy. In addition, the proposed program will offer courses that can be cross-listed as graduate classes to enhance these graduate programs.

The CAS currently offers a B.A. degree in Chemistry, as well as B.A. and B.S. degrees in Biology. The increased development of pharmaceutical and biotechnology industries will require employees trained not just in the disciplines of chemistry or biology, but in a combined program that will integrate these disciplines. Students completing a B.S. in Biochemistry program at FGCU will add to a pool of graduates who will be immediately employable at the State, national, and international levels either in the public or private sector (please see advertisement from Algenol Inc. in Appendix M). Also, these graduates will likely help to attract biotechnology and drug industries to the State by providing a trained workforce.

In addition to industries and government agencies, graduates of an FGCU B.S. in Biochemistry program are poised to contribute to basic research activities at universities within the State or nationally either as employees (e.g. laboratory workers) or as students pursuing graduate degrees. They will provide the needed resources to successfully pursue federal and private funding to further basic research.

- C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology (table) of activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

During Fall 2011, the chemistry curriculum team at FGCU contacted a number of chemistry programs at other universities both in the State (UCF, UF, FIU, UNF) and outside of Florida (Marshall, Murray State, Western Kentucky, South Alabama, NC-Wilmington) and discovered that several have recently instituted B.S. in Biochemistry programs with strong enrollment.

To gauge the level of student interest in a B.S. in Biochemistry degree here at FGCU, students enrolled in chemistry courses were surveyed in Fall 2011. Results are shown in Appendix D. In total over 550 students completed the survey and ~30% indicated that they would be interested in a B.S. in Biochemistry or Chemistry degree. Between those two choices, the B.S. in Biochemistry was preferred almost twice as much as the B.S. in Chemistry. This demonstrates a strong level of student interest in a B.S. in Biochemistry degree at FGCU.

The overwhelming majority of the student population at FGCU comes from Florida, with Southwest Florida comprising 51% of total enrollment. Of the Southwest Florida enrollment, 35% of the students are from Lee County. Based on this fact, the student interest in the B.S. Biochemistry program and the strength of the FGCU chemistry program in the number of Biochemistry faculty, the B.S. in Biochemistry program would prepare students with the knowledge and skills to successfully compete for opportunities in research and development locally, in the State or in the country should they become more mobile after graduating.

Planning Process

Date	Participants	Planning Activity
Fall 2011	Chemistry Department	Survey of students on BS Biochemistry program
Spring 2012	Chemistry Department	Faculty vote and decide to proceed with pursuing BS in Biochemistry program
August 2012	Chemistry Department	Biochemistry Curriculum Committee formed: Su Coticone (chair), Jose Barreto, David Brown, John Reilly, Greg McManus, Zanna Beharry
10/18/2012	Provost Toll, Dr. Paul Snyder, Dr. Glenn Whitehouse, Dr. John Reilly	Program review team meeting: Biochemistry program discussed
10/31/2012	Dean Donna Henry and Dr. John Reilly	Submitted new pre-approval form
2/11/2013	Dr. Cathy Duff and Provost Toll	Pre-approval form signed by Provost
2/15/2013	Dr. Cathy Duff and State Advisory Council	BS Biochemistry: <i>No concerns</i> from State Advisory Council
3/25/2013	Dr. Cathy Duff and Provost Toll	BS Biochemistry: <i>Provost Toll recommends to move forward with program</i>
3/26/2013	Dr. Cathy Duff and Dr. John Reilly	Go over forms and timeline. Decision was made to make the April 2014 Deadline to BOT.
3/26/2013	Biochemistry curriculum team: Drs. John Reilly, Jose Barreto, Sulekha Coticone, David Brown, Zanna Beharry, Gregory McManus	Go over forms and timeline. Decision was made to make the April 2014 Deadline to BOT.

5/2013-8/2013	Dr. Cathy Duff and Dr. John Reilly	Go over forms and timeline. Decision was made to make the April 2014 Deadline to BOT.
8/2013-1/2014	Dr. Cathy Duff and Dr. John Reilly	Fill-in worksheets on faculty and resources and transfer data to required tables
1/29/2014	Dr. Duff, Dr. Reilly, Dean Volety, Jennifer Baker, Norm Walker	Discuss financial aspects of proposal and determine if the program is viable to move forward in the review process

Events Leading to Implementation

Date	Implementation Activity

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

The B.A. in Chemistry program recently underwent an external review (spring 2012) and a 7-year internal review (Fall 2012) as required by the State of Florida. The department used an external reviewer who was an accreditation reviewer for the American Chemical Society, the accrediting body of B.S. in Chemistry programs. The department plans a similar review process for the biochemistry program. In addition, the chemistry department will eventually seek American Chemical Society accreditation for the B.S. in Biochemistry. A copy of the external reviewers report is in Appendix E.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

The student learning outcomes are described in Appendix F.

B. Describe the admission standards and graduation requirements for the program.

The admission standards are the standards of the university and the graduating requirements are completion of the 120 credit hours with C or better in all the major courses. The catalog copy is shown in Appendix G.

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

The curricular coursework is 120 credit hours and the framework is presented in the catalog copy shown in Appendix G.

- D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.**

A sequenced course of study is shown in Appendix H.

- E. Provide a one- or two-sentence description of each required or elective course.**

A complete list of course descriptions is shown in Appendix I.

- F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.**

An advisory council has been formed and it consists of the following individuals:

Dr. Mitchell Rosner, Algenol Biofuels Inc.

Dr. George Preti, Monell Chemical Senses Center.

Dr. Shelley Lusetti, Associate Professor of Biochemistry, New Mexico State University.

Dr. Luis Juarbe,(retired)

The council was asked to review the catalog copy, course descriptions and learning outcomes. The council was asked to comment on the preparation of a student graduating with a B.Sc. in biochemistry from FGCU for either graduate school or a position in industry. The council's comments are shown in appendix J.

- G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.**

The American Chemical Society is the accrediting body for all chemistry programs in the United States of America. The department will seek accreditation for the B.Sc. in Biochemistry. For a full functioning program, the accreditation process takes approximately 3 years. The department envisions applying for accreditation in 3-5 years.

- H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?**

NOT APPLICABLE

- I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.**

The program will be delivered traditionally and on the main FGCU campus. Existing classroom and laboratory facilities are sufficient for the offering of all courses in the degree program.

IX. Faculty Participation

- A. Use Table 4 in Appendix A to identify existing and anticipated ranked (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practical, and supervising thesis or dissertation hours).

Please see Table 4 in Appendix A. We have outlined the major courses needed to be taught over 5 years and have assigned the course to faculty members on a rotation basis. This includes faculty at the assistant, associate and full level.

- B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated ranked faculty (as identified in Table 2 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

From Table 2 in Appendix A we are asking for a total of 70,943 in E&G funds. This includes the cost of an assistant professor to teach upper-level, Advanced Biochemistry I course to be offered in the fall 2014 semester. In addition, the OPS costs are for adjuncts to teach the additional lower-level course that won't be covered by the faculty with the implementation of the program. In addition, with the general chemistry I and II sequence increasing in sections we anticipate that we will need additional undergraduate teaching assistant used in the course. We don't anticipate any reallocation of funds for the new programs to be implemented.

- C. Provide in the appendices the curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

Please see Appendix K for a list of abbreviated curriculum vitae.

- D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

Teaching:

As a teaching load, full-time faculty members teach a minimum of 9 contact hours per fall and spring semesters unless they receive administrative or other course release. Instructors on permanent lines meet the requirements of the State University System of 12 contact hours per semester. The FTE production is large as chemistry program faculty support both general education science courses (such as General Chemistry and Organic Chemistry) and students from other departments taking upper level chemistry science courses that are cross listed in their majors. The general education courses include: CHM 1045, CHM 1045L, CHM 1046, CHM 1046L, CHM 2210, CHM 2210L, CHM 2211, CHM 2211L.

The Chemistry Faculty includes members with diverse expertise in specific disciplines to provide breadth to all areas of chemistry. They produce significant scholarship and are highly active in service activities at the University, within the College and the Program. In addition they are active in service professionally and within their communities (*See CVs in Appendix K*).

Chemistry Program Faculty:

For fall 2013, there are 13 ranked full-time Chemistry faculty. In addition, our program is supported by 2 full-time instructors and a visiting instructor.

RANKED FACULTY

- **Jose Barreto, Professor, Ph.D.**
- **Zanna Beharry, Assistant Professor, Ph.D.**
- **Greg Boyce, Assistant Professor, Ph.D.**
- **David Brown, Professor, Ph.D.**
- **Ju Chou, Assistant Professor, Ph.D.**
- **Sulekha Coticone, Associate Professor, Ph.D.**
- **Kevin Davies, Assistant Professor, Ph.D.**
- **Terry Dubetz, Associate Professor, Ph.D.**
- **Joe Kakareka, Associate Professor, Ph.D.**
- **Greg McManus, Assistant Professor, Ph.D.**
- **Arsalan Mirjafari, Assistant Professor, Ph.D.**
- **John Reilly, Associate Professor and Chair, Ph.D.**
- **Yinghong Sheng Associate Professor, Ph. D.**

INSTRUCTORS

- **Rachel Campbell, Instructor I, MS**
- **Ian Campbell, Instructor I, MS**

Over time, we tracked unduplicated headcount for the BA program is shown below:

Academic Year	Fall		Spring		Summer		Total*	
	Headcount	% Increase	Headcount	% Increase	Headcount	% Increase	Headcount	% Increase
2005-2006	3		12		10		25	
2006-2007	20	566.7%	23	91.7%	12	20.0%	55	120.0%
2007-2008	44	120.0%	41	78.3%	17	41.7%	102	85.5%
2008-2009	49	11.4%	48	17.1%	19	11.8%	116	13.7%
2009-2010	53	8.2%	52	8.3%	29	52.6%	134	15.5%
2010-2011	74	39.6%	76	46.2%			150	11.9%
2011-2012	100	35%	120	57.8%				

*Note that the "total" is not a total number of unduplicated headcount in a year; it is simply a way of creating an annual ratio

Since its inception on fall 2005, the Chemistry (BA) program has grown rapidly, averaging about 13% growth in the last few years, with around 100 majors in the current academic year. Other than in its first two years of operation, when growth was extremely fast (from about 10 majors to about 40 majors), the last few years has seen another large increase in majors. In addition, over the past two graduations we have graduated 20 students and expect another 12 to be graduated in May 2014.

Research:

Summary of Scholarly Work							
	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Awards and Honors		1		1		1	2
Publications—Peer Reviewed Journal Articles and Contributions to Collections	3	6	9	8	8	3	7
Publications - Peer Reviewed Journal Problems			1		1	1	1
Publications—Book Reviews					1	1	1
Scholarly Presentations—Refereed	3	2	10	8	13	19	21
Presentations – Non-refereed		7	18	3	5	7	7
Grants/Appropriations	3	3	7	1	2	7	9

Analysis of Data/Information:

The data reveals a significant increase in scholarly activity from 2006 to 2013 at all levels of scholarly activity. This is observed both in the Peer Reviewed Journal articles, Grants as well as scholarly presentations and involvement of undergraduate students in research projects.

Service: Summary of Service Activities by faculty:

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
University	16	7	3	1	5	5	5
College	7	7	3	3	10	10	10
Program	14	11	9	2	6	6	6
Local Community	12	14	7	4	11	11	11
Profession	3			4	4	4	4

The Chemistry Department faculty has contributed significantly to the area of service at all levels important for a growing University. Faculty have served on several different committees from faculty senate, college governance team, curriculum committee, peer review committee etc. In addition, faculty have participated in community outreach programs including the chemistry Olympiad for high school students, GEMS (girls in engineering math and science), judging at science fairs and mentoring students for science fair projects.

X. Non-Faculty Resources

- A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.**

In Appendix L is the Library Impact Statement. At this time the library has access to a large number of biochemistry journals and this will be sufficient to implement and grow the programs. There will be an ongoing discussion as to the necessity of what the Library recommends.

- B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 3 in Appendix A.**

The resources at present are more than adequate for implementing the program and resources through year 5 can be folded into the natural growth of the department.

Signature of Library Director

Date

- C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.**

All of the coursework required for this program are regularly scheduled courses. Therefore, the existing facilities on the FGCU campus are sufficient.

- D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (J) below.**

No additional classroom, research or office space will be needed.

- E. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.**

The following specialized equipment and research facilities are available for implementation of the proposed program.

Spectral Measurements

Beckman DU530 UV-Vis Spectrometer
 Aminco Bowman II Luminescence Spectrometer
 Shimadzu UV-2450 UV-Vis Spectrometer
 Tecan Genios Pro Microplate Spectrometer
 Jasco FT/IR-4200 Spectrometer
 Nicolet Avatar 360 FT/IR Spectrometer

Mass Spectrometers and Chromatography

Finnigan LTQ Linear Ion Trap w/ autosampler
 Finnigan Trace GC-MS (quadrupole) Ultra MS w/ autosampler
 Finnigan Surveyor LC-MS (quadrupole) w/ autosampler
 Thermo Trace GC Ultra w/ autosampler
 Buck Scientific Model 910 GC
 Buck Scientific Model BLC-20 LC/UV/Vis detector

Materials Characterization

Nanalysis NMReady 60 MHz NMR (Nuclear Magnetic Resonance)
 TA Instruments Auto Q20 DSC (Differential Scanning Calorimeter)

Miscellaneous Research Equipment and Infrastructure

Confocal Microscope

Johnson Matthey Magnetic Susceptibility Balance (Mark 1)
 Cytomics FC500 Flow Cytometer
 BSL-2 and BSL-3 facilities
 PRA LN1000 Nitrogen Laser
 PTI GL-301 Dye Laser
 SRS NL100 Nitrogen Laser
 Multiple -80C Freezers
 Lyophilizer
 NIC MA-2 Mercury Analyzer w/ autosampler
 Thermo Flash 4000 Combustion N/Protein Analyzer (CHNS/O Analysis)
 Dynex MRX TC Revelation Microtiter Plate Reader
 Fisher Scientific 825 Isotemp Programmable Oven

F. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

Any additional instrumentation is of a small scale (<\$2000.00) and can be incorporated either into year-end funds or small equipment lab fees

G. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

No specialized resources will be needed to implement the program.

H. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

No existing fellowships or scholarships will be allocated to the proposed program.

I. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

The proposed program does not require internships or practicum experiences.

J. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

No new capital expenditures are required.