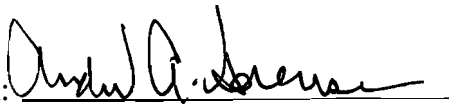
Program Planning Summary

Institution:

University of South Carolina

Program Title:

Bachelor of Science, Biochemistry and Molecular Biology

Signature of Chief Executive Officer of the Institution: 

Andrew Sorenson, President

Bachelor of Science, Biochemistry and Molecular Biology
(CIP code 26.2010)
128 Credit Hours
Proposed Implementation: January 2008

Justification:

The objective in creating a new undergraduate degree program, the Bachelor of Science, Biochemistry and Molecular Biology, at the University of South Carolina Columbia, is justified in two ways. First, it will provide an integrative program of training for undergraduates combining two disciplines that underlie much of the conceptual and practical foundation of modern biological, biochemical and medical research and technology. The 2003 National Research Council report 'BIO 2010' points out that undergraduate programs in the life sciences should be transformed to include a more integrated approach to quantitative and analytical disciplines to foster better understanding of the biological sciences earlier in the careers of undergraduates.

The intentional combination of molecular biology and biochemistry proposed in this new degree program directly reflects this point, as it requires an extensive integration of knowledge of biochemical, molecular and cellular processes affecting all scales in biological systems. This unique approach arose from interactions between strong research faculties in chemistry and biology at USC and has not been taken by other institutions in the State.

Second, the Bachelor of Science, Biochemistry and Molecular Biology degree program responds to and anticipates needs to develop new interdisciplinary programs of study capable of producing graduates with expanded knowledge sets and skills to support the growth of biotechnology and health-related businesses in the State of South Carolina. Anticipating new job opportunities and basic research initiatives in 21st century life sciences, students finishing this major will have enhanced their competitive preparedness to move into careers dominated by research and development (medical, pharmaceutical, basic), thus increasing the pool of professionals and elevating the intellectual competitiveness of the State.

The development of the USC Research Campus and its recruitment of biomedical and pharmaceutical scientists and industries will offer additional opportunities for these undergraduates.

Anticipated Program Demand and Productivity:

Based on current cross Chemistry/Biology major/minor degrees awarded each year at USC Columbia, and the number of students currently taking the full year biochemistry course sequence, it is estimated that a steady state class of 35-50 students will eventually opt for this degree within the next decade. The existing full year biochemistry-molecular biology (Biol 545, 546=Chem 555,556) sequence was created in anticipation of the implementation of this new degree and has served as the means to

gauge student interest in the Bachelor of Science, Biochemistry and Molecular Biology degree program. An average of 70 students annually for the last two years have taken this biochemistry1molecular biology sequence. The rapid development of biotechnology start-up companies and their pharmaceutical counterparts, both locally and throughout the country, will require employees trained not just in the disciplines of biochemistry or molecular biology, but in a combined discipline that will bring these joint conceptual frameworks and the attendant skills to a pool of professionals who will be eminently employable, and likely to help attract biotechnology, bio-nanotechnology and drug industries to the State.

Relationship between the Proposed Program and Existing Programs in the State:

The proposed program is a unique combination of courses in an integrative package to fully satisfy the Department of Education CIP code 26.0210, which requires the structural and functional integration of biochemistry and molecular biology at all levels of organization of biological organisms. Other institutions in the State have traditional programs in biochemistry. The Bachelor of Science, Biochemistry and Molecular Biology degree program requires not only courses that currently comprise the biochemistry degrees at other institutions, but also a wide range of biology courses essential to integrate that curriculum with the structure and function of diverse types of cells and organisms (i.e., vertebrates, invertebrates, and prokaryotes).

In addition, because of the excellent relationship between USC and Midlands Technical College (and other institutions in the technical school system), preparation of students to move smoothly into science programs at USC will enhance the uninterrupted flow of transfer students into this new degree program. This articulation will encourage an increase in the number of students aiming to pursue Bachelor of Science degrees incorporating both biochemistry and molecular biology.

Relationship of the Proposed Program to Existing Programs at the Proposing Institution:

A program leading to a Bachelor of Science, Biochemistry and Molecular Biology would integrate well with other degree programs within the University of South Carolina due to the interdisciplinary nature of its scientific content. This is particularly true with regard to the existing biology and chemistry programs, but also other programs in which molecular and biochemical approaches are fundamental for student success, including the marine science program, exercise science, psychology (notably neurosciences) and chemical, mechanical and biomedical engineering. The proposed undergraduate program furthermore will generate a cadre of students seeking entry into USC's graduate MS and Ph.D. programs in these fields.

Relationship of the Proposed Program to Other Institutions Via Inter Institutional Cooperation:

The program will have its own specialized and extensive curricular requirements, but will clearly relate to programs in the curricula of other institutions in South Carolina. Students in this major at USC would be able to transfer to biochemistry and biology programs at other institutions, and undergraduate students in those institutions with backgrounds in biochemistry and biology would be able to transfer into the Bachelor of Science, Biochemistry and Molecular Biology degree program. This 'portability' in the program expands opportunities for students throughout the State to engage their intellectual interests to the fullest. The Biochemistry and Molecular Biology program will also act as a feeder to graduate MS and Ph.D. programs in this discipline not just at USC, but also at Clemson University and the Medical University of South Carolina.

Total New Costs Associated with Implementing the Proposed Program:

Because resources within the Departments of Chemistry and Biochemistry and Biological Sciences already accommodate the core components of the new curriculum (including the already fully developed one-year course sequence in Biochemistry and Molecular Biology; Biol 545, 546=Chem 555, 556), no significant new costs are anticipated to implement the program.