



The John Knoblock  
Faculty Senate Office  
Ashe Administration Building, #325  
1252 Memorial Drive  
Coral Gables, FL 33146

[facsen@miami.edu](mailto:facsen@miami.edu)  
web site: [www.miami.edu/fs](http://www.miami.edu/fs)  
P: 305-284-3721  
F: 305-284-5515

## MEMORANDUM

**To:** Julio Frenk  
University President

**From:** Tomás A. Salerno  
Chair, Faculty Senate

A handwritten signature in blue ink, appearing to read 'Tomás'.

**Date:** March 5, 2018

**Subject:** Faculty Senate Legislation #2017-25 (B) – Creation of a Five-Year Bachelor of Science / Master of Science Degree in Chemistry, College of Arts and Sciences

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The Faculty Senate, at its February 28, 2018 meeting, had *no objections* to the College of Arts and Sciences proposal to create a five-year Bachelor of Science / Master of Science degree in Chemistry. This dual degree is designed to improve the academic foundation in chemical sciences for undergraduates while increasing their advantage for employment or admission into Ph.D. graduate programs, and health professional schools. Analogous to the traditional six-year undergraduate and master's degree, this five-year degree allows students the comparable hands-on training in research and analysis, to learn to operate state-of-the-art instrumentation, improve their written and oral presentation skills specific to chemical sciences, and receive professional training to advance their careers.

This legislation is sent to you for your action.

TAS/rh

Enclosure

cc: Jeffrey Duerk, Executive Vice President and Provost  
Leonidas Bachas, Dean, College of Arts and Sciences  
Guillermo Prado, Dean, Graduate School  
Orlando Acevedo, Associate Professor, Chemistry, College of Arts and Sciences  
Maryann Tobin, Executive Director of Programs, College of Arts and Sciences

CAPSULE: Faculty Senate Legislation #2017-25 (B) – Creation of a Five-Year Bachelor of Science / Master of Science Degree in Chemistry, College of Arts and Sciences

**PRESIDENT'S RESPONSE**

APPROVED: \_\_\_\_\_

  
(President's Signature)

DATE: 3/16/18

OFFICE OR INDIVIDUAL TO IMPLEMENT: Dean Leonidas Bachas

EFFECTIVE DATE OF LEGISLATION: IMMEDIATELY (Pending any additional required Board of Trustees approval)

NOT APPROVED AND REFERRED TO: \_\_\_\_\_

REMARKS (IF NOT APPROVED): \_\_\_\_\_



# Proposal Submission Checklist

Proposals are to be submitted to the Office of Assessment and Accreditation (OAA), if applicable, the Graduate Council (for graduate programs excluding Law and Medical), if applicable, and the Faculty Senate. Refer to the Procedures for Program Changes document for information on the approvals and notifications needed for program changes and the Proposal Submissions Specifications document for an explanation of the process and a list of the materials required.

(Please note that change approvals can take 2 semesters to complete.)

Include this checklist at the beginning of each proposal.

(Complete the information below, save the form as a pdf, and insert it with the background materials that are specified, in the order listed, and send the package electronically as noted above.)

## KEY CONTACT PERSONNEL INFORMATION

First Name

Orlando

Last Name

Acevedo

Proponent's Title

Associate Professor

Department, if applicable

Chemistry

School/College

Arts & Sciences

E-mail

orlando.acevedo@miami.edu

Phone

305-284-5662

Title of Proposal

Five-Year Bachelor of Science/Master of Science Degree in Chemistry

(-continue to next page-)

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## MANDATORY MEMORANDA AND FORMAT

*Please check that each item listed below is included in the proposal package of materials, in the ORDER as listed. The applicable title (i.e. Letter of Explanation, Memo from the Dean, etc. ) is to precede each section in the materials.*

Only proposals conforming to this format will be accepted.

### 1. This completed checklist.

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### 2. Letter of explanation. (2-3 pages only, double spaced, 12 pt font)

Yes     No

If no, explain why.

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### 3. A memo from the dean(s) signifying approval of the faculty of the relevant School(s) / Colleges(s).

Yes     No

If no, explain why.

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### 4. A memo that all affected or relevant School / College Council(s) have approved.

Yes     No

If no, explain why.

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**5. A memo from the department chair(s) signifying approval of the faculty of the relevant department(s).**

Yes     No

If no, explain why.

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**6. A memo from the Office of Accreditation and Assessment (OAA) if the proposal involves academic programs (degrees, certificates, majors, minors, concentrations, specializations, tracks, etc.) such as new programs, closing programs, or program changes (such as changes in requirements, program length, modality, name, location).**

*(To be submitted by OAA to the Graduate Council or the Faculty Senate, as appropriate.)*

Applicable             Not applicable.

If not, explain why.

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**7. A memo from the Graduate School Dean signifying approval of the Graduate Council (for graduate programs only).**

*(To be submitted to the Faculty Senate by the Graduate Council.)*

Applicable             Not applicable.

If not, explain why.

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**8. Academic Deans Policy Council (ADPC) approval, for interdisciplinary issues and as appropriate. Please consult with the Dean of the Graduate School or the Secretary of the Faculty Senate to check if this is needed.**

Yes     No

If no, explain why.

This is not an interdisciplinary proposal.

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**9. Additional required documents as listed on the "Proposal Submissions Specifications," i.e. market analysis, budget information, assessment of library collections, etc. as specified.**

List additional documents included.

A budget is attached separately. Market analysis is included in the proposal document.

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End form.

COVER PAGE

**DEGREE PROPOSAL:**

**Five-Year Bachelor of Science/Master of Science Degree in Chemistry**

Questions about the program should be directed to:

Dr. Orlando Acevedo, Associate Professor  
Department of Chemistry, College of Arts & Sciences  
#305-284-5662  
Orlando.acevedo@miami.edu

Dr. Maryann Tobin, Executive Director of Programs  
Dean's Office, College of Arts & Sciences  
#305-284-3737  
met@miami.edu

## Letter of Explanation

### **Executive Summary:**

The goal of Chemistry's dual BS/MS degree is to improve the academic foundation of undergraduates in the chemical sciences and allow them to become more competitive for employment and/or admission into Ph.D. graduate programs and health professional schools, such as medical and dental programs. Highly qualified job applicants in the chemical and pharmaceutical manufacturing fields often begin by earning an undergraduate degree and then completing a master's degree, which generally requires a minimum of 6 years of total training. This dual degree BS/MS program is designed to provide students with comparable hands-on training in research and analysis, but in a reduced timeframe of 5 years. Students will learn to operate state-of-the-art instrumentation, develop analytical skills, improve their written and oral presentation skills specific to the chemical sciences, and receive the professional training necessary to advance their careers.

The proposed program will be beneficial to both students and faculty. Students will receive considerable exposure to research environments as an undergraduate and for one intensive research year as a post-baccalaureate. The undergraduate research time allows training and establishment of research mastery; the post-baccalaureate year is especially important to facilitating research as it minimizes the distractions of course work. Faculty will benefit from motivated, trained researchers in their lab. The Departmental expectation is that students will become authors on peer-reviewed papers and present their research at a national conference.



Memo from the Dean


**Memorandum from Dean Leonidas Bachas, College of Arts and Sciences**

UNIVERSITY OF MIAMI  
COLLEGE of  
ARTS & SCIENCES



Office of the Dean 1252 Memorial Drive Phone: 305-284-4117  
Ashe Building, Suite 227 Fax: 305-284-5637  
Coral Gables, Florida 33146 as.miami.edu

To: Tomas Salerno  
Chair, Faculty Senate

From: Leonidas Bachas  
Dean, College of Arts and Sciences 

Subject: New Dual Degree Program:  
Five-Year Bachelor of Science (BS) and Master of Science (MS) in Chemistry

Date: April 4, 2017

Dear Tom,

I am writing to express my full support of the proposal for a new Five-Year Dual Degree Bachelor of Science (BS) and Master of Science (MS) program in Chemistry. On April 3, 2017, the faculty of the College of Arts and Sciences unanimously voted in favor of this new Five-year BS/MS Dual Degree program, offered by the Department of Chemistry. I am now forwarding the proposal to the Senate for action.

For your convenience, attached you will find a copy of the proposal. If you have any questions, please feel free to contact me.

LGB/mtt

## Memo from the College

### Email from the College Curriculum Committee, College of Arts and Sciences

Tuesday, February 6, 2018 at 2:08:48 PM Eastern Standard Time

**Subject:** Fwd: Chemistry BS/MS  
**Date:** Thursday, March 9, 2017 at 2:48:20 PM Eastern Standard Time  
**From:** Mallery, Charles H.  
**To:** Glemaud, Rose-Ketlie  
**CC:** Tobin, Maryann T.  
**Attachments:** BS-MS\_program\_formatted\_v2\_03-03-17.docx, image001.jpg, image002.jpg, image003.jpg, image004.jpg, image005.jpg, image006.jpg, image007.jpg

Attached please find the final revised copy of the Chemistry Proposal for a Bs.MS degree that was approved by the Curriculum Committee at its meeting on March 03, 2017.

## Thanks Charles Mallery,

charles mallery, associate dean, college of arts & sciences  
Merrick bldg., room 304 - (305) - 284-3188 - [cmallery@miami.edu](mailto:cmallery@miami.edu)

Begin forwarded message:

**From:** "Tobin, Maryann T." <[met@miami.edu](mailto:met@miami.edu)>  
**Subject:** Chemistry BS/MS  
**Date:** March 9, 2017 at 2:42:50 PM EST  
**To:** "Mallery, Charles H." <[cmallery@miami.edu](mailto:cmallery@miami.edu)>  
**Cc:** "Glemaud, Rose-Ketlie" <[rglemaud@miami.edu](mailto:rglemaud@miami.edu)>

Hi, Charly.

Rose is taking agenda items for College Council. Can you please send her the Curriculum Committee's approval of the Chemistry BS/MS?

Thanks!  
Maryann



## Memo from the Department

### Memorandum from the Department of Chemistry

UNIVERSITY OF MIAMI  
COLLEGE of  
ARTS & SCIENCES



Department of Chemistry

P. O. Box 249118  
Coral Gables, Florida 33124-0431  
Cox Science Building  
1301 Memorial Drive, Room 315  
Coral Gables, Florida 33146-0431

Phone: 305-284-2174  
Fax: 305-284-4571

#### MEMORANDUM

**February 23, 2017**

**To:** Professor Leonidas Bachas, Dean of the College of Arts and Sciences

**From:** Roger Leblanc, Professor and Chair, Department of Chemistry

**Subject:** Letter of Support to Create a Dual Degree, 5-Year Bachelors of Science/Master Degree Program

I am very pleased to support the creation of a dual degree, 5 year Bachelors of Science/ Master Degree program. This program was initiated by the Department of Chemistry and was approved unanimously by the department faculty at a Faculty Meeting held on December 5, 2016. The program is designed to improve the academic foundation of undergraduates in the chemical sciences and allow them to become more competitive for employment and/or admission into Ph.D. graduate programs and health professional schools, such as medical and dental programs. We anticipate that this program will attract high quality students, and will provide an additional viable option of future employment for these students.

Sincerely Yours,

A handwritten signature in blue ink, appearing to read "Roger Leblanc".

## Memo from PIRA/OAA

### Memorandum from the Office of Assessment and Accreditation

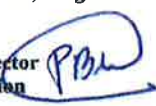
UNIVERSITY  
OF MIAMI



#### MEMORANDUM

**DATE:** February 2, 2017

**TO:** Dr. Maryann Tobin, Executive Director, Programs  
College of Arts and Sciences

**FROM:** Dr. Patricia Murphy, Executive Director  
Office of Assessment and Accreditation 

**SUBJECT:** New Dual Degree Program: Bachelor of Science and Master of Science in Chemistry

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On 01/10/2017, the College of Arts and Sciences notified our office of its intent to implement a new dual Bachelor of Science (BS) and Master of Science (MS) in Chemistry degree program beginning in the fall of 2017.

The goal of the dual program is to improve the academic foundation of undergraduates in chemical sciences and allow them to become more competitive for employment and/or admission into PhD graduate programs and health professional schools, such as medical and dental programs. The BS/MS dual degree is designed to provide students with comparable hands-on training in research and analysis, but in a reduced timeframe of 5 years. The BS in Chemistry degree requires 120 credits including 40 credits in chemistry, and 30 additional credits of coursework for the MS in Chemistry. During both the senior and MS years, students will be required to enroll in the department seminar each term. Students in the BS/MS dual degree program are required to complete a thesis on research.

The dual program involves two existing degree programs offered on the Coral Gables Campus, and will not require additional resources or the hiring of new faculty. Based on the details on the proposal, this change is not substantive and will not require notification or approval from the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) in order to proceed with its implementation.

Please feel free to contact our office should you have any questions or require additional assistance (305) 284-9431.

cc: Faculty Senate  
Dr. Guillermo Prado, Dean, Graduate School  
Dr. Leonidas Bachas, Dean, College of Arts and Sciences  
Dr. Angel Kaifer, Associate Dean, College of Arts and Sciences  
Dr. Roger LeBlanc, Department Chair, College of Arts and Sciences  
Dr. Orlando Acevedo, Associate Professor, College of Arts and Sciences

## Memo from the Graduate School

### Memorandum from the Graduate School Dean

UNIVERSITY OF MIAMI  
GRADUATE SCHOOL




1252 Memorial Drive  
P.O. Box 248125  
Coral Gables, FL 33124-4629

Phone: 305-284-4154  
Fax: 305-284-5441  
graduateschool@miami.edu

### MEMORANDUM

DATE: November 27, 2017

TO: Tomas Salerno  
Chair, Faculty Senate

FROM: Guillermo (Willy) Prado   
Dean, The Graduate School

SUBJECT: Proposal – BS/MS degree in Chemistry

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The College of Arts and Sciences submitted a proposal for a dual Bachelor of Science/Master of Science degree program in Chemistry. The proposal was discussed at the November 14, 2017, meeting of the Graduate Council, and was unanimously approved by those present.

cc: Leonidas Bachas, Dean, College of Arts and Sciences  
Angel Kaifer, Senior Associate Dean, College of Arts and Sciences  
Roger LeBlanc, Chair, Department of Chemistry  
Burjor Captain, Director of Graduate Studies, Department of Chemistry  
Office of Planning, Institutional Research and Assessment

## PROPOSAL

### **Department of Chemistry Proposal to Create a Dual Degree, Five-Year Bachelor of Science/ Master of Science Degree Program in Chemistry**

Prepared by: Dr. Orlando Acevedo, Associate Professor  
#305-284-5662  
Orlando.acevedo@miami.edu

Responsible administrative unit for the program:  
Department of Chemistry  
College of Arts and Sciences

Proposed date for implementation: Summer 2018

#### **1. RATIONALE**

##### **a. Exact Degree Title.**

The Department of Chemistry seeks to offer a five-year dual degree that combines a Bachelor of Science (BS) degree with a Master of Science (MS) degree. It will be titled the Five-year BS/MS Degree in Chemistry.

##### **b. Purpose and goals of the dual degree.**

The goal of the dual BS/MS degree in Chemistry is to improve the academic foundation of undergraduates in the chemical sciences and allow them to become more competitive for employment and/or admission into Ph.D. graduate programs and health professional schools, such as medical and dental programs. Highly qualified job applicants in the chemical and pharmaceutical manufacturing fields often begin by earning an undergraduate degree and then completing a master's degree, which generally requires a minimum of 6 years of total training. This dual degree BS/MS program is designed to provide students with comparable hands-on training in research and analysis, but in a reduced timeframe of 5 years. Students will learn to operate state-of-the-art instrumentation, develop analytical skills, improve their written and oral presentation skills specific to the chemical sciences, and receive the professional training necessary to advance their careers.

The proposed program will be beneficial to both students and faculty. Students will receive considerable exposure to research environments as an undergraduate, and for one intensive research year as a post-baccalaureate. The undergraduate research time allows training and establishment of research mastery; the post-baccalaureate year is especially important to facilitating research as it minimizes the distractions of course work. In addition, faculty will benefit from motivated, trained researchers in their lab. The Departmental expectation is that students will become authors on peer-reviewed papers and present their research at a national conference.

This program will be a revenue-generating Master's program. Undergraduates may be eligible for internal fellowships and scholarships, but the Master's year will require at least 9 credits of tuition payment per semester, as no tuition waivers will be granted. Tuition

## PROPOSAL

funds returned to the department will defray costs of the BS/MS program and contribute to support of our Ph.D. program.

### c. Motivation and Demand.

With the impending creation of the *Frost Institute of Chemistry and Molecular Science*, it is anticipated that the national prominence of the Institute will grow demand for student chemistry research experiences at the University of Miami. With the anticipated hiring of 6-7 faculty members in the *Frost Institute*, a significant expansion of the Department of Chemistry's graduate program is expected. New instrumentation and state-of-the-art facilities will be very attractive to undergraduates desiring advanced chemistry training.

For undergraduate students seeking careers in pharmaceuticals and bulk chemical manufacturing, the BS/MS degree offers the appropriate training sought by companies worldwide. Students can achieve the required academic credentials in 1-2 years less time due to the integrated and focused nature of the BS/MS degree. In addition, the MS degree allows students to become more competitive for successful admission in graduate, medical, and professional schools.

Chemistry faculty regularly train undergraduates in research, but projects are often limited in scope due to the restrictive time requirements of the BS degree. The MS year will allow for an expanded timeframe that students can use to learn more advanced techniques and further develop the preliminary data produced during their junior and senior years of the BS. At present, any student wishing to receive an MS degree in Chemistry would have to apply to the existing program that requires a minimum two year study plan involving extra courses and a teaching assistantship. In practice, all slots in the Chemistry graduate program are reserved for Ph.D. applicants as teaching assistantships and tuition remission positions are limited. No admission offers into the existing MS degree program has been issued for over 10 years. In addition, the BS/MS program allows completion of the MS degree in one year because the student had at minimum a prior year of research experience with the same research advisor during their senior year (and perhaps even their junior year). Any student coming in from an outside University would not have enough time to perform the amount research required to defend a Master's thesis in a year (even if we let them begin in the Summer, which is not available in the existing MS degree program).

## **2. CURRICULUM**

### a. List the major division or divisions of the discipline in which graduate degree work will be offered.

The degree will be in Chemistry. Students may do research with any of the graduate Chemistry faculty, in any field of chemistry, including cross-disciplinary studies. The research must be with a faculty member in Chemistry, and does not include sponsored research activities that are centered outside the department, e.g., in the medical school.

### b. Provide a detailed description of the proposed program.

The BS/MS program is a five-year program emphasizing research in the Senior year and in the Master's year. Before they enter the program, students will be prepared for their

## PROPOSAL

research experience through existing laboratory courses and by mentored research with a Chemistry graduate faculty member. Whereas students may begin mentored research as early as their freshmen year, it is expected that they should have at least one semester of research prior to the start of their senior year. Students will have access to capstone and interdisciplinary 500 level courses as seniors and to 600 level courses as Masters students.

### 3. REQUIREMENTS

Students must be enrolled as an undergraduate in the University of Miami. Students are encouraged to have two semesters of research in their junior year and must be accepted into the BS/MS program by the end of their junior year. Research requirements must be carried out under the direction of the same faculty member throughout both their senior and MS years. All requirements for the BS in Chemistry degree must be completed by the end of their senior year.

#### a. Prerequisites.

Students must have been identified and accepted into a research lab by a Graduate Faculty member in Chemistry. The student must do research directly in the lab of a faculty member in Chemistry; students may not be sponsored to work in other departments.

#### b. Courses.

The BS degree requires a total of 120 credits with 40 of those credits in chemistry: the core courses; CHM 360, 364, 365, 316, 320, 441; BMB 401; plus three credits of electives from the following list: CHM 317, 401, or any 500-level course. The BS degree will be issued after completion of the required 120 undergraduate credits.

In the MS year, students must take 30 credits over the course of the Summer, Fall, and Spring semesters. At least 21 credits will be for research/thesis work. Additional courses may be taken at 600 or 700 levels, if their thesis committee judges that the courses justifiably support the student's progress and aspirations. In both their senior and MS years, students are required to enroll in the department seminar each semester.

#### **Required**

- CHM 810, Masters Thesis, 9 credits in the Summer semester and 6 credits in each of the Fall and Spring semesters
- CHM 779, 2 credits, Departmental Seminar
- CHM 780, 1 credit, Chemistry Seminar
- 600 level course, 3 credits, per semester

#### c. Examinations.

At the end of the MS year, students will present their written thesis and defend their research in a public presentation after which their committee will examine their mastery of their topic in a private session. Conferral of the MS degree is subject to the committee's approval of the exam and thesis.

#### d. Additional Coursework.

During the MS year, additional course work must be approved by the student's committee.



## PROPOSAL

### e. Thesis.

Students must write a thesis on research conducted during the BS/MS program.

f. Degree Track. The program will not be divided into tracks.

g. Proposed schedule of course offerings for the Five-year degree program. A proposal plan of study is listed below.

## 4. STUDENTS

### a. Estimate the number of students in the program and the pool from which they will come.

We anticipate that at the onset of the program 2-3 students will be enrolled. However, once the program is fully established and the *Frost Institute of Chemistry and Molecular Science* is operational, Chemistry will admit up to a dozen BS/MS students each year.

### b. Describe requirements for admission to and retention in each degree.

The main qualification for admission is research promise. The acceptability of candidates will be judged by our Graduate Admission Committee, based on two letters addressing research promise, one from a chemistry instructor and one from the sponsoring chemistry graduate faculty member who agrees to mentor the research. A minimum of 3.0 GPA will be required for admission. Students will generally be admitted at the beginning of their senior year. Each student will be assigned a three-member committee of graduate faculty, who will monitor status and progress.

## 5. ADMINISTRATION

### a. Estimate the administrative increments imposed by this program.

#### *i. Need for additional salary support*

- Part time support for departmental administrative activities

#### *ii. Need for additional office equipment and supplies.*

- \$1,000 for a new computer once every five years of the program

#### *iii. Need for additional travel, publication costs and other funds.*

- Research expenses will vary with research area but likely include reagents, chemicals, research supplies, data storage/computational resources, and instrument time. Students are expected to present results at a professional meeting and to publish their work.

b. Budget. The program is designed to be self-supporting through those tuition revenues returned to the department. Approximately \$1,500/yr per student for *research expenses* and up to \$1,000 *additional* for travel and publication costs will be given to mentoring faculty, contingent on their student entering the MS year. The research expenses in the first year of the program will be covered by the Chemistry Department and/or the research mentor and will be reimbursed once tuition revenue has been received. Hence, no budget

## PROPOSAL

will be required from the Dean's office in the first year. *Administrative costs* will be covered by the Chemistry Department in the first years.

### 6. COMPARISONS

#### a. Compare the proposed program at UM with five high quality established programs.

Dual BS/MS science degrees have large precedence nationwide and here at the University of Miami, as the Department of Biology offers a similar program for their undergraduate majors. The proposed BS/MS degree in Chemistry models the programs of the some of the highest ranking chemistry departments in the country. For example, the University of Utah (ranked #35 in chemistry, 2015 U.S. News and World Report) offers a 5-year BS/MS degree in chemistry (<http://chem.utah.edu/undergraduate/bs-ms.php>). Students are required to take 10 credit hours of research with a faculty member in Chemistry and must write a 10 page report detailing their project. Students present and defend their project at the end of their 5<sup>th</sup> year. Colorado State University (ranked #49 in chemistry, 2015 U.S. News and World Report) offers a 5-year BS/MS degree in chemistry (<http://www.chem.colostate.edu/undergraduates/bs-ms-degree/>). CSM students are accepted after their 3<sup>rd</sup> year of study with an important element being an independent research project under a chemistry faculty member. The Georgia Institute of Technology School of Chemical & Biomolecular Engineering (ranked #4 in chemical engineering, 2015 U.S. News and World Report) offers a 5-year BS/MS degree (<http://www.chbe.gatech.edu/programs/bs-ms>). Students are eligible after 30 semester credits at Georgia Tech (at the end of freshman year). Their program compresses the degree into potentially 4 years by accepting AP credits and double-counting requirements. Stony Brook University - SUNY (ranked #56 in chemistry, 2015 U.S. News and World Report) offers a 5-year BS/MS degree in chemistry (<http://www.stonybrook.edu/commcms/chemistry/education/undergradbsms.html>). Many of their requirements are similar to other programs detailed here and our own proposed program. They have a GPA requirement of 3.0 or better, students in their junior year choose a research advisor in Chemistry, and the fifth year is an intensive research program. Finally, Caltech (ranked #1 in chemistry, 2015 U.S. News and World Report) offers a BS/MS joint degree to exceptionally qualified students (<http://www.cce.caltech.edu/content/bsms-joint-degree>). Students must take 27 units of research as a junior and write and present a thesis. The thesis must be judged exceptional by a committee that includes their research advisor. As a senior, students take 27 units of research and submit a Master's Thesis and oral presentation. Many other national programs offer a combined BS/MS degree with requirements aligned with the proposed degree. Other well-regarded Chemistry Departments include, the University of Massachusetts Boston, Northeastern University, and the City College of New York. The common theme among the programs is an early and consistent focus on research. Admission is mostly dependent upon the sponsorship of a research active faculty member. Many programs require a minimum GPA (often 3.0 in the major, but as high as 3.5 at Caltech), none examined required a GRE score. Our standing graduate committee will oversee the integrated program, as it has overseen MS as well as Ph.D. programs in the past.

PROPOSAL

**Five-Year Bachelor of Science/Master of Science Degree in Chemistry**

**Sample Plan of Study:**

<b>Year 1</b>		
<b>Fall</b>		
CHM 111	Principles of Chemistry I	3
CHM 113	Chemistry Laboratory I	1
MTH 161	Calculus I	4
ENG 105	English Composition I	3
Arts and Humanities Cognate		3
	<b>Credit Hours</b>	<b>14</b>
<b>Spring</b>		
CHM 112	Principles of Chemistry II	3
CHM 114	Chemistry Laboratory II	1
MTH 162	Calculus II	4
ENG 106	English Composition II	3
Arts and Humanities Cognate		3
	<b>Credit Hours</b>	<b>14</b>
<b>Year 2</b>		
<b>Fall</b>		
CHM 201	Organic Chemistry I (Lecture)	3
CHM 205	Organic Chemistry Laboratory I	1
PHY 201	University Physics I, Life Sciences	4
PHY 106	College Physics Laboratory I	1
Language 101 Course		3
Arts and Humanities Cognate		3
	<b>Credit Hours</b>	<b>15</b>
<b>Spring</b>		
CHM 202	Organic Chemistry II (Lecture)	3
CHM 206	Organic Chemistry Laboratory II	1
PHY 202	University Physics II, Life Sciences	4
PHY 108	College Physics Laboratory II	1
Language 211		3
People and Society Cognate		3
	<b>Credit Hours</b>	<b>15</b>
<b>Year 3</b>		
<b>Fall</b>		
CHM 214	Quantitative Analytical Chemistry	3
CHM 360	Physical Chemistry I (Lecture)	3
CHM 364	Physical Chemistry Laboratory I	1
Language 212		3
People and Society Cognate		3
Elective		3
	<b>Credit Hours</b>	<b>16</b>

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<b>Spring</b>		
CHM 316	Instrumental Analytical Course	3
CHM 320	Instrumental Methods in Chemistry	2
CHM 365	Physical Chemistry II (Lecture)	3
People and Society Cognate		3
Elective		3
Elective		3
	<b>Credit Hours</b>	<b>17</b>
<hr/>		
<b>Year 4</b>		
<b>Fall</b>		
BMB 401	Biochemistry for the Biomedical Sci.	3
Chemistry Elective		3
CHM 488	Undergraduate Research	3
Elective		3
Elective		3
	<b>Credit Hours</b>	<b>15</b>
<hr/>		
<b>Spring</b>		
CHM 441	Inorganic Chemistry (Lecture)	3
Chemistry Elective		3
CHM 488	Undergraduate Research	2
Elective		3
Elective		3
	<b>Credit Hours</b>	<b>14</b>
<b>Total B.S. in Chemistry Credit</b>		<b>120</b>
<hr/>		
<b>Year 5</b>		
<b>Summer - Session A</b>		
CHM 810	Masters Thesis	5
<b>Summer - Session B</b>		
CHM 810	Masters Thesis	4
	<b>Credit Hours</b>	<b>9</b>
<hr/>		
<b>Fall</b>		
CHM 6XX	Graduate Chemistry Course	3
CHM 810	Masters Thesis	6
CHM 780	Departmental Seminar	1
	<b>Credit Hours</b>	<b>10</b>
<hr/>		
<b>Spring</b>		
CHM 6XX	Graduate Chemistry Course	3
CHM 810	Masters Thesis	6
CHM 779	Chemistry Seminar	1
CHM 780	Departmental Seminar	1
	<b>Credit Hours</b>	<b>11</b>
<b>Total M.S. in Chemistry Credit</b>		<b>30</b>