

BOARD OF HIGHER EDUCATION
REQUEST FOR COMMITTEE AND BOARD ACTION

COMMITTEE: Academic Affairs

NO: AAC 15-05

COMMITTEE DATE: October 14, 2014

BOARD DATE: October 21, 2014

**APPLICATION OF UNIVERSITY OF MASSACHUSETTS DARTMOUTH TO AWARD
THE DOCTOR OF PHILOSOPHY DEGREE IN CHEMISTRY AND BIOCHEMISTRY**

MOVED: The Board of Higher Education hereby approves the application of **University of Massachusetts Dartmouth** to award the **Doctor of Philosophy in Chemistry and Biochemistry**.

Upon graduating the first class for these programs, the University shall submit to the Board a status report addressing its success in reaching program goals as stated in the application and in the areas of enrollment, curriculum, faculty resources, and program effectiveness.

Authority: Massachusetts General Laws Chapter 15A, Section 9(b)

Contact: Winifred M. Hagan, Ed.D., Director for Educator Policy

BOARD OF HIGHER EDUCATION

October 2014

University of Massachusetts Dartmouth Doctor of Philosophy in Chemistry and Biochemistry

INTENT AND MISSION

The mission of the University of Massachusetts Dartmouth (UMD) is to act as an intellectual catalyst for regional, national, and global economic and cultural development and to provide educational opportunities for the residents of Southeastern Massachusetts. UMD reports that a doctoral program in Chemistry and Biochemistry will help achieve these objectives. The purpose of the proposed Ph.D. program in Chemistry and Biochemistry (PhD/ChemBio) at the University of Massachusetts Dartmouth (UMD) is to prepare students for careers in industry, academia, and government. It is intended that graduates will seek industrial employment, postdoctoral research appointments, and employment in government agencies and nonprofit environmental organizations.

The proposed program has obtained all necessary governance approvals on campus and was approved by the University of Massachusetts, Board of Trustees on June 18, 2014. The required letter of intent was circulated on April 4, 2014. No comments were received.

NEED AND DEMAND

National and State Labor Market Outlook

The unemployment rate for Ph.D. chemists in the United States is below the unemployment rate for most other professions at approximately 1% compared to the overall rate of 7%. In 2012, the unemployment rate for PhD chemists was 3.6%^[1], while the unemployment rate in the general population was near 8% (for BS chemists, the unemployment rate in 2012 was 6.2%).

The total number of bachelor degrees in chemistry granted in the United States, as compiled by the American Society Committee on Professional Training^[2], was 14,577 in 2009, increasing from 10,945 in 2005. It is expected that the proposed program will meet the need of industrial demand for medicinal, analytic and environmental chemists. In addition, it is expected that the industrial demand in these fields will impact university faculty hiring. UMD expects graduates will also be in demand for academic positions.

Student Demand

During the period of 1999 through 2013 there were 334 applications for graduate study in the Department of Chemistry & Biochemistry, 180 of these applicants indicated that they would like

¹ Salaries 2012 - Analysis of the American Chemical Society's 2012 Comprehensive Salary and Employment Status Survey, American Chemical Society, <http://www.acs.org/content/dam/acsorg/careers/salaries/surveys/salaries-2012.pdf>.

² Annual Reports of Earned Bachelor's Degrees in Chemistry, American Society Committee on Professional Training, <http://www.acs.org/content/acs/en/about/governance/committees/training/reports/degreesreport.html>.

to pursue a Ph.D. degree at UMD. The proposed PhD/ChemBio program is planned in response to this demand. It is expected to target part-time students working full time in the field as well as domestic and international students.

OVERVIEW OF PROPOSED PROGRAM

Duplication

UMD currently participates in a joint Ph.D. in Chemistry program with the University of Massachusetts Lowell (UML) and the University of Massachusetts Amherst (UMA). Within the UMass system, a total of between 35 and 45 Ph.D.'s in chemistry were earned in the period 2006-2009. The proposed PhD/ChemBio program would be the only one of its kind offered in Southeastern Massachusetts. All private universities offering Ph.D. degree in Chemistry are located in greater Boston area. Harvard, the Massachusetts Institute of Technology, Boston University, Boston College, Tufts University, Brandeis University, Northeastern University, Clark University, and Worcester Polytechnic Institute also offer a Ph.D. in Chemistry. Harvard and MIT have large PhD programs. Harvard and MIT awarded between 30 and 40 Ph.D.'s annually in Chemistry in between 2006 and 2009. BU and BC both awarded, between 15-20 Ph.D.'s annually in the same three year period. Tufts, Northeastern and Brandeis awarded 4 to 12 Ph.D.'s annually between 2006-2007 and 2008-2009. Clark University and WPI awarded 2-5 Ph.D.'s annually between 2006-2007 and 2008-2009³. The UMD program is designed to be differentiated by a focus on biological, analytical, and environmental chemistry.

ACADEMIC AND RELATED MATTERS

Admission

To be eligible for admission to the proposed program candidates submit official Graduate Record Examination (GRE) scores. Advanced Chemistry GRE scores are recommended. Most of the candidates accepted to the program will have a combined verbal score and quantitative score above 1,100, though no formal cut-off is planned. International applicants whose native language is not English or who have not graduated from an institution where the medium of instruction is English must submit results from the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 81 (550) is required for admission and assistantship considerations. All eligible applicants will be required to have completed a minimum of one year of general chemistry, one year of organic chemistry, one year of physical chemistry and one semester of analytical chemistry. A minimum undergraduate grade point average (GPA) of 3.00 on a scale of 0 to 4.00 is required.

³ Chemistry and chemical engineering degrees awarded by schools offering ACS-approved program, American Society Committee on Professional Training, <http://www.acs.org/content/acs/en/about/governance/committees/training/reports/degreesreport.html>.

PROGRAM ENROLLMENT PROJECTION FOR YEARS 1-4

	# of Students Year 1	# of Students Year 2	# of Students Year 3	# of Students Year 4*
New Full Time	4	4	4	4
Continuing Full Time	-	3	6	9
New Part Time	2	2	2	2
Continuing Part Time	-	1	2	3
Totals	5	8	12	15

* Each part-time student is counted as 0.5 FTE. 50% attrition rate is assumed for part-time students.

Curriculum (Attachment A)

The proposed curriculum is designed to help students develop a high level of knowledge and expertise in a particular focus area of chemistry in addition to knowledge of the theoretical foundations and experimental fundamentals of chemistry and biochemistry. It is planned that the first four semesters of the program will be formal coursework, and beginning work on a research project. At the start of the first semester a set of placement examinations will be administered as a diagnostic for determining progress in background preparation. Informal coursework will be provided to strengthen student preparation as needed. Upon completion of 24 credits of formal courses and adequate performance on the placement examinations, a series of written cumulative qualifying examinations, and an oral examination on an original research proposal, students will advance to doctoral candidacy. The remainder of the program will be devoted to doctoral dissertation research under the supervision of a faculty research advisor, culminating in an oral presentation and defense of the completed dissertation before a faculty dissertation committee. Throughout the program, doctoral students will be required to attend graduate and departmental seminars and to present seminars in the graduate seminar series.

The proposed curriculum does not require Internships or Field Studies.

RESOURCES AND BUDGET

Fiscal (Attachment B)

Currently UMD enrolls 12 students in the joint Ph.D. program with UML. Seven students are expected to graduate by September 2015, and three are expected to graduate by September 2017. The revenues from these students will be treated as UMD program revenue. Based on the existing joint Ph.D. program, and the proposed PhD/ChemBio program, UMD anticipates four full-time and two part-time students will be admitted into the proposed program every year.

UMD expects to serve local and out-of-state students in the program as it is planned that the program will be widely marketed. It is expected that by year 5 there will be 15-20 students enrolled. Revenues planned for the proposed program include students' tuition and fees, and research grants and contracts. The year-1 newly generated revenue from new students (projected four full-time students and two part-time students) is expected to be \$48,392, and increase to \$233,318 by year-5. This projection also reflects a 3% increase in tuition and fees each year, which represents an estimate that is reported to be based on UMD historical trends. It is anticipated that increases in specific departments and programs are evaluated and appropriately resourced during the annual budget process.

Faculty and Administration (Attachment C)

The PhD in Chemistry curriculum is designed so as to build upon the existing M.S. program. The doctoral part of the program is expected to function mainly as a research training program. There will be no need to offer more courses than already needed for the M.S. program. The small number of additional lecture courses that will be taken by Ph.D. students will also serve the M.S. program. It is expected that the proposed program will be implemented by the existing faculty, most of whom have active research programs in the one of the focus areas. It is planned that as the program develops, retiring faculty will be replaced by new research-active faculty.

Facilities, Library and Information Technologies

UMD's Department of Chemistry and Biochemistry is equipped with modern equipment necessary for supporting the proposed PhD program. These include the currently N.S.F.-funded 400MHz NMR facility (Bruker) and bench-top EPR (Bruker), Laser Confocal Microscope (Zeiss LSM 710), LS-MS, GC-MS, FT-IR, HPLC, plate readers, UV-vis and fluorescent spectrometers, molecular modeling, cell culture facilities, etc. The newly established Center for Scientific Computing & Visualization Research at UMD provides the department computational tools for biological modeling and other environmental modeling. UMD faculty members also participate in the Massachusetts Green High Performance Computing Center, a data center dedicated to research computing. The facilities, equipment, and library resources needed for the proposed Ph.D. program match the existing joint programs in Chemistry. The UMD library has been recently renovated with significant improvements. In addition to the traditional book and journal collections, new electronic subscriptions including SCI finder, Web of Knowledge data bases and the American Chemical Society journals are available on line in the library. Interlibrary loan service is also available at the UMD library. It is expected that new library resources, such as bibliographic search tools and journal subscriptions will be requested to enhance faculty and graduate student research in the focus areas of the proposed Ph.D. program.

Affiliations and Partnerships

The Department of Chemistry and Biochemistry has a history of research collaboration with industry, federal labs, non-profit organizations, and other universities, and has established partnerships with those entities that will enhance graduate program and support our graduate research. Partnerships include federal laboratories such as the US Army Natick Soldier Research, Development & Engineering Center (NSRDEC), the US Army Medical Research Institute of Infectious Diseases (USAMRIID), the US Army Medical Research Institute of Chemical Defense (USAMRICD) and the US Food and Drug Administration (FDA). Industry

collaborators include Microbiotix, Inc., Worcester, Bruker Biospin, Inc., Billerica, Anterios, Inc., Woburn, Ocean Spray Cranberries, Inc., Lakeville-Middleboro, and CreaGen Bioscience, Inc., Woburn. Non profit partnerships have included The Cranberry Institute, Cape Cod Cranberry Growers Association, and the Cranberry Marketing Committee. UMD graduate program collaborators with higher education include the University of Massachusetts Lowell, the University of Massachusetts Amherst, the University of Massachusetts Medical School, the UMass Cranberry Station, Worcester Polytechnic Institute, the University of Prince Edward Island and Tel Aviv University.

Researchers from UMD collaborative partnerships have served as co-advisors or thesis and dissertation committee members for our graduate students. The interdisciplinary nature of UMD programs provide actively engaged collaborations within UMD, including the departments of Bioengineering, Medical Laboratory Science, Biology, Electrical and Computer Engineering, and Mechanic Engineering. Faculty members from those departments have also served as committee members or co-advisors for our graduate students. In the proposed standalone PhD program, we will continue to include researchers from our research partners as our graduate students' committee members or co-advisors as appropriate, and with the approval of our graduate committee.

PROGRAM EFFECTIVENESS

Goal	Measurable Objective	Strategy for Achievement	Timetable
Enrollment	15-20 students	Increase external grant funding, recruit more research active faculty, & increase TA positions; intense marketing strategy through web design, ACS graduate directory, mailings to colleges, and emphasizing our unique focused areas.	5 years
Graduation	Approximately 4 students/year	Provide resources to current research active faculty, and recruit more research active faculty to replace retiring faculty.	5 years
Program Quality	Graduate Placement: 100% placement upon graduation, more than half as permanent position (rather than postdoc); Peer-reviewed Publications: average 2-4 publications/student	Elaborate our focused areas, which are well suited for the market need; strategic recruitment of new faculty	5 years

EXTERNAL REVIEW AND INSTITUTIONAL RESPONSE

Dr. Michael J. Clarke, Professor Emeritus of Chemistry at Boston College and Dr. Mark M. Turnbull, Professor of Chemistry at Clark University conducted an external review of the proposed Ph.D. in Chemistry and Biochemistry program, including a site visit to UMD on March 6, 2014. The Committee met with graduate students, department faculty, deans and provosts and noted the advocacy and enthusiasm for the proposed program throughout the campus community.

The review team suggested that the size of the department should preclude UMD from accepting its own undergraduates directly into the proposed program, and for the same reason the reviewers suggested one member of each dissertation committee come from outside of the department. It was recommended that an additional three tenure lines be added to the department, in addition to the current full-time lecturers, and that a space audit be done immediately. The review team suggested that in addition to the department AQAD assessment, an annual outcomes assessment should be provided by exit interviews with all students who exit the program, including those not obtaining a degree, and graduate surveys of Ph.D. students at 5-year intervals.

UMD concurred with the recommendations concerning undergraduates and outside dissertation committee members due to the size of the department. Undergraduates will be encouraged to look at other institutions, though qualified students who apply and want to attend UMD will not be turned away. UMD plans to implement the outside dissertation committee policy. Concerning the three additional tenure track lines UMD agreed and plans to follow this course of action. As well, plans for a space audit are currently underway. UMD concurred with the recommendation regarding outcomes assessment and plans to conduct annual exit interviews with all students and a survey of program alumni every five years.

Staff thoroughly reviewed all documentation submitted by the **University of Massachusetts Dartmouth** and external reviewers. Staff recommendation is for approval of the proposed **Doctor of Philosophy in Chemistry and Biochemistry**.

ATTACHMENT A: CURRICULUM

Graduate Program Curriculum Outline

Major (Core) Courses (Total # of core courses required = 5)		
<i>Course Number</i>	<i>Course Title</i>	<i>Credit Hours</i>
CHM 599	Proseminar on Ethics	1
CHM 699	Chemical Literature and Writing	2
Three courses chosen from following five courses* in consultation with division coordinator		
CHM 510	Advanced Organic Chemistry	3
CHM 512	Biochemistry II	3
CHM 520	Advanced Inorganic Chemistry	3
CHM 542	Quantum Chemistry	3
CHM 552	Instrumental Methods of Analysis	4
	SubTotal # of Core Credits Required * Some equivalent courses may be used for substitutions	12
Seminar and Doctoral Dissertation core		
CHM 650	Graduate Seminar (4 credits, with one credit each semester)	4
CHM 700	Doctoral Dissertation Research	27
	Subtotal # of additional core credits required	31
Elective Course Choices (Total # of courses required = 4) (list of choices is below)		
CHM 510	Advanced Organic Chemistry	3
CHM 512	Biochemistry II	3
CHM 514	Biochemistry Laboratory	3
CHM 520	Advanced Inorganic Chemistry	3
CHM 521	Organic Mechanisms	3
CHM 522	Computer and Mathematical Methods in Physical Science	3
CHM 523	Chemistry of the Mind	3
CHM 526	Polymer Synthesis and Characterization	3
CHM 527	Electronic Structure of Atoms and Molecules	3
CHM 528	Drug Design and Modeling	3
CHM 529	Physical Biochemistry	3
CHM 531	Chemical Kinetics	3
CHM 542	Quantum Chemistry	3

CHM 544	Applied Spectroscopy	3
CHM 550	Special Topics in Chemistry	3
CHM 552	Instrumental Methods of Analysis	4
CHM 553	Nuclear and Radiochemistry	3
CHM 555	Methods of Chemical Separation	3
CHM 562	Natural Products	3
CHM 570	Food Chemistry	3
CHM 589	Forensic Chemistry	3
CHM 595	Graduate Independent Study	3
CHM 596	Graduate Directed Study	3
	Subtotal # Elective Credits Required	12

Curriculum Summary	
Total number of courses required for the degree	11
Total credit hours required for degree	55 (27 Credits of doctoral dissertation research, 24 credits of formal courses, 4 credits of Graduate Seminar (four semesters, with 1 credit each semester). For students with an earned master's degree in chemistry or biochemistry, a minimum of 8 credits from formal courses will be required)
<p>Prerequisite, Concentration or Other Requirements: All students entering the Ph.D. program will be required to pass placement examinations in four out of the following five subfields as the prerequisite: physical chemistry, organic chemistry, inorganic chemistry, analytical chemistry, and biochemistry. The purpose will be to identify any deficiencies in undergraduate training. Students who perform inadequately on one or more of these examinations will be required to meet with the Graduate Programs Director and develop a plan for remediation of the deficiencies, through independent study, auditing of undergraduate course lectures, or formal enrollment in undergraduate courses, and then take the next series of placement examinations in the subjects in question.</p>	

ATTACHMENT B: BUDGET

Revenue

UMass New Program Approval Budget

Campus: Dartmouth

Program: PhD in Chemistry and Biochemistry

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REVENUE ESTIMATES										
	Year 1		Year 2		Year 3		Year 4		Year 5	
<i>Full-Time Tuition Rate: In-State</i>	1553		1599.59		1647.58		1697.01		1747.92	
<i>Full-Time Tuition Rate: Out-State</i>	6074		6256.22		6443.91		6637.22		6836.34	
<i>Mandatory Fees per Student (In-state)</i>	8665		8924.95		9192.70		9468.48		9752.53	
<i>Mandatory Fees per Student (out-state)</i>	10354		10664.62		10984.56		11314.10		11653.52	
<i>FTE # of New Students: In-State</i>	2		2		2		2		2	
<i>FTE # of New Students: Out-State</i>	3		3		3		3		3	
<i># of In-State FTE Students transferring in from the institution's existing programs</i>										
<i># of Out-State FTE Students transferring in from the institution's existing programs</i>										

	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs
Tuition and Fees										
<u>First Year Students</u>										
Tuition										
In-State	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Out-of-State	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mandatory Fees	\$48,392	\$0	\$49,844	\$0	\$51,339	\$0	\$52,879	\$0	\$54,466	\$0
<u>Second Year Students</u>										
Tuition										
In-State			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Out-of-State			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mandatory Fees			\$40,919	\$0	\$42,146	\$0	\$43,411	\$0	\$44,713	\$0
<u>Third Year Students</u>										
Tuition										
In-State					\$0	\$0	\$0	\$0	\$0	\$0
Out-of-State					\$0	\$0	\$0	\$0	\$0	\$0
Mandatory Fees					\$42,146	\$0	\$43,411	\$0	\$44,713	\$0
<u>Fourth Year Students</u>										
Tuition										
In-State							\$0	\$0	\$0	\$0
Out-of-State							\$0	\$0	\$0	\$0
Mandatory Fees							\$43,411	\$0	\$44,713	\$0
<u>Fifth Year Students</u>										
Tuition										
In-State										\$0
Out-of-State										\$0
Mandatory Fees									\$44,713	\$0

Gross Tuition and Fees	\$48,392	\$0	\$90,763	\$0	\$135,632	\$0	\$183,112	\$0	\$233,318	\$0
Grants (20% of Indirect)	\$24,640	\$0	\$31,360	\$0	\$50,400	\$0	\$62,720	\$0	\$72,800	\$0
Contracts	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Campus budget allocation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Revenues (specify in cell 54)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$73,032	\$0	\$122,123	\$0	\$186,032	\$0	\$245,832	\$0	\$306,118	\$0

Expenditures

UMass New Program Approval
Budget

Campus: Dartmouth
Program: PhD in Chemistry and
Biochemistry

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EXPENDITURE ESTIMATES										
	Year 1		Year 2		Year 3		Year 4		Year 5	
	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources
Personnel Services										
Faculty	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Administrators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Support Staff	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Others	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fringe Benefits ____%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Personnel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Operating Expenses										
Supplies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Library Resources	\$25,000	\$0	\$25,000	\$0	\$25,000	\$0	\$25,000	\$0	\$25,000	\$0

Marketing/Promotional Expenses	\$10,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0
Laboratory Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
General Administrative Overhead	\$0	\$0	\$25,000	\$0	\$30,000	\$0	\$35,000	\$0	\$40,000	\$0
Other (specify)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Operating Expenses	\$35,000	\$0	\$55,000	\$0	\$60,000	\$0	\$65,000	\$0	\$70,000	\$0
Net Student Assistance										
Assistantships - 3 TAs	\$45,000	\$0	\$46,350	\$0	\$47,741	\$0	\$49,173	\$0	\$50,648	\$0
Fellowships (TA Fee waivers)	\$31,062	\$0	\$31,992	\$0	\$32,952	\$0	\$33,942	\$0	\$34,959	\$0
Stipends/Scholarships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Student Assistance	\$76,062	\$0	\$78,342	\$0	\$80,693	\$0	\$83,115	\$0	\$85,607	\$0
Capital										
Facilities / Campus recharges	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Capital	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Expenditures	\$111,062	\$0	\$133,342	\$0	\$140,693	\$0	\$148,115	\$0	\$155,607	\$0

BUDGET SUMMARY OF NEW PROGRAM ONLY

	Year 1	Year 2	Year 3	Year 4	Year 5
Total of newly generated revenue	\$73,032	\$122,123	\$186,032	\$245,832	\$306,118
Total of additional resources required for program	\$111,062	\$133,342	\$140,693	\$148,115	\$155,607
Excess/ (Deficiency)	<u>(\$38,030)</u>	<u>(\$11,219)</u>	<u>\$45,339</u>	<u>\$97,717</u>	<u>\$150,511</u>

ATTACHMENT C: FACULTY

Name of faculty member (Name, Degree and Field, Title)	Tenured Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sections	Division or College of Employment	Full- or Part- time in Program	Full- or part-time in other department or program (Please specify)	Sites where individual will teach program courses
Boerth, Donald Ph.D., Chemistry Chancellor Professor	Y	<ul style="list-style-type: none"> • Advanced Organic Chemistry (C) • Organic Mechanisms • Drug Design, Modeling, and Action • Applied Spectroscopy • Electronic Structure of Atoms and Molecules 	(1) (1) (1) (1) (1)	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Cai, Shuowei Ph.D., Chemistry Associate Professor	Y	<ul style="list-style-type: none"> • Proseminar on Ethics (C) • Chemical Literature and Writing (C) • Biological Spectroscopy • Chemical Biology & Technology • Biophysical Techniques • Pharmaceutical Biotechnology -- Protein Formulation and Delivery 	(1) (1) (1) (1) (1) (1)	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Guo, Maolin Ph.D., Chemistry Associate Professor	Y	<ul style="list-style-type: none"> • Biochemistry II (C) • Modern Bioanalytical Techniques 	(1) (1)	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
David Manke Ph.D., Chemistry Assistant Professor	N	<ul style="list-style-type: none"> • Advanced Inorganic Chemistry (C) 	(1)	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Mayes, Maricris Ph.D., Chemistry Assistant Professor	N	<ul style="list-style-type: none"> • Computer and Mathematical Methods in Physical Science 	(1)	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Neto, Catherine Ph.D., Chemistry Professor	Y	<ul style="list-style-type: none"> • Natural Products • Food Chemistry 	(1) (1)	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus

Ojadi, Emmanuel Ph.D., Chemistry Associate Professor	Y	<ul style="list-style-type: none"> • Quantum Chemistry (C) (1) • Polymer Synthesis and Characterization (1) • Nuclear and Radiation Chemistry (1) • Chemistry and Materials (1) • Photochemistry and Laser Spectroscopy (1) 	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Rasapalli, Sivappa Ph.D., Chemistry Assistant Professor	N	<ul style="list-style-type: none"> • Advanced Stereoselective Organic Synthesis (1) • Chemical Biology (1) 	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Singh, Bal Ram Ph.D., Chemistry Professor	Y	<ul style="list-style-type: none"> • Biochemistry Laboratory (1) • Physical Biochemistry (1) • Biochemical Fluorescence Spectroscopy (1) • Chemistry of Mind (1) • Biological Spectroscopy (1) • Chemical Biology & Technology (1) 	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Su, Timothy Ph.D., Chemistry Chancellor Professor	Y	<ul style="list-style-type: none"> • Chemical Kinetics (1) 	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus
Zuo, Yuegang Ph.D., Chemistry Professor	Y	<ul style="list-style-type: none"> • Instrumental Methods of Analysis (C) (1) • Chemical Separation (1) • Forensic Chemistry (1) 	Day College of Arts & Sciences	Full-time	No	• Dartmouth, Main Campus