

Contact: Diana Gonzalez

**REQUEST FOR A NEW PROGRAM AT THE UNIVERSITY OF IOWA:
BACHELOR OF SCIENCE PROGRAM IN BIOMEDICAL SCIENCES**

Action Requested: Consider approval of the request by the University of Iowa to establish a new Bachelor of Science Program in Biomedical Sciences in the Department of Biology in the College of Liberal Arts and Sciences.

Executive Summary: The proposed program will prepare students for research and/or practice in the chemical, genetic, cellular, and physiological basis of human disease. This proposal was reviewed by the Board Office and the Council of Provosts and is recommended for approval. No concerns were raised when it was presented to the Iowa Coordinating Council for Post-High School Education. The proposed program addresses the Board of Regents Strategic Plan priorities to “provide educational excellence and impact as well as economic development and vitality” and Goal #8 – “Iowa’s public universities and special schools shall be increasingly efficient and productive.”

Background:

- ◇ **Description of program.** The proposed program will require course work in the natural and social sciences, mathematics, and statistics. There will be a required lab component, with the expectation that students will work in faculty research labs beginning in the first or second year of their studies. Consequently, the proposed program will be highly selective¹; the students will be trained in research techniques and issues by a faculty mentor who will be assigned during the first year. The objective of the proposed program will be to prepare students for future research and clinical practice when the focus of medicine will shift from the treatment of symptoms to an intervention related to the genetic basis of a disease.

The proposed program will be administered by the Department of Biology; the Departments of Chemistry, Biochemistry, and Microbiology will serve on the advisory committee overseeing the program and advising students. Faculty will serve as advisors and mentors; students will be equally assigned to each participating department.

- ◇ **Link to institutional strategic plan.** The University of Iowa’s strategic plan stresses the importance of interdisciplinary research and “cross-college scholarship.” The University is committed to using these priorities to “address major societal challenges” and “areas of national or global need and significance that require the collaborative efforts of multiple disciplines,” including health and health-care related issues. The proposed program is interdisciplinary and will bring together faculty from a number of disciplines in the College of Liberal Arts and Sciences (CLAS) and the Carver College of Medicine to educate students to understand the new frontiers of medicine and health issues. Both the University and CLAS are committed to student success, with the “increased success of undergraduates an educational imperative.” The proposed program will provide a challenging, quality curriculum while pairing students with a faculty mentor who will train and guide the student from the freshman year through the student’s application to medical or graduate school.

¹ Selection criteria are included in Appendix A.

- ◇ Relationship to existing programs at SUI. The College of Liberal Arts and Sciences offers a number of related programs that may be used as preparation for careers in the health professions, including a BA/BS in Chemistry, BA/BS in Biology, BA/BS in Human Physiology, and the Health Science track within the Interdepartmental Studies Program. The College also offers programs in Biochemistry (BA/BS) and Microbiology (BS) as well as programs of study administered by the Carver College of Medicine. Each program appeals to different populations with different abilities and professional goals ranging from health promotion and education to dentistry and medicine. The College of Engineering offers a Biomedical Engineering program with a pre-medical track; this combination provides an engineering concentration as well as preparation for a career related to both engineering and medicine. Those programs are more narrowly designed than the proposed program in Biomedical Sciences, which will use courses from all the departments (except Engineering) to create a unique program of study. The students in the proposed program will be exposed to multiple perspectives on similar issues, combining the study of core material from different perspectives and the application of findings in a research setting. The proposed program will also give faculty an opportunity to work collaboratively across disciplines.

- ◇ Unique features. The Department of Biology is well known for its research affiliations; the Departments of Chemistry and Biochemistry and Microbiology also have active research labs in which undergraduates participate. Cluster hire initiatives at the university, which are part of the strategic action for fulfilling its commitment to advancing interdisciplinary knowledge that will help solve the “Grand Challenges” of the century, provide additional opportunities for students as well as a stimulating environment in which to learn. Three of the cluster hire initiatives relate to the proposed program – Genetics; the Aging Mind and Brain; and Obesity. These initiatives, related to health and health-care issues and to research problems, result in synergy across disciplines and create opportunities for learning at every level, including internships, classes, and lab experiences. Undergraduates will have more informed access to these opportunities as a result of having faculty working across disciplines and colleges. In addition, access to the Carver College of Medicine and the University of Iowa Hospitals and Clinics will make available physicians who are also researchers studying society’s most pressing health problems. Undergraduates will have the opportunity to volunteer, help with research, and participate in other outreach activities offered by UIHC.

- ◇ Duplication. The College of Liberal Arts and Sciences works closely with the faculty of the Departments of Biochemistry and Microbiology in the Carver College of Medicine, especially those faculty who teach courses as well as advise and mentor students in the proposed major. CLAS has also consulted with both UNI and ISU on the proposed program. ISU offers a Biomedical Sciences program at the graduate level; this program is in the College of Veterinary Medicine. At the undergraduate level, ISU offers an interdisciplinary program in Genetics; this program has a more specialized focus than the proposed program. ISU does not offer an undergraduate biomedical sciences program. UNI offers a track within its Bachelor of Arts program in Biology called Biomedical Emphasis with similar requirements to the proposed program. However, the proposed program is aimed at students pursuing a medical career with a research component while the UNI program is broader and designed for a range of student aspirations.

Two other Iowa institutions offer a program that appears to be part of the specific sub-area of biology – Iowa Wesleyan College has a Pre-Medical Science program and Loras College has a Biological Research program. These programs are more general than the proposed program and do not have the research orientation of the proposed program.

- ◇ Student demand. The number of students interested in the sciences and health professions has risen nationally during the past two decades. The National Center for Education Statistics notes that “the number of degrees conferred in biological sciences increased by 17% between 2000-01 and 2005-06 and by 27% between 2005-06 and 2010-11...The number of degrees conferred in health professions and related programs was 21% higher in 2005-06 than in 2000-01, and increased by 56% between 2005-06 and 2010-11.”² The University of Iowa has also experienced the same demand – the Department of Biology now has more than 650 majors. The number of undergraduates in CLAS with the primary major in an area preparing them for the health professions total more than 1,700 students.

- ◇ Need for proposed program. The purpose of the proposed program is to offer an intensive preparation for clinical practice and a related research career by providing a challenging curriculum with lab experiences. A major revision of the Medical College Admission Test (MCAT) for 2015 reflects this understanding that a new approach to medical education is needed. Medical schools also are revising their curriculum and pedagogy to stay abreast of scientific changes. The proposed program will help Iowa students to be prepared for the future.

The proposed program is intended for students preparing for research and/or practice in the chemical, genetic, cellular, or physiological basis of human disease. It will also facilitate close faculty collaboration across disciplines between the College of Liberal Arts and Sciences and the College of Medicine, and will help to create a foundation for future discussions and innovations to benefit undergraduate students.

- ◇ Workforce need/demand. The U.S. Department of Labor Occupational Outlook Handbook notes that “Employment of physicians and surgeons is projected to grow 18% from 2012 to 2022, faster than the average for all occupations. Job growth will occur because of the continued expansion of health care-related industries.” The Handbook projected a 20% growth rate in related health diagnosing and treating fields of practice.

- ◇ Resources. No new faculty, facilities, or equipment will be required for the proposed program. Existing facilities will be used with no additional expense. There are no new courses required for the proposed program because the course work will be drawn from courses taught for other programs, with classroom lab space and faculty lab space available for the students’ use.

- ◇ Cost. The department does not anticipate the need for new resources. Existing faculty members are teaching the required courses with space available in these courses. Facilities and staff are already funded and operational.

² <http://nces.ed.gov/fastfacts/display.asp?id=37>.

- ◇ Projected enrollment. The projected enrollment is 25 students in Year One, increasing to 120 students by Year Seven. The department anticipates that some students will enter the program from another major offered by CLAS. The proposed program is likely to attract students who might otherwise choose an out-of-state institution with a challenging science program offering research experiences with faculty early in the undergraduate experience.

- ◇ Date of implementation. Creation of the proposed program will become effective upon approval by the Board of Regents and will be included in the University's General Catalog. The anticipated implementation date is August 2014.

ADMISSION REQUIREMENTS AND PROCEDURES

Students who apply for admission to the university and to the college from high school with the following profile will be considered for admission to the proposed program as space in the program permits:

- ◆ A minimum ACT composite score of 29 or the equivalent SAT composite.
- ◆ A minimum ACT Math and Scientific Reasoning score of 29 or the equivalent SAT score.
- ◆ A minimum high school cumulative GPA of 3.70.
- ◆ A record of completing advanced science courses in high school such as AP, IB, or Honors courses if offered by the high school and/or of completing a second course in a sequence of courses (such as Chemistry I and Chemistry II), with grades in key science courses considered.
- ◆ A dedication to and passion for the sciences and mathematics as suggested in a statement of purpose.
- ◆ A letter of reference from a high school teacher or from a teacher in an early/pre-college program of study in the sciences or mathematics.
- ◆ Students interested in the program will meet with the director for an informal discussion about the requirements before declaration of the major.

A student may also be admitted to the major as a continuing student at Iowa or as a transfer student, with the understanding that a late declaration of the major may delay graduation. These applicants must show a strength in the sciences and mathematics through their outstanding grades in related UI or transfer course work. A statement of purpose and one letter of reference from a science or mathematics instructor is required.

Before admission to the program, a student must meet with the director of undergraduate studies. Admission to the program also depends on the number of spaces available in the program and the logistics of faculty mentorship as well as the student's ability to work in a team, to show a strong work ethic, and to have a high-level of academic integrity, which is necessary for research in a faculty lab.