



UNIVERSITY OF WASHINGTON

OFFICE OF THE PRESIDENT

Mark A. Emmert, President

April 15, 2008

Dean Ana Mari Cauce
College of Arts and Sciences
Box 353765

Dear Ana Mari:

Based on the recommendation of the Faculty Council on Academic Standards, the Faculty Council on Tri-Campus Policy has recommended approval of a Bachelor of Arts degree in Biochemistry. A copy of the change is attached.

I am writing to inform you that the Department of Chemistry is authorized to specify these requirements beginning winter quarter 2008.

The new requirements should be incorporated in printed statements and in individual department websites as soon as possible. The *General Catalog* website will be updated accordingly by the Registrar's Office.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Mark A. Emmert".

Mark A. Emmert
President

Enclosure

cc: Ms. Lani Stone (with enclosure)
Mr. Robert Corbett (with enclosure)
Dr. Deborah H. Wiegand (with enclosure)
Todd Mildon, J.D. (with enclosure BIOC-20060109)



Creating & Changing Undergraduate Academic Programs*
 After college/school review, send signed original and 8 copies to: University Registrar, 355850

BIOC - 20060109
Revised

College: Arts & Sciences Department or Unit: Chemistry Date: 5/22/06

New Programs

- Leading to a Bachelor of Arts in Biochemistry degree
- Leading to a Bachelor of _____ degree with a major in _____
- Leading to a _____ Option within the existing major in _____
- Leading to a Minor in _____

Changes to existing programs

- New Admission Requirements for the Major in _____ within the Bachelor of _____
- Revised Admission Requirements for the Major in _____ within the Bachelor of _____
- Revised Program Requirements for the Major in _____ within the Bachelor of _____
- Revised Requirements for the Option in _____ within the major in _____
- Revised Requirements for the Minor in _____

Other Changes

- Change name of program from _____ to _____
- New or Revised Continuation Policy for _____
- Eliminate program in _____

Proposed Effective Date: (quarter/year) Winter 2007

Contact Person	Phone Number	Email
Lani Stone	3-9343	stone@chem.washington.edu

1. **Explanation of and Rationale for Proposed Change:** (Please use additional pages if necessary. For new programs, please include any relevant supporting documentation such as student learning outcomes, projected enrollments, letters of support, and departmental handouts.)

SEE ATTACHED DOCUMENT

* For information about when and how to use this form please go to <http://www.washington.edu/faculty/facsenate/councils/fcas/1503/>.

Creating & Changing Undergraduate Academic Programs

2. Catalog Copy

A. Catalog Copy as Currently Written *(Include only sections/paragraphs that would be changed if your request is approved. Please cross out or otherwise highlight any deletions.)*

This is a new major proposal for a BA in Biochemistry

B. Proposed Catalog Copy, Reflecting Requested Changes *(Include exact wording as you wish it to be shown in the printed catalog. Please underline or otherwise highlight any additions. If needed, attach a separate, expanded version of the changes that might appear in department publications.)*

Department Admission Requirements

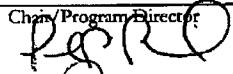
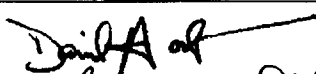
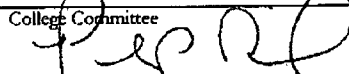
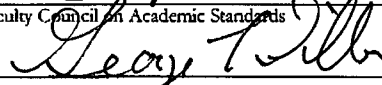
Students in good academic standing may declare this major at any time.

Major Requirements

90-92 credits as follows:

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136)
2. PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116) with the PHYS 121 sequence recommended.
3. CHEM 142, CHEM 152, CHEM 162 (or CHEM 145, CHEM 155, CHEM 165); CHEM 237, CHEM 238, CHEM 239, CHEM 241, CHEM 242 (or CHEM 335, CHEM 336, CHEM 337, CHEM 346, CHEM 347); CHEM 452, CHEM 453 (or CHEM 455, CHEM 456, CHEM 457)
4. BIOL 180, BIOL 200 (or BIOL 201, BIOL 202)
5. BIOC 405, BIOC 406 (or BIOC 440, BIOC 441)
6. Science Electives: 9 credits chosen from a current department list (available in 109 Bagley) of upper-division science and relevant classes including biology, chemistry, genomic sciences, immunology, math, medical history and ethics, microbiology, or math. Up to 3 credits of approved advanced-level undergraduate research may also be applied to this requirement.
7. A minimum 2.00 GPA is required for all chemistry, biology and biochemistry courses counted toward the major; a minimum 1.7 grade is required for all chemistry, biology and biochemistry courses counted toward the major.

3. Signatures (required)

Chair, Program Director 	Date 5/24/06	Dean 	Date MAY 23 2006
College Committee 	Date MAY 23 2006	Faculty Council on Academic Standards 	Date 11-17-06 <i>Post-implementation</i>

Email: preid@chem.washington.edu

Substantive Statement of Demand and Need

In 1989, the Departments of Chemistry and Biochemistry initiated the Bachelor of Science (B.S.) degree in Biochemistry. This program was initially designed to provide to students interested in careers in medicine, chemistry, biochemistry, and biotechnology an education that encompassed the interdisciplinary nature of biochemistry. As originally envisioned, the B.S. in Biochemistry degree was to be extremely demanding, and designed for "perhaps 20 students." The program designers could not have anticipated the remarkable growth of this program, which now grants some 120 degrees per year, making it among the largest such degree programs in the nation. In hindsight, this growth is not surprising given that an undergraduate degree in Biochemistry is excellent preparation for further professional or graduate education, and because the Puget Sound region increasingly offers career prospects for these trainees.

As the program has grown considerably in the fifteen years since its inception, we now wish to create a Bachelor of Arts (B.A.) in Biochemistry. Our aims are twofold. First, we want to provide opportunities for students who are interested in studying biochemistry, but who are seeking a broader educational experience than is practical given the extensive upper-division lecture and laboratory requirements of the B.S. degree. Second, an alternate path leading to a meaningful degree is needed for students who, while academically capable, cannot meet the grade performance requirements for the B.S. The most significant difference between the B.A. and B.S. degrees will be in the required coursework. In comparison to the B.S., the B.A. degree requirements involve a reduction in the amount of required upper-division laboratory work. Also consistent with a degree program designed to provide a broader educational experience, the B.A. will include a variety of elective courses in related sciences, history, and public policy. The end result is that the B.A. in Biochemistry will provide students with a fundamental background in biochemistry, but with the opportunity to expand their educational focus to other related areas of interest.

Currently there is considerable student demand for B.S. in Biochemistry. In addition to awarding 120 degrees each year, the program has about 680 declared majors by headcount. This represents a 30% increase in enrollment since 2002, and is orders of magnitude greater than the envisioned enrollment at the inception of the B.S. in 1989. A number of the declared majors desire an understanding of biochemistry, but their career goals are not focused directly on industry or graduate school. These students are better served by the B.A. degree that still provides a solid foundation in biochemistry, but also allows for the exploration of other related interests (including a second major). The B.A. curriculum is appropriate for students interested in medical, dental, or nursing school. The degree is also appropriate for students interested in law, public policy, or journalism given the impact biochemistry has (and certainly is perceived as having) on society at large. We currently do not expect to expand the number of majors in the existing biochemistry program. Instead, the B.A. represents the best way for the University of Washington to serve students who have declared Biochemistry as their major, but are interested in a more diverse education that is possible given the required coursework for the B.S.

The B.A. in Biochemistry is an appropriate degree for those small number of capable students that do not meet the GPA requirements for the B.S. To receive the B.S. students must achieve a

cumulative G.P.A. of 2.80 for all chemistry, biochemistry, and biology courses required for the major. From 2002 to 2004, roughly 25 students failed to meet this requirement. For these students, the “fallback” degree was the B.A. in Chemistry. Unfortunately, this degree does not reflect the areas of knowledge acquired by the students, and many times students are forced to take additional courses at the last minute to meet the course requirements for this degree. Most science programs (Chemistry, Physics, Math, etc.) award both a B.A. and a B.S. Programs that only award a B.S, such as Neurobiology (and Biochemistry as originally envisioned) are small, specialized programs. Changes in our knowledge and changes in the economy have created a demand for biochemistry such that a B.A. is now warranted.

Employment outcomes for students receiving the B.A. in Biochemistry are varied and numerous. Roughly, a third of our students attend graduate school, another third go to professional schools (medical and dental primarily), and the final third enter the workforce. The B.A. is an excellent degree for those students interested in professional school or industry. One reason for the increasing interest in this degree program is the student perception that Biochemistry is excellent preparation for professional or graduate study. In addition, biotechnology is currently recognized as an important area for economic growth in the Puget Sound region; therefore, increasing employment opportunities in this area will further increase student interest in this degree. Finally, the diversity of training afforded by the B.A. will provide students with an excellent preparation for careers involving biochemistry and law or public policy. In short, our Biochemistry majors have found post-graduate success in a variety of activities, and the B.A. in Biochemistry will allow a more diverse student population to share in this success.

Proposed Coursework

The required coursework for the BA in Biochemistry is as follows (credits shown in parenthesis):

- 1) Mathematics: MATH 124 (5), 125 (5) and 126 (5)
or
MATH 134 (5), 135 (5) and 136 (5)
- 2) General Chem: CHEM 142 (5), 152 (5) and 162 (5)
or
CHEM 145 (5), 155 (5) and 165 (5)
- 3) Organic Chem: CHEM 237 (4), 238 (4), 239 (3), 241 (3), and 242 (3)
or
CHEM 335 (4), 336 (4), 337 (4), 346 (3), and 347 (3)
- 4) Biology: BIO 180 (5) and 200 (5)
- 5) Physics: PHYS 121 (5), 122 (5) and 123 (5)
or
PHYS 114 (4), 115 (4), 116 (4)
- 6) Biochemistry: BIOC 405 (3) and 406 (3)
- 7) Physical Chem: CHEM 452 (3) and 453 (3)
- 8) Science Elect.: Nine (9) credits total taken from the following:

Biology: BIOL 220

Chemistry: Any 300 or 400 level course other than
CHEM 498 or required coursework.

Genome: GENOME 371

Immunology: IMMUN 441

Math/Amath: MATH 307, 308, AMATH 351, 352.
Limit of three credits allowed.

Medical History & Ethics: MHE 411.

Microbiology: MICROM 402, 410, 411

Research: Up to 3 credits of advanced undergraduate research. Research conducted outside Chemistry of Biochemistry must first be approved.

Grade Requirements: Minimum cumulative GPA of 2.0 for required coursework.
Minimum grade of 1.7 in an individual required course.
Overall cumulative GPA of 2.0 for work done resident at the UW.
Required courses must be taken for a decimal grade unless the course is only offered on a CR/NC basis.

Coursework Rationale

90 - 92 credits of coursework in the major are required for the BA in Biochemistry. Combined with the 90 required credits of coursework outside the major by the College of Arts and Sciences, a total number of 180 credits are required for this degree.

The proposed required coursework follows closely the existing coursework for the BS in Biochemistry. The differences are as follows:

1. Biochemistry Requirements: The BS in Biochemistry requires BIOC 440 (4), 441 (4), 442 (4) and 426 (4) where the BA requires BIOC 405 (3) and 406 (3).
2. Genome Sciences: GENOME 371 is required for the BS, and is a science elective for the BA.
3. Science Electives: Number of credits is reduced from 11 for the BS to 9 for the BA.

The proposed coursework ensures that the areas of learning required for a Biochemistry degree remain in place for the BA, with the reduction in required coursework providing students with more flexibility.

Admission Requirements

Biochemistry is an open major. As such, students can declare this major at anytime, and there are no entrance requirements.

Projected Resource Requirements

Since the coursework for the BA in Biochemistry follows that for the BS, this degree program can be initiated without creating any additional courses. Therefore, no additional resources (faculty, teaching assistants, and support staff) are projected to be required at this time.

Bachelor of Arts in Biochemistry Degree Requirements

1) Mathematics (MATH)

- | | | |
|----------------------------------|----|----------------------------------|
| Regular | or | Honors Calculus |
| <input type="checkbox"/> 124 (5) | | <input type="checkbox"/> 134 (5) |
| <input type="checkbox"/> 125 (5) | | <input type="checkbox"/> 135 (5) |
| <input type="checkbox"/> 126 (5) | | <input type="checkbox"/> 136 (5) |

2) General Chemistry (CHEM)

- | | | |
|----------------------------------|----|----------------------------------|
| Regular | or | Honors |
| <input type="checkbox"/> 142 (5) | | <input type="checkbox"/> 145 (5) |
| <input type="checkbox"/> 152 (5) | | <input type="checkbox"/> 155 (5) |
| <input type="checkbox"/> 162 (5) | | <input type="checkbox"/> 165 (5) |

3) Organic Chemistry (CHEM)

- | | | |
|----------------------------------|----|----------------------------------|
| Regular | or | Honors |
| <input type="checkbox"/> 237 (4) | | <input type="checkbox"/> 335 (4) |
| <input type="checkbox"/> 238 (4) | | <input type="checkbox"/> 336 (4) |
| <input type="checkbox"/> 239 (3) | | <input type="checkbox"/> 337 (4) |
| Laboratory | | |
| <input type="checkbox"/> 241 (3) | or | <input type="checkbox"/> 346 (3) |
| <input type="checkbox"/> 242 (3) | | <input type="checkbox"/> 347 (3) |

4) Biology (BIOL)

- 180 (5)
- 200 (5)

5) Physics (PHYS)

- | | | |
|----------------------------------|----|----------------------------------|
| Calculus-based | or | Algebra-based |
| <input type="checkbox"/> 121 (5) | | <input type="checkbox"/> 114 (4) |
| <input type="checkbox"/> 122 (5) | | <input type="checkbox"/> 115 (4) |
| <input type="checkbox"/> 123 (5) | | <input type="checkbox"/> 116 (4) |

The calculus-based series is recommended.

(NOTE: one-credit lab is included with each course in this sequence).

7) Biochemistry (BIOC)

- 405 (3)
- 406 (3)

8) Physical Chemistry (CHEM)

- 452 (3)
- 453 (3)

9) Science Electives

Nine credits from courses on the following list are required.

- | | |
|--|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> Amath 351 (3)* <input type="checkbox"/> Amath 352 (3)* <input type="checkbox"/> Biol 220 (5) <input type="checkbox"/> Chem 312 (3) <input type="checkbox"/> Chem 317 (4) <input type="checkbox"/> Chem 321 (5) <input type="checkbox"/> Chem 410 (2) <input type="checkbox"/> Chem 416 (3) <input type="checkbox"/> Chem 417 (3) <input type="checkbox"/> Chem 418 (3) <input type="checkbox"/> Chem 419 (3) <input type="checkbox"/> Chem 426 (3) <input type="checkbox"/> Chem 428 (3) <input type="checkbox"/> Chem 429 (3) <input type="checkbox"/> Chem 436 (3) <input type="checkbox"/> Chem 460 (3) | <ul style="list-style-type: none"> <input type="checkbox"/> Chem 461 (3 or 4) <input type="checkbox"/> Chem 462 (2 or 3) <input type="checkbox"/> Chem 463 (2) <input type="checkbox"/> Chem 464 (3) <input type="checkbox"/> Chem 465 (3) <input type="checkbox"/> Genome 371 (5) <input type="checkbox"/> Immun 441 (4) <input type="checkbox"/> Math 307 (3)* <input type="checkbox"/> Math 308 (3)* <input type="checkbox"/> MHE 411 (3) <input type="checkbox"/> Microm 402 (3) <input type="checkbox"/> Microm 410 (3) <input type="checkbox"/> Microm 411 (5) |
|--|---|

- *Limit of 3 credits allowed.
- Up to 3 credits of advanced undergraduate research may count toward this requirement. Research conducted outside Chemistry or Biochemistry must first be approved by one of the undergraduate advisers.
- Additional 400 level science and relevant courses may be considered for science electives after consultation and a petition is submitted to the biochemistry advisers.

Date: Mon, 11 Dec 2006 20:59:21 -0800
 From: Marcia Killien <killien@u.washington.edu>
 To: Todd B. Mildon <tmildon@u.washington.edu>, Curriculum Office <uwcr@u.washington.edu>
 Cc: Ana Mari Cauce <cauce@u.washington.edu>, Marcia Killien <killien@u.washington.edu>, Secretary of the Faculty <secfac@u.washington.edu>
 Subject: FCTCP review of BIOC-20060109 (BA in Biochemistry) at UWS
 Parts/Attachments:

<u>View</u>	<u>Save</u>	1.1	OK	~7 lines	Text (charset: ISO-8859-1)
<u>View</u>	<u>Save</u>	1.2	Shown	~19 lines	Text (charset: ISO-8859-1)
<u>View</u>	<u>Save</u>	2	OK	306 KB	Application
<u>View</u>	<u>Save</u>	3	OK	23 KB	Application

FCTCP has completed the Phase II review of the attached 1503, comments, and other supporting documentation for BIOC-20060109 (BA in Biochemistry), from UW, Seattle.

We have completed the checklist indicating that the proposal received the appropriate three-campus review and we recommend that it be forwarded to the Provost and President for final approval

UNIVERSITY CAMPUSES UNDERGRADUATE PROGRAM REVIEW PROCEDURES**

CHECKLIST

Title of Proposal: Bachelor of Arts in Biochemistry (BIOC-20060109)

Proposed by (unit name):

Originating Campus:

UW, Seattle

UW, Bothell

UW, Tacoma

I. Phase I. Developed Proposal Review (to be completed by Originating Campus' Academic Program Review body)

A. Review Completed by: (list name of program review body)

Chaired by:

06/02/06 Date proposal received by originating campus's review body

06/02/06 Date proposal sent to University Registrar

06/05/06 Date proposal posted & email sent to standard notification list

11/17/06 Date of originating campus's curriculum body approval

(Note: this date must be 15 business days or more following date of posting)

B. 6 Number of comments received. Attach the comments and a summary of the consideration and responses thereof : (1-2 paragraphs)

II. Phase II. Final Proposal Review (to be completed by FCTCP)

A. Review Completed by:

FCTCP subcommittee

FCTCP full council

Chaired by: Marcia Killien

11/20/06 Date request for review received from University Registrar

12/8/06 Date of FCTCP review

B. Review (attached)

YES NO

Was notice of proposal posted on UW Website for 15 business days?

Was notice of proposal sent to standard mailing list 15 business days in advance of academic program review?

Were comments received by academic program review body?

Was response to comments appropriate? (explain, if necessary) [SEE NOTES BELOW]

Was final proposal reviewed by FCTCP within 14 days of receipt?

Was there adherence to the University Campuses Undergraduate Program Review Process? (explain, if necessary)

FCTCP had considerable discussion of this proposal and whether a BA in Biochemistry was the appropriate degree, given the number of science courses in the proposed major. Discussion about the implications for marketing of the degree to students and employers was also held.

**Endorsed by Faculty Senate Executive Committee, 1/10/05, modified 1/31/06; These procedures apply to new undergraduate degrees, majors, minors (and certificates) and substantive changes to same

COMMENTS:

Comment by skimort made 6/16/2006 2:22:57 PM

I am in favor of the proposed degree, BA in Biochemistry. My major concern is that many prehealth students including premed and predent are required to take some biochemistry as a prerequisite for the application to professional school. The number of applicants is growing and this puts pressure on any program that also requires the basic biochem. sequence such as the BA program. If this program is allowed to go forward it must not be at the expense of other students with other majors that require the basic biochemistry sequence.

Comment by clarkji made 6/16/2006 2:33:09 PM

I am in favor of the proposal which appears to be an excellent program.

Comment by Dennis Hartmann made 6/16/2006 2:34:27 PM

I expected it to be more severely dumbed down, but it does seem to require a significant level of real science. The lack of more laboratory experience is a significant loss, but it is more cost effective to ration this to those who would most be able to benefit from it and use it in their future careers.

Comment by Thomas Horbett made 6/16/2006 3:03:43 PM

This seems like a reasonable proposal to serve more of uw students with a biochemistry major that serves broader interests. The inclusion of organic chem and p chem requirements gives it a challenging and fairly complete chemistry experience that not all that many students will find "easy" or dumbed down. Use of biochem 405 and 406 is fine, it is something that i have advised my engineering students to do for many years to get some biochem in their education, without the full rigors of the 440 series, and i think it has served them well, and will do so for the b.a. in biochem too.

Comment by Michael Souter made 6/16/2006 4:44:52 PM

This seems like a reasonable approach to an increasing demand. I am slightly concerned that the BA is seen as appropriate for premed, where I would expect that the BSc would be a better alternative, given the increasing contribution of biomolecular sciences to medicine in general.

Comment by steves made 6/17/2006 8:54:06 AM

Is this meant as a pre-med/dent/nursing major or is it a biochemistry major?

Assuming the former, why not call it that and (more importantly) simply be sure that the curriculum fulfills the usual pre-professional requirements of schools our kids apply to?

Personally, this curriculum seems overly scientific for medical students. I have trouble seeing a need for P Chem or other advanced chemistry in medical school and the micro, immunology and genome likely overlap with what they will get in med school.

A;sp, if we are really trying to support students applications to med school, we might want to include some sort of "course" in medical/nursing service ... a universal requirement of all these

schools.

I would hope that we would encourage pre-profs to include more "soft" materials in their preparation, esp. material that will help them with creative thinking and writing. I believe this sentiment is echoed by the admissions ctees.

The following are the UWMed requirements:

system or 48 credits in a quarter system of undergraduate science courses divided into:

- * Biology -- 8 semester or 12 quarter credits, which can be satisfied by taking any combination of genetics, microbiology, physiology, zoology, or anatomy.
- * Chemistry -- 12 semester or 18 quarter credits, which can be satisfied by taking any combination of inorganic, organic, or biochemistry.
- * Physics -- 4 semester or 6 quarter credits.
- * Additional biology, chemistry, or physics -- 8 semester or 12 quarter credits, which can be met by taking other courses in any of the above broad categories. Molecular Biology can only count toward your additional course credits.

Although a biochemistry course is not absolutely required for admission to the medical school, it is very strongly recommended for entering students. The biochemistry course for the first-year medical students focuses on molecular mechanisms central to human health and disease and it is taught with the presumption that participants have already mastered the fundamentals of biochemistry, including molecular genetics, structure and activity of proteins, and metabolism. A comprehensive undergraduate biochemistry course is the most expedient way to gain this knowledge.

—Summary of Discussion—

FCAS found all of these comments to be supportive of the proposal, and was happy to see that the proposed degree was not felt to be watered down or science-light.

It seemed clear from the presentation of the advisors and representatives of BioChem that this degree was not conceived primarily as a pre-med major, and that probably no more than a third would use it for that purpose. That being the case, the comments by Messrs. Steves and Souter on what would be a good premed major belong properly to another discussion.

W A S H I N G T O N
H I G H E R
E D U C A T I O N
C O O R D I N A T I N G B O A R D

March 2008

DRAFT: Bachelor of Arts in Biochemistry, College of Arts and Sciences, University of Washington

Introduction

The University of Washington (UW) seeks approval to offer a Bachelor of Arts (BA) degree in Biochemistry through the Departments of Chemistry and Biochemistry on the Seattle Campus. In 1989, the department offered for the first time a Bachelor of Science (BS) degree in Biochemistry for students interested in careers in medicine, chemistry, biochemistry, and biotechnology. It was designed as a demanding program for a limited number of students.

Since its inception, the program has grown tremendously with more than 700 declared majors (by headcount) and it has awarded about 150 degrees each year. Students who are interested in careers in the medical or dental professions, bioscience-related law or public policy would benefit from a BA option. It is worth noting that UW offers both a BA and BS option in other fields such as chemistry, physics, and mathematics. Typically, at the UW, it is only small specialized science programs, such as neurobiology, that offer only the BS option. The BA in Biochemistry program distinguishes itself from the BS program in that it:

- Provides a degree option opportunity to students who are interested in biochemistry but seek a broader education than is possible from a BS program, which requires 17 more credits within the major to complete;
- Requires less upper division laboratory coursework than the BS program; and
- Includes a variety of elective courses in related sciences, history, and public policy.

Relationship to Institutional Role and Mission and the Strategic Master Plan for Higher Education

Biochemistry has evolved from a specialized area of study for graduate research to a basic science, akin to biology or physics. The creation of a BA in Biochemistry will broaden access to the biochemistry curriculum and respond to student and industry demand for more flexible degree options. This is consistent with the University's mission, stated as "the preservation, advancement, and dissemination of knowledge."

Program Need

The BS in Biochemistry program has experienced a 45 percent increase in enrollment since 2002, and it is currently many times larger than the anticipated enrollment at the program's inception in 1989. Many students currently enrolled in the Biochemistry BS program and in other programs would benefit from a Biochemistry BA option that may be better-suited to their career goals and educational needs. A Biochemistry BA program may be appropriate for students heading for professional programs in the medical, dental, or nursing fields. Also, students interested in law, journalism, or public policy related to bioscience, may benefit from the BA option. It is not anticipated that the addition of the BA option will significantly increase the number of students in the baccalaureate biochemistry programs, but will instead better serve some students already engaged in the study of biochemistry.

Currently, about one-third of Biochemistry BS students goes on to graduate school, one-third goes to medical or dental professional school, and one-third goes directly to industry. The Biochemistry BA program will primarily serve those headed to professional schools, and to a lesser extent, those headed directly to industry. Graduates may be qualified for jobs in less technical positions in the bioscience/biotechnology industry, which continues to grow in our state. The BA degree will be a more generalist program of study that can be more easily combined with a minor or double major in another field. Many peer public research universities offer both a BA and BS in biochemistry.

Alignment with the Strategic Master Plan

The creation of the BA program will enhance the efficiency of time to degree for some students, as it requires fewer credits than the BS option to complete. At current participation rates, a take up rate of 20 percent in the BA program will yield a total of about 300 fewer credits to graduate than would otherwise be required if those students had selected the BS option. Because the time to degree may be reduced, the rate of program completion may also rise. By providing students with a solid science background in a generalist curriculum, the program addresses an economic need by providing research enterprises with workers who can translate science into ideas and products that people understand and can embrace.

No other public institution in the state offers a BA in Biochemistry, but several offer a BS degree (WSU, Eastern, Western, and Central Washington Universities). Several peer public research institutions with large biochemistry programs like UW's offer a BA in Biochemistry, the University of Texas at Austin and the University of Arizona among them.

Program Description

The program requires 90-92 credits of required core courses combined with 90 required credits of coursework outside the major by the College of Arts and Sciences for a total of 180 credits to earn the BA in Biochemistry degree. Required coursework includes courses in math, general and organic chemistry, biology, physics, biochemistry, physical chemistry, an additional nine credits of electives from a prescribed list, and up to three credits of advanced undergraduate research.

The major differences between the Biochemistry BS and BA programs do not appear until the senior year, so preparation in the freshman and sophomore years would be the same. Both programs are open majors, so transfer students who enroll at UW are free to declare either program as their major. There is no Major Ready Program established for biochemistry, but the upper division required courses have pre-requisites that a transfer student would need to consider in putting together their lower division course schedule. Students interested in transferring into biochemistry as a major at the UW would be well advised to pursue the Associate of Science transfer pathway.

Diversity

The Department participates in UW and College of Arts and Sciences initiatives to enroll more underrepresented minorities and women in science programs. The program will participate in these efforts also. No specific department-sponsored or College initiatives were indicated in the proposal.

External Review

External reviews were conducted by Professor Spencer Anthony-Cahill with the Western Washington University Department of Chemistry, and by Kevin Ahern, Ph.D., in the Department of Biochemistry and Biophysics at Oregon State University. Both reviews were positive and supported the program as well justified and necessary. Citing specific language in the proposal, Dr. Ahern warned against using the program as “a place to dump lower-performing students” or creating a “dumbed down” BS degree. He noted the importance of boosting academic advising efforts to ensure that each student gets into the right program from the start, rather than simply creating an outlet if they later fail. He also noted that the creation of the program might in fact lead to an increase in the number of students interested in biochemistry and completing degrees (not simply shifting students over from the BS program), and the department needs to be prepared for that eventuality, should it arise.

In a response to Dr. Ahern’s observations UW Professor of Chemistry Phillip Reid agreed that it is not the intention of the Department to create a “fallback degree” and acknowledged the importance of timely and effective academic advising. Dr. Reid also stated that they will closely monitor enrollment growth and make sure they can effectively support any growth of enrollment

once the program is initiated. The Department hopes to keep both biochemistry programs as “open majors” without any caps, but may need to reconsider this policy if student interest exceeds available institutional resources.

Program Costs

There are no additional costs incurred by the Department to offer this degree option. No new faculty will be hired nor will courses be created or offered that are not currently available. The Department estimates that about 7 percent of the current faculty budget will be allocated to support the program. In all, costs will rise to \$818,000 annually or \$13,636 per FTE student. The plan is to ramp up over three years to a 60 FTE (60 headcount) enrollment level, graduating 25 students annually, beginning in Year Five.

Staff Analysis

The University of Washington has made a strong case for need of this program from the student, employer, and community perspectives. Establishing a BA in Biochemistry program would also be consistent with pattern and practice in other UW science departments and at other biochemistry departments at peer institutions. It would be the only BA in Biochemistry program at a public institution in the state.

In creating a more generalist degree, this program would be a degree option that may have more appeal to groups of students who traditionally have not shown a high level of interest in pursuing careers in the sciences, particularly female students and students of color. According to IPEDS data for 2005-06, while the current BS program awards degrees to a majority female population, 84 percent of biochemistry degree recipients are non-Hispanic, White, or Asian American. In that year, degrees were awarded to just one black student, two American Indian/Alaskan Native students, and four Hispanic students (5 percent of the total number of degrees awarded that year). Furthermore, according to a 2006 UW report, only 8 percent of tenured and tenure track faculty in the chemistry department are female, the lowest percentage among science departments in the College of Arts and Sciences. This is especially striking when viewed against recent data showing that the percentage of female students receiving doctorates in chemistry has risen to 34 percent, making it possible to recruit female professors.

Given this data, there appears to be an opportunity with the creation of this program for the department to make special efforts to broaden its appeal beyond the White and Asian American groups it currently serves, and make headway on increasing the diversity of tenured and tenure track faculty so that it more closely matches the majority female students sitting in the classes.

Recommendation

Based on careful review of the program proposal and supplemental communications, HECB staff recommends approval of the BA in Biochemistry program at the University of Washington.

The Education Committee met on March 3, 2008 to review this proposal. The Committee reviewed and discussed the *Department of Chemistry Diversity Plan*, which was submitted to the Committee just prior to the meeting. The Education Committee learned that the chemistry department is aware of, and has a plan to address the diversity issues raised above and is dedicated to increasing student and faculty diversity and providing support to under-represented student groups. Overall, the Education Committee was satisfied with the University's response to the issues and the HECB will continue to monitor the department's progress in achieving its diversity goals.

The Education Committee voted unanimously to recommend approval of the proposed program.

RESOLUTION NO. 08-05

WHEREAS, The University of Washington proposes to offer a Bachelor of Arts in Biochemistry to complement its existing Bachelor of Science in Biochemistry program; and

WHEREAS, The program would support the unique role and mission of the institution by providing students with an opportunity to pursue a broader educational plan focusing on biochemistry that can more easily be combined with study in other disciplines; and

WHEREAS, The program would respond to demonstrated student, employer, and community needs, consistent with past experience with this program and the university's assessment of need; and

WHEREAS, The program would expand the education options for students interested in careers related to bioscience and biotechnology;

THEREFORE, BE IT RESOLVED, That the Higher Education Coordinating Board approves the Bachelor of Arts in Biochemistry at the University of Washington.

Adopted:

March 19, 2008

Attest:

Bill Grinstein, Chair

Roberta Greene, Secretary