



Faculty Senate

December 14, 2006

Faculty Senate Curricular Affairs Committee Four Hundred Forty-Eighth Report

Proposed Bachelor of Science Degree in Chemistry and Forensic Chemistry

S E C T I O N I

BACKGROUND INFORMATION

ABSTRACT

The proposed B.S. degree in Chemistry and Forensic Chemistry is a 130-credit program that emphasizes a strong fundamental background in traditional chemistry and includes four existing courses in forensic sciences which are part of the multidisciplinary minor in Forensic Science.

On December 4, 2006, after reviews by the Council of Deans and the Budget Office, the Curricular Affairs Committee approved the proposal from the College of Arts and Sciences and the Department of Chemistry to establish a new B. S. Program Chemistry and Forensic Chemistry under the provisions of the new section 8.85.31 of the University Manual as a program for which no new funding is required.

BACKGROUND

The proposal for a B.S. degree in Chemistry and Forensic Chemistry was approved by the faculty of the Department of Chemistry on October 14, 2005 and by the Curriculum Committee of the College of Arts and Sciences on December 8, 2005 and by the College of Arts and Sciences faculty on May 3, 2006 and was subsequently submitted to the Council of Deans and the Budget Office prior to consideration by the Curricular Affairs Committee.

In the Budget Office review, Budget Director Linda Barrett noted on October 30, 2006 that as a result of the budget analysis, "implementation of the B.S. Degree in Chemistry and Forensic Chemistry will not negatively impact the University's

current budget and the University's general fund will be positively influenced from projected additional tuition revenue."

On November 8, 2006, the Council of Deans unanimously endorsed the proposed B.S. degree. While the Deans' Council suggested changing the title of the degree, the Curricular Affairs Committee decided it was not feasible based on discussion with the Chair of the Department of Chemistry.

Because the proposal is predicated on using existing courses and staffing for at least the first five years of the program, the Curricular Affairs Committee agreed that the proposal fit the criteria outlined in section 8.85.31 of the University as a program for which no new funding is required.

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S E C T I O N II

RECOMMENDATION

The Curricular Affairs Committee has reviewed the proposal and considered all of the comments forwarded to it by the various bodies. On December 4, 2006, the committee voted to recommend to the Faculty Senate that the proposed B. S. Degree in Chemistry and Forensic Chemistry be approved as a program that requires no new funding for its implementation. The proposal is in the format required by the Board of Governors for Higher Education.

Bachelor of Science Degree in Chemistry and Forensic Chemistry

A. Program Information

1. Name of institution:
University of Rhode Island
2. Name of department, division, school or college:
Department of Chemistry, College of Arts & Sciences
3. Title of program and federal Classification of Instructional Program (CIP) code:
Chemistry, Other, 40.0599
4. Intended initiation date of program change and anticipated date for granting first degrees or certificates;
Initiation date: Fall 2006; first degrees awarded: Spring 2008
5. Intended location of program:
Department of Chemistry, Kingston campus
6. Description of institutional review and approval process:

Department

DATE APPROVED
October 14, 2005

Arts and Sciences Curriculum Committee
College of Arts and Sciences
Curricular Affairs Committee
Faculty Senate
President of the University

December 8, 2005
May 3, 2006
December 4, 2006

7. Summary Description:

Student interest in Forensic Sciences has been increasing significantly over the past few years. URI currently offers a multidisciplinary minor in Forensic Science that requires courses from a number of different departments. However, we still get requests from students who wish to major in a forensic science related field. To respond to this high level of student interest, the Department of Chemistry is proposing a new major entitled *Chemistry and Forensic Chemistry*.

The proposed major would emphasize a strong fundamental background in traditional chemistry courses but would substitute four of the upper level courses with forensic courses. The proposed curriculum parallels the changes done for the Chemistry and Chemical Oceanography B. S. degree already offered.

8. Signature of the President

Robert L. Carothers, President

9. Additional Resources

No additional resources will be needed to initiate the new degree program.

10. Contact Persons During Review:

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Chair, Department of Chemistry
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E-mail: chair@chm.uri.edu

Lynn Pasquerella
Vice Provost for Academic Affairs
Phone: 401-874-4408
E-mail: paski@uri.edu

11. Cooperative Agreements with other Institutions

None.

B. Rationale

Student interest in Forensic Sciences has been increasing significantly over the past few years. This is likely due to the current popularity of crime shows on television, many of which emphasize the role of forensic investigations. URI currently offers a multidisciplinary minor in Forensic Science that requires courses from a number of different departments. However, we still get requests from students who wish to major in a forensic science related field. To respond to this high level of student interest, the Department of Chemistry is proposing a new major entitled *Chemistry and Forensic Chemistry*.

The Forensic Science Partnership initiated the multidisciplinary minor in Forensic Science. One of the key components of that minor is the Forensic Science seminar, CHM 391, which enrolls about 30 students per semester and often has attendance in excess of 100 people from around the campus and the community. Further, at the "Meet the University" days where high school students visit URI, the most common questions posed to the chemistry representatives are about the forensic science opportunities.

The proposed major is, at its core, chemistry with some small modifications to address the use of chemistry in forensics. This is in keeping with the recommendations of nearly all of the speakers that have given talks in the Forensic Science seminar series who suggest that the best entry in the forensic field is through the physical sciences.

According to the American Academy of Forensic Science web site (<http://www.aafs.org>), there are about 25 colleges and universities that offer a bachelor's degree in forensic chemistry (or equivalent). None of these institutions is in New England – the closest are the University at Albany and The College of New Jersey. Thus, URI is in a favorable position to be a leader in this emerging area.

C. Institutional Role

URI has enjoyed a growing reputation in the area of forensic sciences since the establishment of the Forensic Science Partnership. As a result of student interests, two new minors have been created in the forensic area: the forensic science minor and the computer forensics minor. This proposal will provide another option for students at URI.

D. Interinstitutional Considerations

As indicated above, there are about 25 colleges and universities that offer a bachelor's degree in forensic chemistry – the closest being the University at Albany and The College of New Jersey. The proposed degree at URI will provide transfer options for students throughout the New England area, including all Rhode Island

institutions. Since the first two years of the program are identical to any chemistry degree, students will be able to seamlessly move into the Chemistry and Forensic Chemistry program. This will be especially true for CCRI students, where we have an established transfer agreement.

No cooperative arrangements have been established with other institutions. No affiliations with external agencies have been made nor are any required. Since no other New England institutions offer a Chemistry and Forensic Chemistry degree at the bachelor's level, it is proposed that the new degree be available under the New England Board of Higher Education Regional Student Program.

E. Program

The new Chemistry and Forensic Chemistry degree program is constructed using existing courses already offered at URI. The new degree starts with the traditional B.S. degree in chemistry, adding courses in forensic science and forensic chemistry, and removing a few upper level chemistry courses to make room for the new courses.

The degree program is modeled after the successful B.S in Chemistry and Chemical Oceanography degree already offered by URI and administered through the Chemistry Department. All three degrees have identical course requirements for the freshman and sophomore years: general chemistry (CHM 191 & 192), quantitative analysis (CHM 212), and organic chemistry (CHM 226, 227, 228) are all standard curricular requirements for every chemistry degree in the country (which is why transfer from other institutions will be seamless). The auxiliary requirements are calculus through differential equations (MTH 141, 142, 243, 244) and one year of introductory physics with calculus (PHY 203, 204, 273, 274), again standard prerequisites for all chemistry degrees.

The changes occur during the junior and senior years. From the standard B.S. degree in chemistry, the following changes are made: CHM 353 (Undergraduate Research, 6 credits) is replaced with CHM 354, (Undergraduate Research in Forensic Chemistry, 6 credits); CHM 402 (Physical Inorganic Laboratory, 2 credits) and CHM 492 (Seminar in Chemistry, 1 credit) are replaced by CHM 391 (Forensic Science Seminar, 1 credit taken 3 times); and PHY 205/275 (Elementary Physics III with lab, 4 credits) is replaced with CHM 392 (Introduction to Criminalistics, 3 credits).

The Chemistry and Forensic Chemistry degree will follow all other University requirements. Students will be encouraged to take SOC 230 (Crime and Delinquency) as part of their General Education requirement in the Social Sciences area.

The credit distribution for the proposed Chemistry and Forensic Chemistry is as follows: Chemistry, 58 credits; Mathematics, 14 credits; Physics, 8 credits; General Education (not including the mathematics and natural science requirements already

enumerated), 30 credits; and Electives, 20 credits. The total number of credits for graduation is 130.

The accrediting agency for chemistry degrees is the American Chemical Society (ACS). The proposed degree in Chemistry and Forensic Chemistry will not meet the ACS accreditation requirements. However, students wishing to obtain an ACS accredited degree need only to take CHM 402, CHM 492, PHY 205, and PHY 275 (7 credits) as part of their electives.

There are no licensing or certification requirements for chemistry degrees.

A comparison of the existing curricula with the proposed curriculum is shown in the table below:

<u>Academic Year</u>		<u>B.S. Chemistry and Chemical Oceanography</u>	<u>B.S. Chemistry and Forensic Chemistry</u>
Freshman	CHM 191* CHM 192** MTH 141 MTH 142	CHM 191* CHM 192** MTH 141 MTH 142	CHM 191* CHM 192** MTH 141 MTH 142
Sophomore	CHM 212 CHM 226 CHM 227 CHM 228 MTH 243 MTH 244 PHY 203 PHY 273 PHY 204 PHY 274	CHM 212 CHM 226 CHM 227 CHM 228 MTH 243 MTH 244 PHY 203 PHY 273 PHY 204 PHY 274	CHM 212 CHM 226 CHM 227 CHM 228 MTH 243 MTH 244 PHY 203 PHY 273 PHY 204 PHY 274
Junior	CHM 335 CHM 353 CHM 431 CHM 432 CHM 412 CHM 414 PHY 205 PHY 275	CHM 335 CHM 431 CHM 432 CHM 412 CHM 414 OCG 451 OCG 493	CHM 335 CHM 354 (3 credits) CHM 431 CHM 432 CHM 412 CHM 414 CHM 391 (1 time) CHM 392
Senior	CHM 353 CHM 401 CHM 402 CHM 425 CHM 427 CHM 441 CHM 492	CHM 401 CHM 425 CHM 427 OCG 494 OCG 521	CHM 354 (3 credits) CHM 401 CHM 425 CHM 427 CHM 441 CHM 391 (2 times)

Course listed in **boldface** are the forensic science (or oceanography) courses used to distinguish from the B.S. in Chemistry.

* CHM 101/102 can be used to substitute for CHM 191

** CHM 112/114 can be used to substitute for CHM 192

F. Faculty and Staff

<u>Name</u>	<u>Rank, Tenure Status</u>	<u>Highest Degree, Institution, Area of Expertise</u>	<u>Courses to be taught</u>
Brown, Chris	Professor, tenured	Ph.D., Minnesota, Analytical Chemistry	CHM 212, 354, 412, 414
Dain, Joel	Professor, tenured	Ph.D., Cornell, Biochemistry	CHM 354
DeBoef, Brenton	Assistant Professor, untenured	Ph.D., Washington University, Organic Chemistry	CHM 226, 227, 228, 354, 425, 427
Euler, William	Professor, tenured	Ph.D., Florida State, Inorganic Chemistry	CHM 112, 354, 401
Fasching, James	Professor, tenured	Ph.D., MIT, Analytical Chemistry	CHM 101, 354
Freeman, David	Professor, tenured	Ph.D., Harvard, Physical Chemistry	CHM 335, 354, 431, 432
Kirschenbaum, Louis	Professor, tenured	Ph.D., Brandeis, Inorganic Chemistry	CHM 112, 354, 401
Lucht, Brett	Associate Professor, tenured	Ph.D., Cornell, Organic Chemistry	CHM 226, 227, 228, 354, 425, 427
Major, Jaycoda	Assistant Professor, untenured	Ph.D., Michigan State, Analytical Chemistry	CHM 191, 354
Oxley, Jimmie	Professor, tenured	Ph.D., British Columbia, Energetic Materials	CHM 391, 392, 354
Rosen, William	Professor, tenured	Ph.D., UC-Riverside, Organic Chemistry	CHM 226, 227, 228, 354, 425, 427
Smith, James	Professor, tenured	Ph.D., British Columbia, Physical and Analytical Chemistry	CHM 192, 354, 441
Vittimberga, Bruno	Professor, tenured	Ph.D., Illinois, Organic Chemistry	CHM 354
Yang, Sze	Professor, tenured	Ph.D., Columbia, Physical Chemistry	CHM 335, 354, 431, 432

All of the courses required for the new major are already taught. This means that there are no additional faculty positions required to initiate the new major.

G. Students

The new major in Chemistry and Forensic Chemistry is expected to attract 5 – 10 new freshmen per year. This estimate is based upon conversations with students at Meet the University days over the past few years: each year 20 – 25 prospective students have asked about the forensic science minor and the possibility of a major. These students come from the traditional pool for URI students, primarily the New England and Mid Atlantic states. The new major may draw a few students from the B.S. degree in chemistry but it is not anticipated that the new major will draw students from any other major at URI.

Historically, about 50 % of students entering URI as a declared chemistry major switch to some other major or leave the University. The retention for the new Chemistry and Forensic Chemistry is expected to be similar so that entering classes of 5 – 10 freshmen will likely graduate 3 – 5 seniors.

H. Administration

The proposed major in Chemistry and Forensic Chemistry will be administered by the Department of Chemistry. The Chair of the Department (currently, Bill Euler) will manage advising and supervision of the program. There will be no additional costs for administering the new degree.

I. Instructional Resources

All courses in the proposed program are already taught on a regular basis by the Chemistry Department. Thus, all of the instructional resources are already in place at the University and no additional resources will be required.

J. Facilities and Capital Equipment

All courses in the proposed program are already taught on a regular basis by the Chemistry Department. Thus, all of the facilities and capital equipment are already in place at the University and no additional resources will be required.

K. Financial Considerations

Since this degree program is designed using existing courses, there no additional budgetary requirements to deliver the new degree. The University will benefit from additional tuition revenue into the general fund.

L. Evaluation

The new degree program will be evaluated using the same assessment tool as the other degrees offered by the Chemistry Department. A copy of the Assessment document, reflecting changes for the new degree, is attached at the end of this proposal.